

**Noise Exposure and Hearing Loss in the Oil and Gas Extraction Industry
(Information Collection Request)**

**Request for Office of Management and Budget Review and
Approval for Federally Sponsored Data Collection**

Section B

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B. Collections of Information Employing Statistical Methods

This is a new information collection request. Approval is being requested for a three-year period (2023 through 2025).

B.1 Respondent universe and sampling methods

The respondent universe of interest for the proposed study includes all adults (18 years and older) employed in the U.S. onshore oil and gas extraction (OGE) industry at increased risk of hearing loss from noise or ototoxicant exposure. A convenience sample of 500 workers will be recruited to complete a questionnaire for this study. We will recruit participants by identifying and recruiting partner companies in the OGE industry.

Companies in the OGE industry are categorized by their core business activities in accordance with North American Industrial Classification System (NAICS): Extraction (NAICS 211), Drilling Oil and Gas Wells (NAICS 213111), and Support Activities for Oil and Gas Operations (NAICS 213112). Companies from these industry categories will be recruited to participate in the proposed research through formal partnerships (e.g., the NIOSH Oil and Gas Extraction Sector Council), industry health and safety meetings, conferences, as well as individual professional relationships and contacts. The number of potentially eligible establishments and employees are displayed in Table 1.

Industry	Number of Establishments	Number of Workers
Extraction (NAICS 211)	6,516	112,536
Drilling Oil and Gas Wells (NAICS 213111)	2,177	34,811
Support Activities for Oil and Gas Operations (NAICS 213112)	14,248	173,525
Total	22,941	320,872

Data source: Quarterly Census of Employment and Wages (QCEW), April, 2021

Once a company agrees to participate, NIOSH and the company will jointly identify the specific locations to collect data (e.g., well sites). Employees and contractors at those locations will be presented the opportunity to be screened for eligibility. In addition to being an adult (18 years+) workers must be employed in the OGE industry for at least one month in the year prior to consent to be eligible. If eligible to participate, workers will be given the option to volunteer for the study. Workers who are eligible and consent to participate will form our study sample. We aim to recruit approximately 500 OGE workers to complete the questionnaire for this study (approximately 0.16% of the respondent universe).

We will recruit more heavily from companies expected to have higher proportions of employees working on locations where occupational noise or ototoxic chemicals may be present – namely, drilling companies and well servicing companies. A prior NIOSH study (OMB Number 0920-1195) took a similar approach, recruiting proportionally more workers from drilling companies than operators (see Table 2). Given the expected high levels of noise during the well drilling process, we aim for a yet higher proportion of drilling company workers (30%).

Table 2: Proposed Sample Size and Distribution of Study Participants, by Company Type, Based on the Distribution of U.S. Oil and Gas Extraction Workers Overall and a Recent NIOSH Study

Industry	Workers in the U.S. OGE Industry* (n=320,872)	Workers in a Previous NIOSH Study** (n=472)	Workers in Proposed Study (n=500)
Extraction (NAICS 211)	35%	20%	20%
Drilling Oil and Gas Wells (NAICS 213111)	11%	23%	30%
Support Activities for Oil and Gas Operations (NAICS 213112)	54%	57%	50%
Total	100%	100%	100%
*Data source: Quarterly Census of Employment and Wages (QCEW), April, 2021			
** OMB Number 0920-1195			

We plan to translate the questionnaire into Spanish, based on the same NIOSH study of OGE workers, where 10% completed the survey in Spanish. Among 528 workers deemed eligible to participate in the previous NIOSH study, 94.3% consented to participate (n=500). Based on this experience, we aim to identify 528 eligible OGE workers for our study.

The goal number of participants for the study is 500 workers. We are collecting a convenience sample for cross-sectional analyses only; thus, this information collection request does not require a statistical power discussion. In addition, the survey questionnaire is intended for hypothesis generation.

B.2 Procedures for the collection of information

The target population for the questionnaire will be English and Spanish speaking workers who work in the oilfield for one of three types of private companies in the land based OGE industry: operators (also called exploration and production (E&P) companies), well-servicing companies, or drilling contractors. Workers must have been employed within the OGE industry for at least one month in the past year to be eligible to participate. “Working in the field” will be defined as any worker whose responsibilities take them onto well-sites at least two days per week or more. Eligibility will be determined by a screening questionnaire. If the worker is eligible for the survey and agrees to participate, the consent materials and main survey questionnaire will be administered. Participants may include both employees of the participating employers and contractor employees to ensure a wide variety of workers are represented. NIOSH staff will conduct information collection during times that are minimally inconvenient to the worker.

B.2.1 Collection of Questionnaire Data

A team of 2–6 individuals (NIOSH staff or contractors) will recruit workers and administer questionnaires, depending on the type and size of recruitment location. All members of the field research team will be trained on the protocols required to successfully complete the data collection activities, and on general information about OGE activities and hazards. For each participant, a screening questionnaire will be administered to determine that the worker is eligible for the survey. This questionnaire will take about five minutes. If the worker is eligible, the worker will be provided with a consent form to review and confirm that they wish to participate in the full questionnaire. The questionnaire, informed consent, and educational

materials will be translated and offered in Spanish, and a fluent Spanish speaker will attend all data collection in the field unless otherwise informed that all workers were fluent English speakers.

Questionnaire completion via touch screen tablets using REDCap software will allow for more accurate data collection. The electronic questionnaire will have built in quality controls, such as multiple choice and data validation. Data entry for responses to screening questions and the questionnaires completed by hand will be entered by one program staff and reviewed by a second staff. For workers who choose to be verbally interviewed, their responses will be entered directly into the tablets during the interview by the research staff. Data from each tablet will be downloaded to a secure CDC owned laptop at the end of each day. All electronic data will be erased from the tablet using necessary software. Tablets will be password protected and kept in the possession of staff and in a locked box between survey administration periods. The ability to encrypt each tablet is being explored with the NIOSH IT department. Each survey will have a unique identifier but no personal identification information. Therefore, surveys will be anonymous and not able to be linked to subject's names via the unique identifier.

B.2.3 Collection of Noise Data

Companies that agree to participate in the questionnaire data collection will be offered to have NIOSH experts conduct noise samples in their workplace. Researchers will conduct a risk characterization and assessment of noise and ototoxic chemical exposures for workers who drill, complete, and service wells in the OGE industry. This includes a focus on collecting full-shift personal exposure data using direct-reading noise dosimeters placed on workers to evaluate the exposures associated with specific job activities across full work shifts. Use of established exposure assessment methods for specific ototoxic chemicals will be used in conjunction with personal noise monitoring equipment.

B.2.3 Collection of Audiometry Data

Companies that agree to participate in the questionnaire data collection will also be offered to have NIOSH experts conduct audiometry tests on subsets of their workers. An estimated 100 workers will be targeted over three years of the study to have audiometry tests conducted using the NIOSH Pittsburgh Mining Research Division (PMRD) mobile audiometric unit with a sound-treated booth and will be stationed at training centers, man camps, and meeting sites. Testing will be conducted by licensed audiologists or Council for Accreditation in Occupational Hearing Conservation (CAOHC)-certified technicians. Pure tone air conduction audiometry is the basic measurement of hearing sensitivity. The test is conducted by presenting pure tone (i.e., single frequency) signals to the ear through headphones and varying the intensity of the signals to identify the threshold at which the person is just able to hear the sound. Pure tone thresholds will be obtained at 500, 1000, 2000, 3000, 4000, 6000, and 8000 Hertz (Hz), representing frequencies across the range of human hearing. A repeat threshold at 1000 Hz will be obtained in each ear to verify response consistency. Such hearing tests allow for the collection of objective quantitative data on the extent and severity of hearing loss experienced by the workers, as a complement to the subjective data on hearing loss reported by workers through the questionnaire. For purposes of this proposed project, the collection and reporting of audiometry data will be anonymized so

that individual test results are not divulged to companies, although companies may be provided aggregated data and information relevant to their company. Overall, test results will be analyzed collectively to look at broad patterns related to hearing loss across the industry documented by these tests.

B.3 Methods to maximize response rates and deal with nonresponse

To gather sufficient numbers of completed surveys, administration of the questionnaire will be conducted at targeted locations that facilitate accessing as many employees in one location as possible to collect the data. Inclusion of more than one location type will increase the chance of success for this study, both in terms of gaining access to workers and in obtaining worker participation. These include the following locations:

- Oil and gas well sites: these will be sites where NIOSH scientists are conducting exposure assessment and control evaluation site visits. Subjects will not need to have worn noise sampling equipment to participate in the questionnaire, although such employees will specifically be targeted for inclusion to participate.
- Temporary modular lodging facilities ('worker camps'): worker camps are a unique worker lodging setting that has become very common in this industry. This environment provides a unique opportunity to access both a large number and wide variety of workers with relative ease; worker camps are common in North Dakota, Colorado, and south Texas. The size of man camps can range from as few as 10 workers up to 600 workers.
- Contractor meeting sites: oil and gas operators often gather their contractors together for meetings to share information. This type of site would provide access to a variety of workers with different occupations and responsibilities. The pilot test of a previous NIOSH oil and gas health and safety survey questionnaire was conducted at this type of location and was very successful.
- Training centers: there are numerous training centers for oilfield workers (both internally at companies and also independent training companies). In a previous oil and gas health and safety survey questionnaire conducted by NIOSH oil and gas epidemiologists, a drilling company that trained 50 workers per month at their training facility in Houston offered to allow NIOSH to collect data from workers during their initial week of training. In these locations, some trainees will be new to the oilfield, in which case they will not be surveyed. However, many trainees will have experience from other companies within this industry and will be able to participate in the survey.

B.4 Tests of procedures or methods to be undertaken

The questionnaire to be used in this study was designed based on well-established population-based survey instruments and multi-lingually validated questions. New questions were developed only if previously validated questions were not available. The questionnaire was reviewed by subject matter experts both internal and external to NIOSH with expertise in OGE safety and health and/or survey administration. It will also be pilot tested with nine OGE workers identified through a convenience sample. Revisions were made to the questionnaire as a result of the pilot test results and reviewer comments.

B.5 *Individuals consulted on statistical aspects and individuals collecting and/or analyzing data*

Contact information for those responsible for collection and analysis of the data:

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