



Excellence Award



3M

February 19, 2016





COMPANY OVERVIEW

- More than 35 Divisions, organized into 5 businesses:
 - Consumer and Office
 - Industrial
 - Health Care
 - Electronics and Energy
 - Safety and Graphics
- Operations in more than 70 countries
- 180 plant locations worldwide (50 US) which produce over 50,000 products
- Over 89,000 employees worldwide.
 - 340 employees at the 3M Alexandria facility.
- Global sales of \$31.8 billion with products sold in nearly 200 countries.



3M ALEXANDRIA

Some of the products we manufacture include:

Abrasive Belts



Abrasive Discs



Trizact™



HCA ELIMINATION PROJECT TEAM



Front: Rick Swenson – Tech, Kevin Helm – Tech, Kim Peterson – Mgr, Matt VanWatermulen - Mgr

Back: Gordon Weiers - Engr, Eric Dummer - Tech, Mike Lenarz - Tech, Jason Moen – Tech, Steve Block - Supv, Randy Dertinger – Boiler, Lance Schoeberl - Supv, Kevin DeGier - Tech



Carl Johnson, CIH, CSP
Industrial Hygienist



Hendra Harapan, CIH
Industrial Hygienist

OUR INITIATIVE

- Reduce hearing loss risk through elimination of hearing conservation areas.
 - In 2011, 199 employees in hearing conservation program
 - 27 plant areas or departments designated hearing conservation areas.
 - Recorded multiple noise-induced hearing loss cases between 2004 and 2011.
 - **Up front, management commitment at corporate and plant levels.**

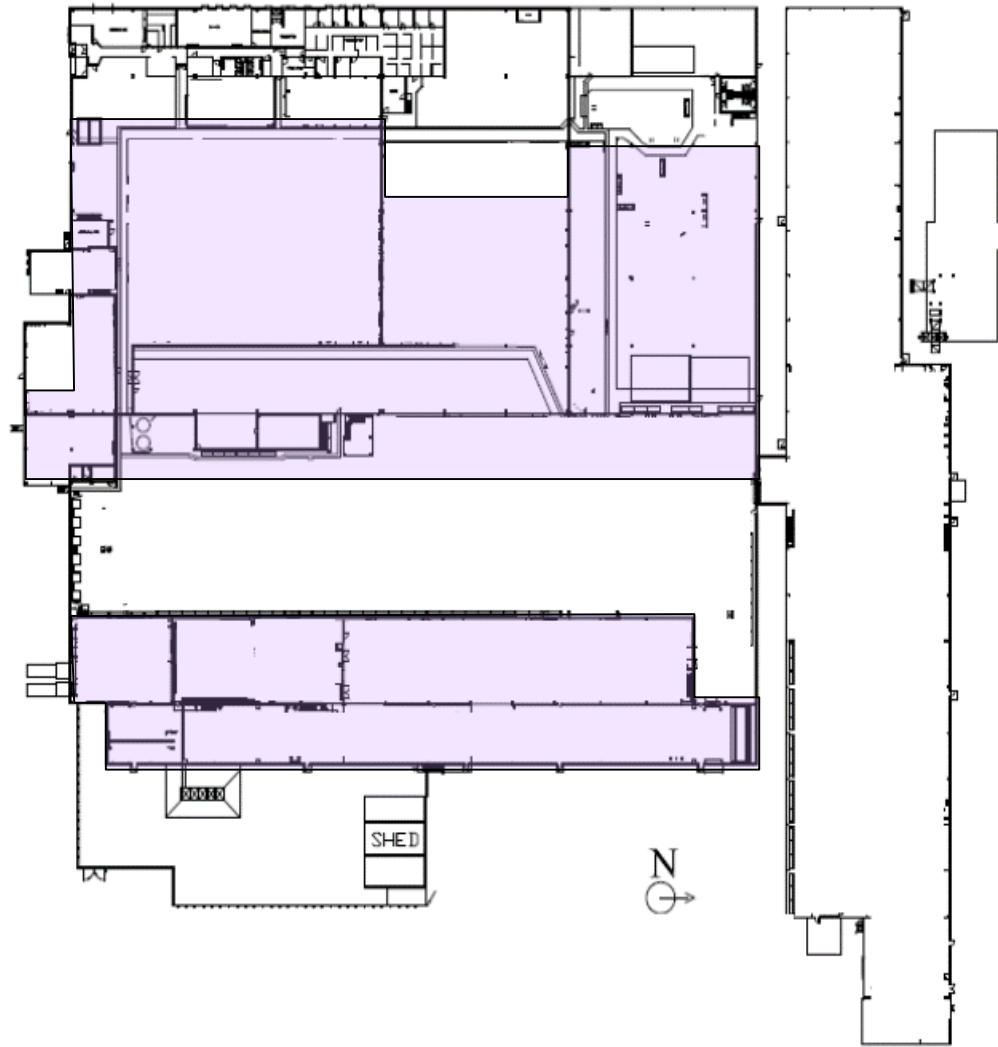


PROJECT OVERVIEW



= Hearing Conservation
Areas Pre-2011

199 employees in HCP



Noise Control Project Rationale

- Many existing **hearing conservations areas (HCAs)** were established using a conservative “blanket” policy with some areas justified by Sound Level Meter (SLM) area measurements to keep the safety of employees at top priority.
- The actual **need** for implementing hearing conservation was overlooked in some areas by using this approach because it did not assess actual personal exposures.
- Many employees crossover between departments, making it difficult to remove by job title.
- HCA's in the plant require employees have annual audiograms to evaluate any potential threshold shift in hearing. By eliminating HCA's in the plant, the need for audiometric testing and recordkeeping are eliminated.
- **MOST IMPORTANTLY** - It also allows for a safer working environment for 3M Alexandria employees

PROJECT STRUCTURE & PHILOSOPHY

SOLUTION

Systematically evaluate and remove (or control & remove) areas by department

- Determine priority of evaluation
- Establish standardized method (“ground-rules”) for evaluating each hearing conservation area.
- Develop overall A3 for managing project
- Assemble project team for each area, and developed project task sub-A3.
- Use personal dosimetry to validate each area according to 3M requirements and IH validation criterion.
- Implement controls, if needed, and remove from hearing conservation, if justified.
- Maintain area removal through employee education and preventive maintenance.

DETERMINE EVALUATION PRIORITIES



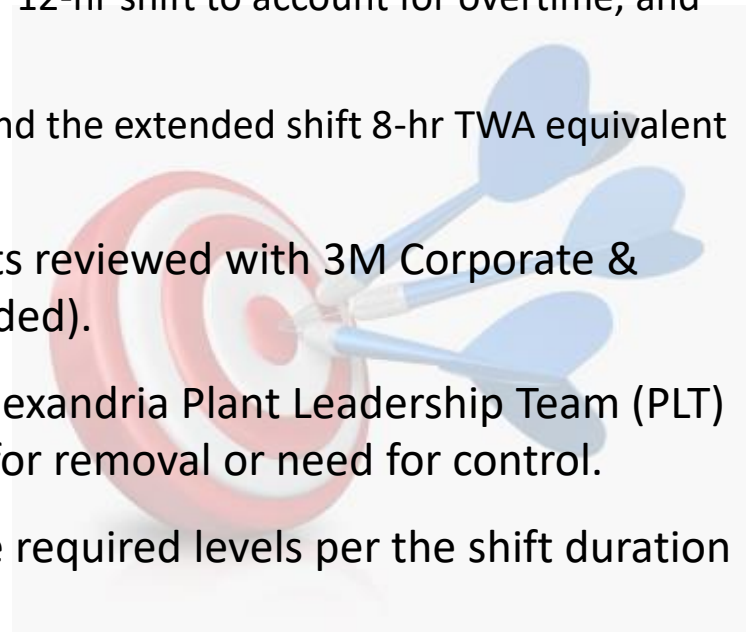
- Risk rank each HCA using a Cause & Effect Matrix
 - C&E developed to rank each area in terms of “noise risk”
 - Used Corporate C&E as a template for design.
- Areas included in HCA with no past dosimetry (SLM justification) receive first priority for dosimetry validation.
 - *Potential “Low-Hanging Fruit”.*
- Areas with higher risk receive next highest priority for evaluation and control implementation.

*Priority for Evaluation = Extent of Overexposure x Population Factor x
Hearing Conservation Area Status x Potential for Success*

THE GROUND RULES

Standardize the method for evaluation

- ✓ Results must be analyzed for 8, 10, & 12 hr shift exposure durations regardless of normal shift length.
 - Some areas need to validate out of HCA for 12-hr shift to account for overtime, and job transfer between departments.
 - Dosimeters run for normal shift duration and the extended shift 8-hr TWA equivalent is calculated.
- ✓ Once analysis & validation complete, results reviewed with 3M Corporate & Division IH contacts, and Occ. Med (as needed).
- ✓ Results reviewed a second time with 3M Alexandria Plant Leadership Team (PLT) and area supervisor to determine options for removal or need for control.
- ✓ If controls needed, area must be below the required levels per the shift duration agreement with PLT and area leadership.



VALIDATING NOISE ASSESSMENTS

What is a Validation?

Exposure Category	Qualitative Description	Statistical Interpretation*
0	Exposures frequently exceed 1% of the OEL, and rarely exceed 10% of OEL	$0.01 * OEL < X_{0.95} \leq 0.1 * OEL$
1	Exposures frequently exceed 10% of the OEL, and rarely exceed 25% of the OEL	$0.1 * OEL < X_{0.95} \leq 0.25 * OEL$
2	Exposures infrequently exceed 50% of the OEL, and rarely exceed the OEL.	$0.25 * OEL < X_{0.95} \leq 0.5 * OEL$
3	Exposures frequently exceed 50% of the OEL and infrequently exceed the OEL.	$0.5 * OEL < X_{0.95} \leq OEL$
4	More than 5% of daily exposures likely exceed the OEL.	$X_{0.95} > OEL$

The Likelihood chart must show the following for the assessment to be validated.

- The exposure rating with the highest decision probability must be more than 0.10 larger than the next highest.
- The exposure rating 4 must be less than 0.10, unless you are validating a category 4 initial rating.

PROCESS FOR AREA REMOVAL

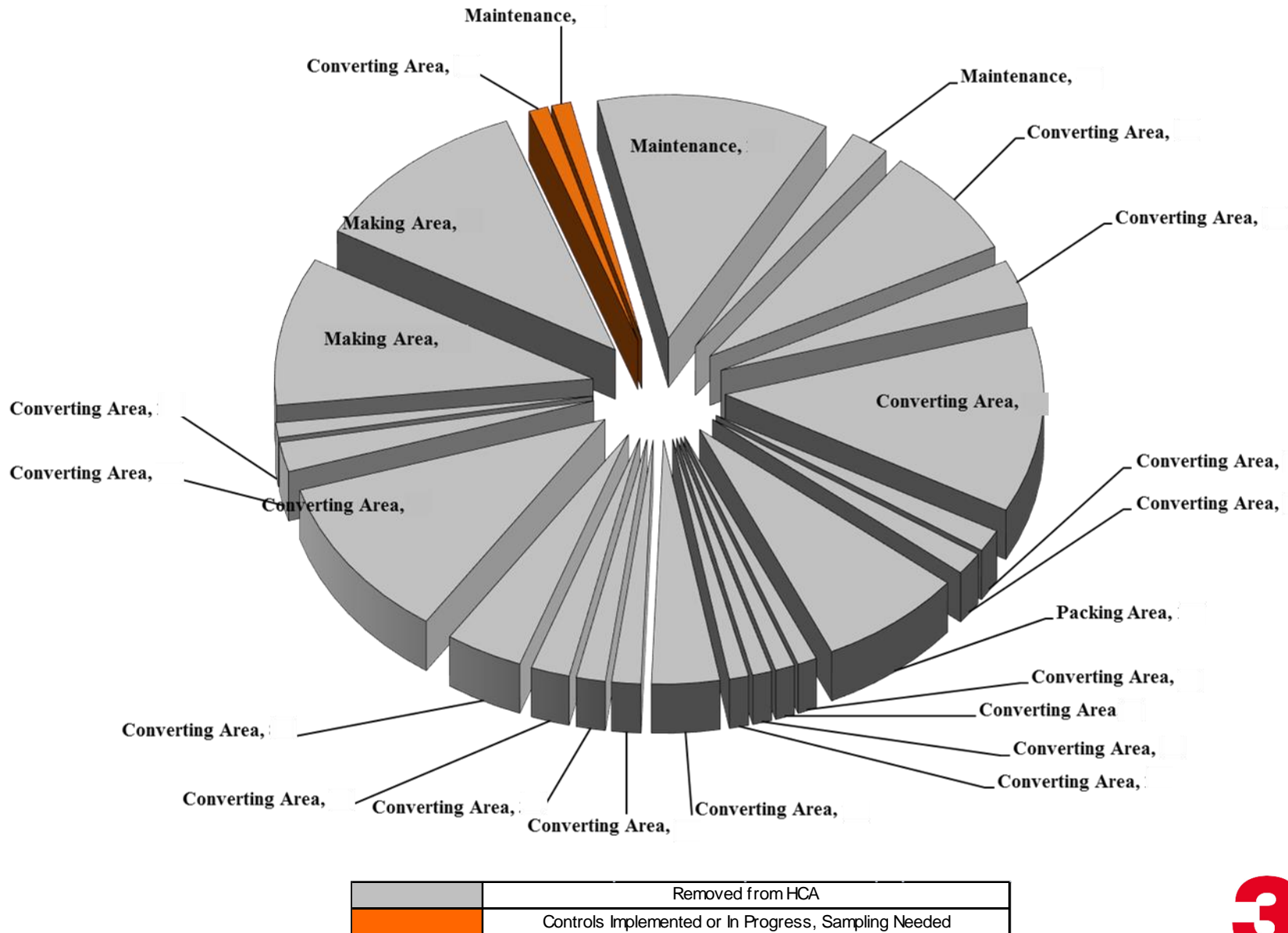


Used A3 methodology to provide a structured project management plant for solving a problem

- Overall project A3 developed identifying each area needing removal, actions needed before advancement, and timeline for completion.
 - Creates accountability for each area
 - Bimonthly review with Plant Manager, Plant Engineering/EHS Manager, and EHS Supv.
- Sub-A3's developed for each department
 - Assigns responsibility for actions needed and sets timeline for completion.
 - Monthly review with Product Manager, EHS Engineer, Supervisor, Process Engineer, Maintenance, and Plant Engineering Supervisor.

Project X's	Activities/Milestones	Primary Owner	Secondary Owner	Target Completion Date	Status	2011	2012	2013	2014	2015	2016	2017	2018
X1	Perform noise mapping in areas targeted for removal in 2012	M. VanWate emulen	Confidential	1-Apr-12	Complete	■	■	■	■	■	■	■	■
X2		M. VanWate emulen	Confidential	1-Sep-12	Complete	■	■	■	■	■	■	■	■
X3		M. VanWate emulen	Confidential	1-Aug-12	Complete	■	■	■	■	■	■	■	■
X4		M. VanWate emulen	Confidential	1-Oct-12	Complete	■	■	■	■	■	■	■	■
X5		M. VanWate emulen	Confidential	1-Oct-12	Complete	■	■	■	■	■	■	■	■
X6		M. VanWate emulen	Confidential	1-Oct-12	Complete	■	■	■	■	■	■	■	■
X7		M. VanWate emulen	Confidential	1-Apr-13	Complete	■	■	■	■	■	■	■	■
X8		M. VanWate emulen	Confidential	30-Nov-12	Complete	■	■	■	■	■	■	■	■
X9		M. VanWate emulen	Confidential	30-Nov-12	Complete	■	■	■	■	■	■	■	■
X10		M. VanWate emulen	Confidential	1-Dec-12	Complete	■	■	■	■	■	■	■	■
X11		M. VanWate emulen	Confidential	31-Dec-16	In Process	■	■	■	■	■	■	■	■
X12		M. VanWate emulen	Confidential	1-Aug-13	Complete	■	■	■	■	■	■	■	■
X13		M. VanWate emulen	Confidential	1-Aug-13	Complete	■	■	■	■	■	■	■	■
X14		M. VanWate emulen	Confidential	1-Jan-13	Complete	■	■	■	■	■	■	■	■
X15		M. VanWate emulen	Confidential	31-Dec-14	Complete	■	■	■	■	■	■	■	■
X16		M. VanWate emulen	Confidential	31-Dec-14	Complete	■	■	■	■	■	■	■	■

HCA REMOVAL PROGRESS



AREA SPECIFIC EXAMPLES



Converting Equipment

- **Area Description:** Pressing
- **Reason for inclusion into HCP:** Area contained other process equipment above 85 dBA. No dosimetry performed, area under “blanket” HCA policy.
- **Controls Implemented:** Process equipment relocated, 3-high racking installed, press motors enclosed.
- **Direct Cost:** \$0

Before Controls	After Controls
~ 85 dBA	64 – 68 dBA



AREA SPECIFIC EXAMPLES



Converting Equipment

- **Area Description:** Drum slitting and disc converting
- **Reason for inclusion into HCP:** Employee exposures could not be validated for a 12 hr shift duration.
- **Controls Implemented:** Acoustical enclosures installed around blower motors
- **Direct Costs:** \$600

Before Controls	After Controls
82 - 85 dBA	72 – 76 dBA



AREA SPECIFIC EXAMPLES

Converting Equipment

- **Area Description:** Slitting
- **Reason for inclusion into HCP:** Areas covered under blanket policy based on SLM measurement
- **Controls Implemented:** Racking installed, “noisy” equipment relocated.
- **Direct Costs:** \$0

Before Controls	After Controls
85 dBA	68 – 75 dBA



AREA SPECIFIC EXAMPLES



Converting Equipment

- **Area Description:** Packaging of converted discs.
- **Reason for inclusion into HCP:** Employee exposures above 85 dBA.
- **Controls Implemented:** Relocated/isolated packaging equipment.
- **Direct Costs:** \$0

Before Controls	After Controls
<85 dBA	75 – 81 dBA



AREA SPECIFIC EXAMPLES

Making Equipment



- **Area Description:** Making
- **Reason for inclusion into HCP:** Employee exposures above 85 dBA.
- **Controls Implemented:** Acoustical enclosures, and brake modifications
- **Direct Costs:** \$14,000

Before Controls

87.9 dBA

After Controls

72 - 79 dBA



AREA SPECIFIC EXAMPLES

Converting Equipment

- **Area Description:** Converting of finished material into belts.
- **Reason for inclusion into HCP:** Employee exposures above 85 dBA.
- **Controls Implemented:** Air leak repairs, muffler replacements, new blower fans, design of “silencer” for blasters, MAC valves, acoustical enclosures around steering units.
- **Direct Costs:** Approximately \$65,000

Before Controls	After Controls
85.9 – 91.4 dBA	79 dBA

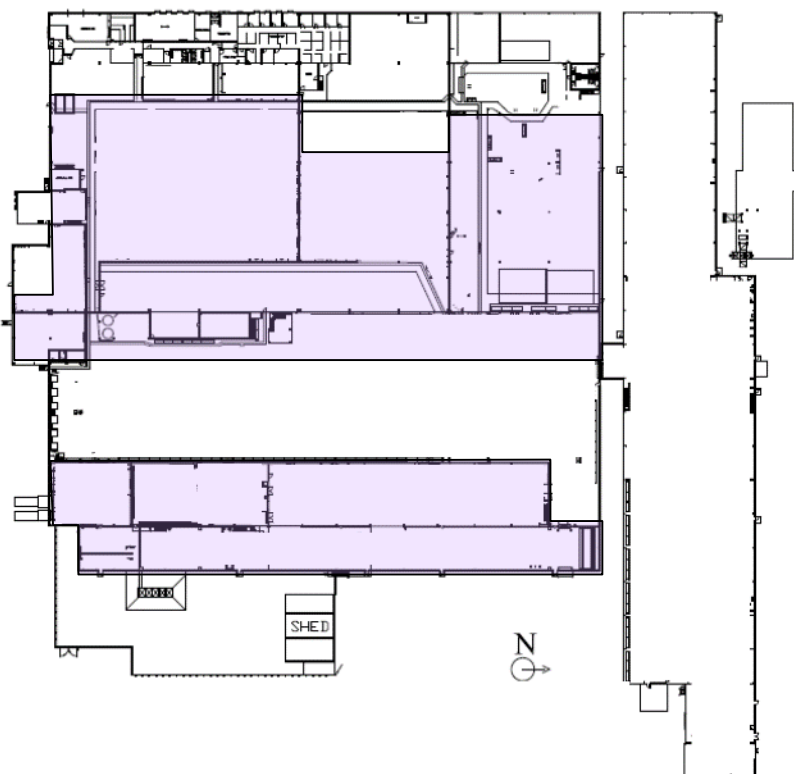


Before and After Noise Control

 = Hearing Conservation Areas

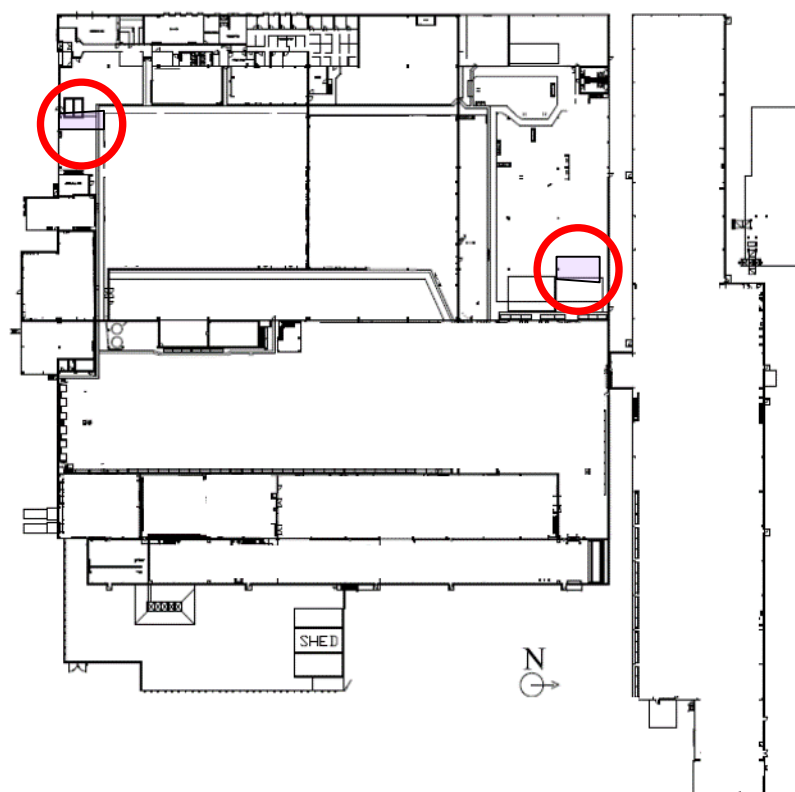
Pre-2011

199 Employees in HCP



2015

4 Employees Remain in HCP



PROJECT RESULTS & BENEFITS

- Reduced noise in **100%** of areas previously in hearing conservation.
- Eliminated **92%** of areas previously in hearing conservation.
- Taken ~950 samples (8-hrs) on 61 different job tasks.
- Removed, or in process of removing 195 of 199 employees from the hearing conservation program. Four (4) employees are currently still in the HCP.
- Employees feel better when they are working.





PROJECT RESULTS & BENEFITS

- Removed 11 hearing conservation areas at zero cost.
- Targeting to remove entire plant from hearing conservation by end of 2016
 - All remaining areas have or are in progress of implementing controls.
- Sharing practices and methodology with other 3M facilities.
 - IBG Webinars, 3M TV, Site Visits, 1-on-1 Consultations.

ZERO Standard Threshold Shifts in 2013.
One (1) Standard Threshold Shifts in 2014 (Exit).
Zero Standard Threshold Shifts in 2015
186 Audiograms (Hearing Tests) Performed

LOOKING TO THE FUTURE

Program Sustainability

- Annual prioritization of assessments for areas to ensure noise levels are sustained.
- Robust preventative maintenance program to ensure lasting controls.
- New equipment introductions – must be engineered “noise free” before allowed into the facility.



LOOKING TO THE FUTURE

Next Steps



- Eliminate last two (2) area remaining in hearing conservation program.
- Continuing the project to engineer a further reduction in noise for areas that resulted in higher validations.



LOOKING TO THE FUTURE



Future Initiatives

- Communicate and teach methodology to other 3M facilities
 - Many already using with an expectation of reduction.
- Elimination of other “At-Risk” work activities
 - Respirator usage
 - Ergonomic risk factors



LESSONS LEARNED

- **Noise Control is the Way to Go!**
- **Top Management Commitment & Engagement is an absolute must!**
- Development of a structured plan with “set-in-stone” timeline is needed.
- Be critical in the process for removal. Involve other resources; Audiologists, Occ. Physicians, Industrial Hygienists, etc.
- Removal from Hearing Conservation is not the end point, continuous improvement will be necessary throughout the life of a process.
- Focus on hearing conservation areas, but consider non-hearing conservation areas (the annoying sounds).
- Employee's are a critical part of determining both reduction needs and noise controlled.
- Some areas can be reduced at zero cost, but is not feasible for all areas.





SIGNIFICANCE OF THE AWARD

- Validates and recognizes that our efforts can expand beyond 3M Company.
- Shows that 3M is a leader in EHS innovation and initiatives



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