

**ExxonMobil**

Taking on the world's toughest energy challenges.™

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# Hearing protection offered by HPD's in the “real world”



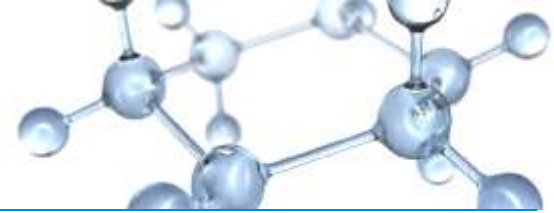
June 18, 2010

Dave Marsh

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This presentation includes forward-looking statements. Actual future conditions (including economic conditions, energy demand, and energy supply) could differ materially due to changes in technology, the development of new supply sources, political events, demographic changes, and other factors discussed herein (and in Item 1 of ExxonMobil's latest report on Form 10-K). This material is not to be reproduced without the permission of Exxon Mobil Corporation.

# Global Hearing conservation programme – ExxonMobil



- Objective to:
  - Enhance Engineering Controls
  - Progress work activities to drive down exposure to noise
- And comply with regional regulations
  - Control Of Noise At Work Regulations in UK
- Reduce noise at source to lowest levels reasonably practicable
- Further reduce worker exposure to noise
- Build quieter facilities

# Worker exposure to noise

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- With the controls in place, including use of HPD's
- NIHL is still possible
- To what level do HPD's provide adequate control ?
- The remainder of the presentation will focus on performance of HPD's

# Performance of HPD's

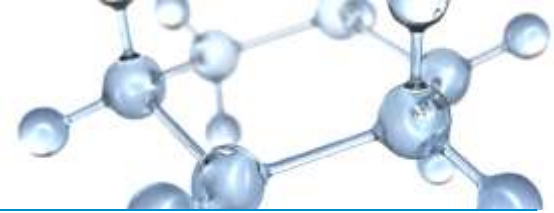
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- Is PPE suitable for everyone ?
- What level of attenuation does it provide ?
- Previous studies have indicated a reduction in attenuation from the manufacturers stated performance
  - 22 studies evaluated
  - NRR84 values determined
    - Range 12% to 62% (NRR84 to labelled NRR)
- To maximise protection of employees we should consider the use of reduced NRR

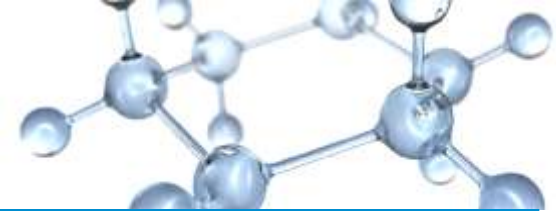
# ExxonMobil requirements

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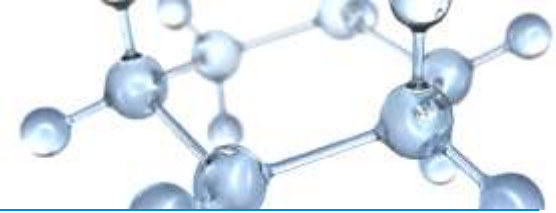
- Determine the performance of HPD in the field
  - Can the selected HPD's deliver 15dB reduction in attenuation
    - Based on a minimum NRR of 30 from the HPD
- Determine the performance of “double HPD” in the field
  - Can the double HPD's deliver 20dB reduction in attenuation
    - Based on a minimum NRR of 30 from the HPD
- Use existing protocols to measure the attenuation at the ear
- Deliver a global programme that can be applied in all regions
- Manage the risk of NIHL in our employees
- Try to understand why there is a reduction in attenuation in the field

# Protocols to determine reduction in attenuation



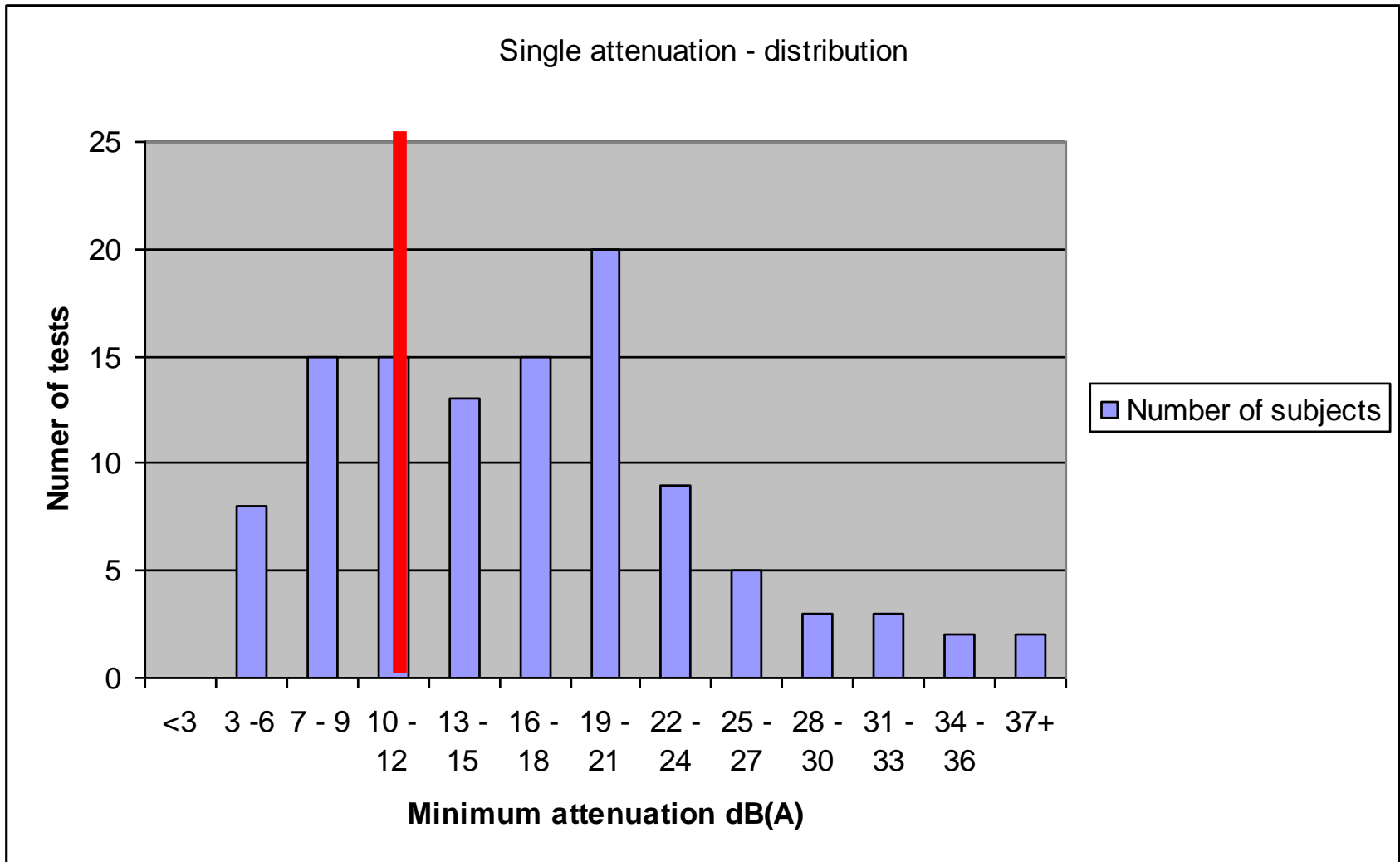
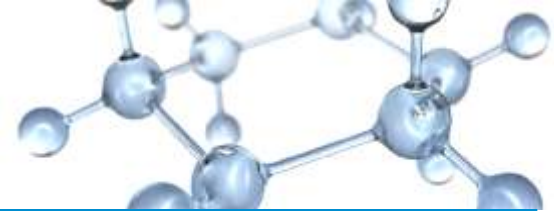
- Two methodologies used to evaluate performance of HPD's
- Real Ear Attenuation at Threshold (REAT)
  - For workers using ear plugs
- Microphone in Real Ear (MIRE)
  - For workers who wore Ear muffs

# Real world attenuation data summary single HPD

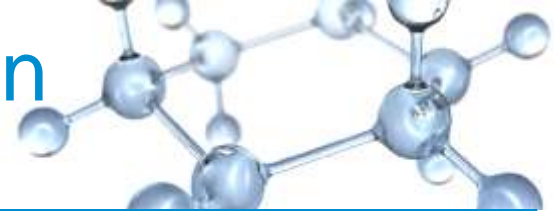


HPD device	No. of subjects	NRR84 dB	% subjects < 15dB	% subjects < 9dB
Foam earplug 1	25	13.5	36	12
Foam earplug 2	3	5.9	67	67
Foam earplug 3	33	9.8	42	12
Foam earplug 4	5	5.2	42	0
Foam earplug 5	4	7.9	50	25
Custom moulded earplug	20	11.8	35	10
All earplugs	90	10.7	40	13
Earmuffs	28	12	32	11
<b>All HPD</b>	<b>118</b>	<b>10.8</b>	<b>38</b>	<b>13</b>

# Single HPD attenuation

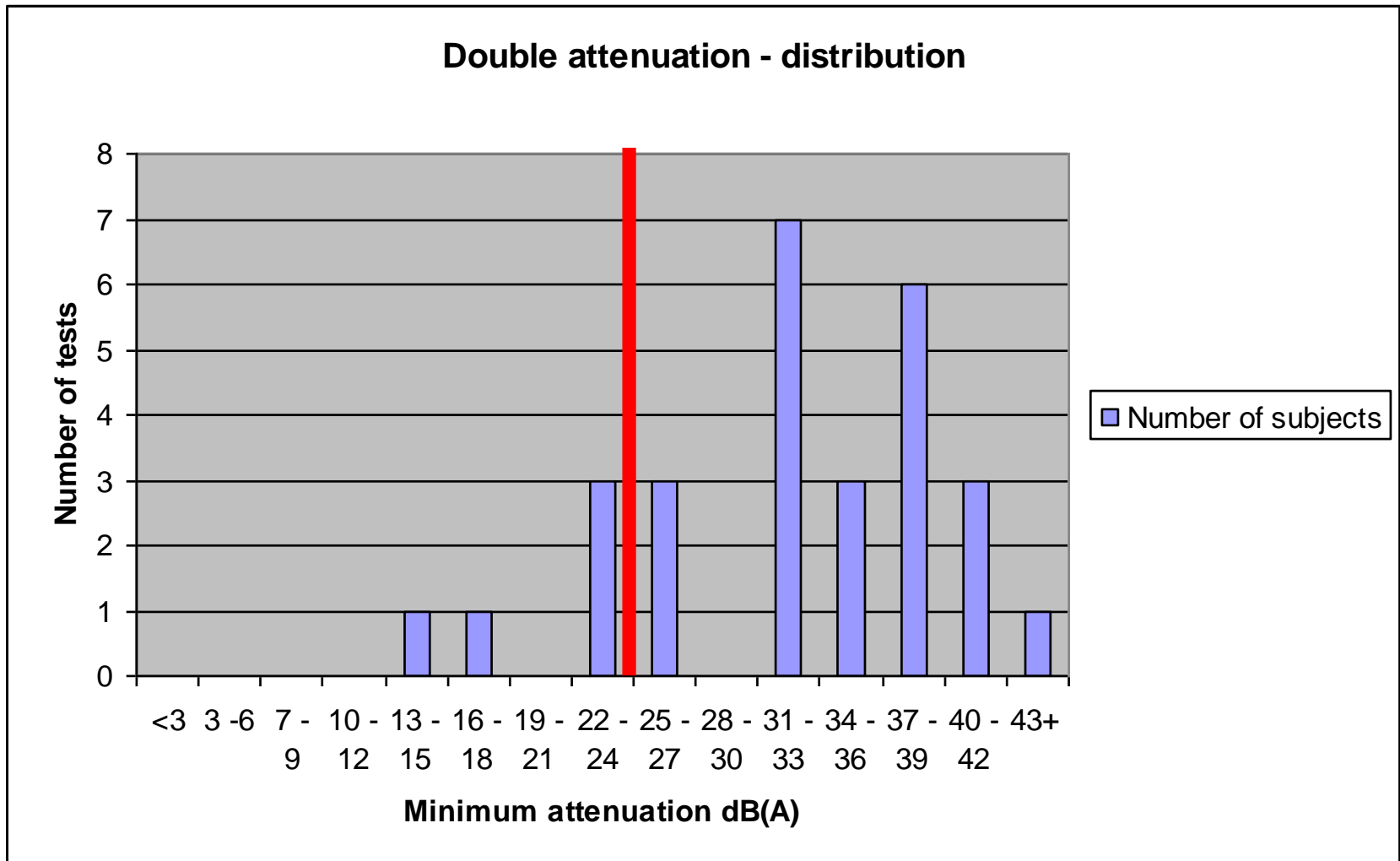
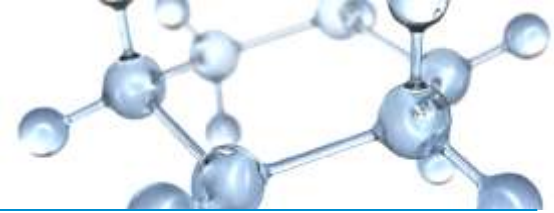


# Protocol to determine reduction in attenuation double HPD

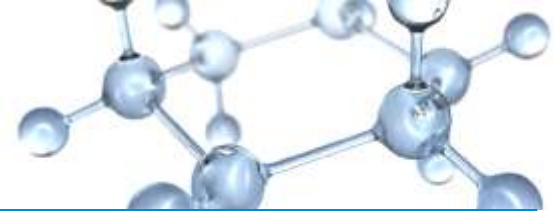


- Use of MIRE.
- Microphone placed in an ear plug and worn underneath ear muff.
- Measurements carried out in area with noise levels greater than 100dB
- Summary data:
  - n=28
  - NRR84 = 24.6dB
  - Workers <20dB = 7%
  - Workers <15dB = 4%

# Double HPD attenuation



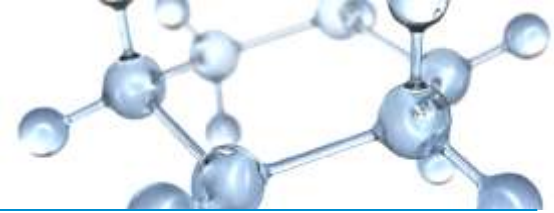
# Why is attenuation so different from manufacturers data



- Manufacturers data compiled in laboratory situations with test subjects
  - Compare RPE and the difference between NPF and APF
- The study tested the “as is” situation
  - All test subjects wore eye protection
  - Tested with current HPD’s
    - In cases where subjects received <15dB (single) asked to reinsert plugs or try a different model (7 subjects retested and 5 achieved better attenuation)
  - Movement, sweating and other factors cause earplugs to move in the ear canal reducing attenuation

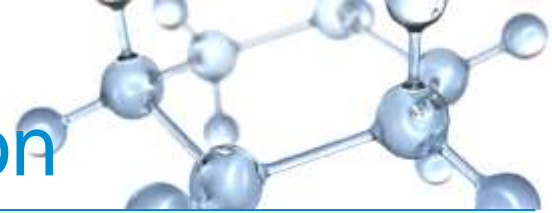
# Global policy

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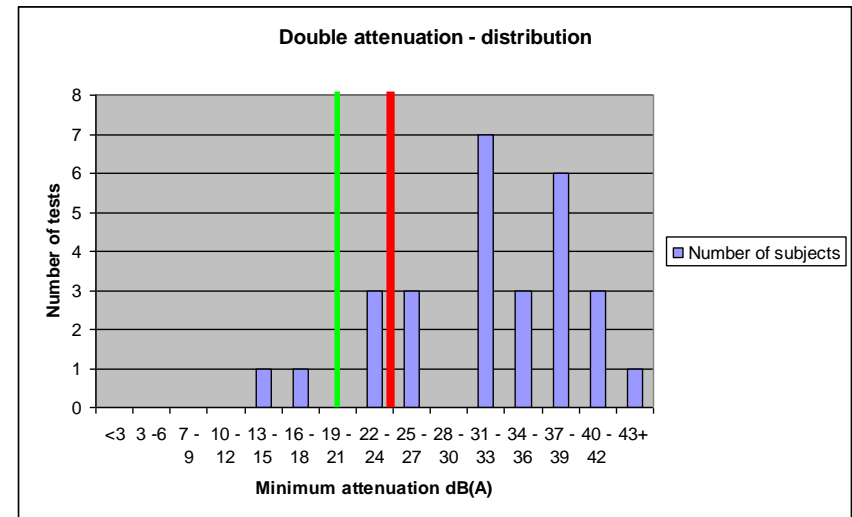
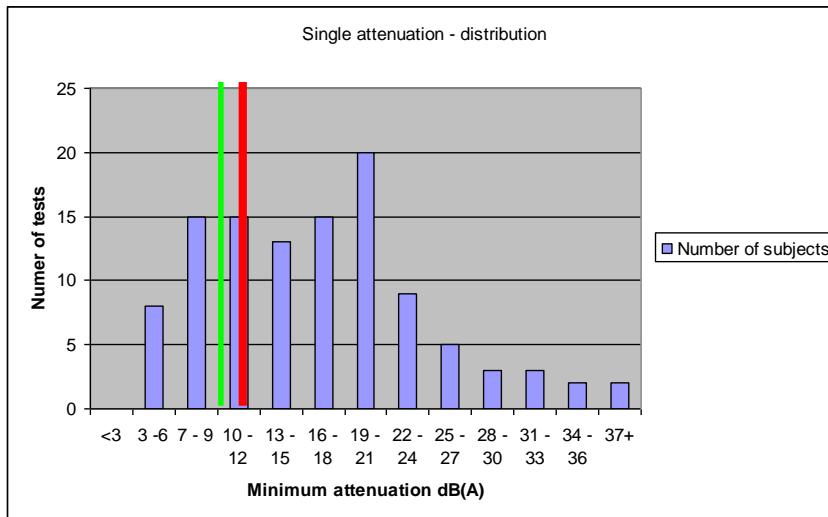
- Engineering measures to reduce noise at source
- Apply management controls in conjunction with other control measures
- Apply conservative protection factors for PPE to minimise number of workers at risk from NIHL
- Protection factors will account for “real world” variation
- Protection factors greater than NRR84
- Evidence based assumptions
- Apply the following for use of HPD’s to attenuate against noise levels at ExxonMobil facilities

# Applying Assigned attenuation



NRR84 = 10.8dB  
Assigned NRR = 9dB

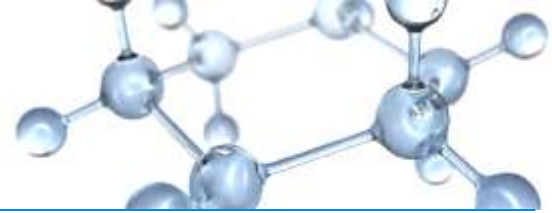
NRR84 = 24.6dB  
Assigned NRR = 20dB



# Use of HPD at ExxonMobil facilities worldwide



- When predicted daily noise levels  $\geq 85\text{dB(A)}$  Lepd
  - Single hearing protection required
- When predicted daily noise levels  $\geq 95\text{dB(A)}$  Lepd
  - Double hearing protection required
- When predicted daily noise levels  $\geq 105\text{dB(A)}$  Lepd
  - Double hearing protection required and a restriction on working time in accordance with 3dB doubling rate



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Thank you for listening

Acknowledgements for the collection and understanding of the data

Neil J Barone and Alex Bianchi