Attachment I- Exposure Results Notification Letter

[PARTICIPANT NAME]
[DATE]

[ADDRESSS]

Dear PARTICIPANT:

Thank you for taking part in the "Noise Exposures and Hearing Loss in the Oil and Gas Extraction Industry" study. As part of this research study in which you voluntarily participated, the National Institute for Occupational Safety and Health (NIOSH) performed exposure monitoring on you at an oil and gas industry worksite between [DATE RANGE]. We are writing because you asked for your individual sampling results. In Attachment A, we talk a little more about the study and explain the sampling results.

What did we do?

- We took samples on you for noise and/or chemicals in the air. The air sampling equipment was attached to your outerwear in your personal breathing zone.
- We wiped portions of your skin for the presence of lead.

What did we compare the results to?

Occupational exposure limits (OELs) have been developed by federal agencies such as NIOSH, the Occupational Safety and Health Administration (OSHA), and other safety and health organizations such as the American Conference of Governmental Industrial Hygienists (ACGIH®) to prevent harmful health effects from workplace exposures. OELs established by OSHA are enforced by law. These limits are generally defined as the highest amount of a substance that workers can be exposed to over a work shift, day after day, without causing health problems.

We compared your sampling results to available OELs for those specific compounds, typically the NIOSH Recommended Exposure Limit (REL) or the ACGIH threshold limit value (TLV). For noise, we also compared your sampling results against the OSHA permissible exposure limit (PEL). Your results for noise and chemicals provided in this letter represent the time-weighted averages over the shifts we sampled during your work activities.

- For noise, we compared results with the NIOSH REL and the OSHA PEL. For an 8-hour shift, the REL is 85 decibels, A-weighted (dBA) and the OSHA PEL is 90 dBA.[1,2] These may be adjusted to account for shifts longer than 8-hours, including typical 12-hour shifts worked in the industry. Even if someone is exposed to noise above an OEL, wearing appropriate hearing protection may reduce those exposures below that OEL.
- For air concentrations of ototoxic chemicals, we compared results with the ACGIH Threshold Limit Value (TLV) and the OSHA PEL for each compound, if available.[3] Ototoxic chemicals have a toxic effect on the ear or its nerves supply. For up to an 8-hour shift, the TLVs are:
    - n-hexane: 50 parts per million (ppm)
    - toluene: 20 ppm
    - p-xylene: 100 ppm
    - ethylbenzene: 20 ppm
    - propylbenzene: none available

- For dermal wipe samples for lead, no accepted OEL has been developed. The results represent the relative presence or absence of lead on each sample on each sample.

Your Air Sampling Results

Air sampling results are listed in Tables 1–3. Values in bold represent concentrations above occupational exposure limits. Table 1 presents the average and maximum levels of noise you were exposed to on each of the study days. We averaged the noise exposure levels over your working day. We report noise in dBA which are a measure of the noise you hear, using a scale that focuses on the sounds that a human ear can hear. Noise measurements were taken once per second and average noise exposures were calculated based on the NIOSH REL, which is more protective that then OSHA PEL. See the graphic at the end of the Attachment A to see how long you can work at each noise level without hearing protection and not exceed the noise exposure limit.

Table 1. Personal noise exposure results

Study day	Sample duration (hr)	Your TWA and maximum exposure level using NIOSH REL Criterion (dBA)	NIOSH REL (dBA)	Your TWA and maximum exposure level using OSHA PEL Criterion (dBA)	OSHA PEL (dBA)
		Average: Maximum:		Average: Maximum:	
		Average: Maximum:		Average: Maximum:	
		Average: Maximum:		Average: Maximum:	

Table 2. Personal results of measured air concentrations of ototoxic chemicals

Study day	Sample duration (hr)	Your average concentration (ppm)	ACGIH TLV (ppm)	OSHA PEL (ppm)

Table 3. Personal wipe sample results for lead

Study day	Sample location on body	Quantity of lead present (micrograms)

What happens next?

Once testing has been completed at your site, we will summarize all the results, including these tests, and will make the summary results available to you and your employer. We ask that each company post this report in an area visible to the study participants and other workers at the company. This report will not mention you by name. The report will also contain a discussion on how to reduce your exposures and better protect employees at your workplace. We encourage you to discuss your work and possible exposures with your company management. If you have any questions, please call me at (303) 236-5933.

Sincerely,

Bradley King, PhD, MPH, CIH
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NIOSH Western States Division
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References:

[1] NIOSH [1998]. Criteria for a recommended standard: occupational noise exposure (revised criteria 1998). Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 98-126, http://www.cdc.gov/niosh/docs/98-126/pdfs/98-126.pdf.

[2] OSHA [2008] 29 CFR 1910.95 - Occupational noise exposure. https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.95.

[3] ACGIH [2021]. 2021 TLVs® and BEIs®: threshold limit values for chemical substances and physical agents and biological exposure indices. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.

Attachment A: Frequently Asked Questions

Why did NIOSH do this study?

NIOSH did this study because oil and gas extraction workers can become sick or experience health symptoms because of their job. These workers can be around too much noise or breathe in harmful substances such as certain hydrocarbon gases or vapors that can affect their hearing. This study is helping NIOSH learn more about how to prevent these workers from losing their hearing because of exposures they have on the job.

Who can take part in this study?

Any upstream oil and gas extraction worker could take part in the study.

How did NIOSH measure my exposure to noise and hydrocarbon gases/vapors?

We used direct-reading instruments to measure and record the noise conditions around you as you worked. We measured the hydrocarbon gases or vapors that was around you as you worked by pumping an air sample through a charcoal-filled tube during the task or working day. Hydrocarbon gases and vapors of interest were captured on the charcoal in the tube as air passed through it. We sent the tube to a lab that measured how much of these substances was on the charcoal. These numbers were used to calculate the average amount of these hydrocarbons in the air you breathed as you worked.

What is an occupational exposure limit (workplace safety limit)?

An occupational exposure limit is the most noise or amount of harmful substance you can be around all day, every working day without being harmed. OSHA issues permissible exposure limits (PELs), which are laws that limit the amount of noise or harmful substances you can be around. NIOSH gives recommended exposure limits (RELs), that are limits we recommend, but are not laws. A NIOSH ceiling limit is an exposure that should not be exceeded for any length of time. To protect workers, harmful noise and substances should be kept below occupational exposure limits.

What is an 8-hour time-weighted average?

An 8-hour time-weighted average is how much of a noise or substance you worked around over an 8-hour working shift. We based the average on how long an employee worked around each level of harmful noise or substance over that period.

What do my results show?

If your results exceed limits, in some cases your employer can add or change equipment or controls to reduce the noise or harmful substance. This is an example of an “engineering control,” which is the best way to protect you. Your employer can also reduce your risk by providing personal protective equipment, such as earplugs or a respirator. If given hearing protection such as ear plugs, you should always wear them properly to make sure they give you the best protection they can.

My job varies from day to day. Are my results typical for me?

Like your job, noise and harmful substances you work around may vary from day to day. Your results are a “snapshot” of the harmful noise and substances you worked around on the days we studied your

workplace. Depending on your job, the days that we took results may be like other days you work, or they may not be like your normal workdays.

How will NIOSH use my results?

We will group your results with other workers who took part in the study so we can form an overall picture of the harmful noise and substances involved with the type of work you do. We also plan to identify and recommend controls that can lessen the amount of noise and harmful substances where you work.

Am I around too much noise or harmful substances?

At this time, we do not know the significance, if any, of these results for your health. If you have health concerns, you can talk with your health care provider about these results.

HOW TO "LOOK" AT NOISE: Intensity comparisons with NISOH recommended permissible exposure time

Note: for every 3 dB, the energy level doubles

85 dBA – 8-hour exposure limit

88 dBA – 4-hour exposure limit

91 dBA – 2-hour exposure limit

94 dBA – 1-hour exposure limit

97 dBA – 30-minute exposure limit

100 dBA – 15-minute exposure limit

103 dBA – 7 ½ minute exposure limit

106 dBA – 3 ¾ minute exposure limit

Note: Noise levels for the following:

91 dB – Orbital Sander

96 dB – Router

101 dB – Circular Saw