minutes, time permitting, and shall proceed at the discretion of the Advisory Council chair. Individuals with disabilities, or others who need special accommodations, should indicate their needs along with their request.

José Javier Rodríguez,

Assistant Secretary for Employment and Training, Labor.

[FR Doc. 2024–22101 Filed 9–25–24; 8:45 am]

BILLING CODE 4510–FN–P

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

[Docket No. OSHA–2024–0003]

Ballard Marine Construction Lower Olentangy Tunnel Project; Grant of Permanent Variance

AGENCY: Occupational Safety and Health Administration (OSHA), Labor.

ACTION: Notice.

SUMMARY: In this notice, OSHA grants a permanent variance to Ballard Marine Construction (Ballard) related to work in compressed air environments.

DATES: The permanent variance specified by this notice becomes effective on September 26, 2024 and shall remain in effect until the completion of the Lower Olentangy Tunnel Project or until modified or revoked by OSHA.

FOR FURTHER INFORMATION CONTACT: Information regarding this notice is available from the following sources:

Press inquiries: Contact Mr. Frank Meilinger, Director, OSHA Office of Communications, U.S. Department of Labor; telephone: (202) 693–1999; email: *meilinger.francis2@dol.gov.*

General and technical information: Contact Mr. Kevin Robinson, Director, Office of Technical Programs and Coordination Activities, Directorate of Technical Support and Emergency Management, Occupational Safety and Health Administration, U.S. Department of Labor; telephone: (202) 693–1911; email: *robinson.kevin@dol.gov.*

SUPPLEMENTARY INFORMATION:

Copies of this ***Federal Register*** *notice.* Electronic copies of this **Federal Register** notice are available at *http://www.regulations.gov.* This **Federal Register** notice, as well as news releases and other relevant information, also are available at OSHA's web page at *http://www.osha.gov.*

I. Overview

On April 11, 2023, Ballard Marine Construction (Ballard or the applicant), submitted under section 6(d) of the Occupational Safety and Health Act of 1970 (the Act), 29 U.S.C. 655, and 29 CFR 1905.11 (Variances and other relief under Section 6(d)) an application for a permanent variance from several provisions of the OSHA standard that regulates work in compressed air, 1926.803 of 1926 subpart S—Underground Construction, Caissons, Cofferdams, and Compressed Air, and an interim order allowing it to proceed while OSHA considers the request for a permanent variance (OSHA–2024–0003–0002). This notice addresses Ballard's application for a permanent variance and interim order for construction of the Lower Olentangy Tunnel Project in Columbus, Ohio only and is not applicable to future Ballard tunneling projects.

This notice addresses Ballard's application for a permanent variance and interim order from the provisions of the standard that: (1) require the use of the decompression values specified in decompression tables in appendix A of subpart S (29 CFR 1926.803(f)(1)); and (2) require the use of automated operational controls and a special decompression chamber (29 CFR 1926.803(g)(1)(iii) and (xvii), respectively).

OSHA reviewed Ballard's application for the variance and interim order and determined that they were appropriately submitted in compliance with the applicable variance procedures in Section 6(d) of the Occupational Safety and Health Act of 1970 (OSH Act; 29 U.S.C. 655) and OSHA's regulations at 29 CFR 1905.11 (Variances and other relief under section 6(d)), including the requirement that the applicant inform workers and their representatives of their rights to petition the Assistant Secretary of Labor for Occupational Safety and Health for a hearing on the variance application.

OSHA reviewed the alternative procedures in Ballard's application and preliminarily determined that the applicant's proposed alternatives, on the whole, subject to the conditions in the request and imposed by the interim order, provide measures that are as safe and healthful as those required by the cited OSHA standards. On March 27, 2024, OSHA published a **Federal Register** notice announcing Ballard's application for permanent variance, stating the preliminary determination along with the basis of that determination, and granting the interim order (89 FR 21274). OSHA requested comments on each.

OSHA did not receive any comments or other information disputing the preliminary determination that the alternatives were at least as safe as OSHA's standard, nor any objections to OSHA granting a permanent variance. Accordingly, through this notice OSHA grants a permanent variance, subject to the conditions set out in this document.

A. Background

The information that follows about Ballard, its methods, and the Lower Olentangy Tunnel Project comes from the Ballard variance application.

Ballard is a contractor for the Lower Olentangy Tunnel Project (the project), that works on complex tunnel projects using innovations in tunnel-excavation methods. The applicant's workers engage in the construction of tunnels using advanced shielded mechanical excavation techniques in conjunction with an earth pressure balanced micro-tunnel boring machine (TBM). Using shielded mechanical excavation techniques, in conjunction with precast concrete tunnel liners and backfill grout, TBMs provide methods to achieve the face pressures required to maintain a stabilized tunnel face through various geologies and isolate that pressure to the forward section (the working chamber) of the TBM.

Ballard asserts that it bores tunnels using a TBM at levels below the water table through soft soils consisting of clay, silt, and sand. TBMs are capable of maintaining pressure at the tunnel face, and stabilizing existing geological conditions, through the controlled use of a mechanically driven cutter head, bulkheads within the shield, ground-treatment foam, and a screw conveyor that moves excavated material from the working chamber. The forward-most portion of the TBM is the working chamber, and this chamber is the only pressurized segment of the TBM. Within the shield, the working chamber consists of two sections: the forward working chamber and the staging chamber. The forward working chamber is immediately behind the cutter head and tunnel face. The staging chamber is behind the forward working chamber and between the man-lock door and the entry door to the forward working chamber.

The TBM has twin man-locks located between the pressurized working chamber and the non-pressurized portion of the machine. Each man-lock has two compartments. This configuration allows workers to access the man-locks for compression and decompression, and medical personnel

to access the man-locks if required in an emergency.

Ballard's Hyperbaric Operations Manual (HOM) for the Lower Olentangy Tunnel Project indicates that the maximum pressure to which it is likely to expose workers during project interventions for the three tunnel drives is 27 pounds per square inch gauge (p.s.i.g.). The applicant will pressurize the working chamber to the level required to maintain a stable tunnel face, which for this project Ballard estimates will be up to a pressure not exceeding 27 p.s.i.g., which does not exceed the maximum pressure specified by the OSHA standard at 29 CFR 1926.803(e)(5).[1] Ballard is not seeking a variance from this provision of the compressed-air standard.

Ballard employs specially trained personnel for the construction of the tunnel. To keep the machinery working effectively, Ballard asserts that these workers must periodically enter the excavation working chamber of the TBM to perform hyperbaric interventions during which workers would be exposed to air pressures up to 27 p.s.i.g, which does not exceed the maximum pressure specified by the existing OSHA standard at 29 CFR 1926.803(e)(5). These interventions consist of conducting inspections or maintenance work on the cutter-head structure and cutting tools of the TBM, such as changing replaceable cutting tools and disposable wear bars, and, in rare cases, repairing structural damage to the cutter head. These interventions are the only time that workers are exposed to compressed air. Interventions in the excavation working chamber (the pressurized portion of the TBM) take place only after halting tunnel excavation and preparing the machine and crew for an intervention.

During interventions, workers enter the working chamber through one of the twin man-locks that open into the staging chamber. To reach the forward part of the working chamber, workers pass through a door in a bulkhead that separates the staging chamber from the forward working chamber. The man-locks and the working chamber are designed to accommodate three people, which is the maximum crew size allowed under the permanent variance. When the required decompression times are greater than work times, the twin man-locks allow for crew rotation. During crew rotation, one crew can be compressing or decompressing while the second crew is working. Therefore, the working crew always has an unoccupied man-lock at its disposal.

Ballard asserts that these innovations in tunnel excavation have greatly reduced worker exposure to hazards of pressurized air work because they have eliminated the need to pressurize the entire tunnel for the project and thereby reduce the number of workers exposed, as well as the total duration of exposure, to hyperbaric pressure during tunnel construction. These advances in technology have substantially modified the methods used by the construction industry to excavate subaqueous tunnels compared to the caisson work regulated by the current OSHA compressed-air standard for construction at 29 CFR 1926.803.

In addition to the reduced exposures resulting from the innovations in tunnel-excavation methods, Ballard asserts that innovations in hyperbaric medicine and technology improve the safety of decompression from hyperbaric exposures. These procedures, however, deviate from the decompression process that OSHA requires for construction in 29 CFR 1926.803(f)(1) and the decompression tables in appendix A of 29 CFR 1926, subpart S. Nevertheless, according to Ballard, their use of decompression protocols incorporating oxygen is more efficient, effective, and safer for tunnel workers than compliance with the decompression tables specified by the existing OSHA standard.

Ballard contends that the alternative safety measures included in the application provide Ballard's workers with a place of employment that is at least as safe as they would be under OSHA's compressed-air standard for construction. Ballard also provided OSHA a project-specific HOM (OSHA–2024–0003–0003) for the Lower Olentangy Tunnel Project that requires specialized medical support and hyperbaric supervision to provide assistance to a team of specially trained man-lock attendants and hyperbaric or compressed-air workers to support their assertions of equivalency in worker protection.

OSHA included all of the above information in the **Federal Register** notice announcing Ballard's variance application and did not receive any comments disputing any of that information, including the safety assertions made by Ballard in the variance application.

II. The Variance Application

Pursuant to the requirements of OSHA's variance regulations (29 CFR 1905.11), the applicant has certified that it notified its affected workers [2] of the variance application and request for interim order by posting, at prominent locations where it normally posts workplace notices, a summary of the application and information specifying where the workers can examine a copy of the application. In addition, the applicant has certified that it informed its workers of their right to petition the Assistant Secretary of Labor for Occupational Safety and Health for a hearing on the variance application.

III. OSHA History of Approval of Nearly Identical Variance Requests

OSHA has previously approved several nearly identical variances involving the same types of tunneling equipment used for similar projects (tunnel construction variances). OSHA notes that it granted several subaqueous tunnel construction permanent variances from the same provisions of OSHA's compressed-air standard (29 CFR 1926.803(e)(5), (f)(1), (g)(1)(iii), and (g)(1)(xvii)) that are the subject of the present application: (1) Traylor JV for the completion of the Blue Plains Tunnel in Washington, DC (80 FR 16440 (March 27, 2015)); (2) Impregilo, Healy, Parsons, Joint Venture (IHP JV) for the completion of the Anacostia River Tunnel in Washington, DC (80 FR 50652 (August 20, 2015)); (3) Tully/OHL USA Joint Venture for the completion of the New York Economic Development Corporation's New York Siphon Tunnel project (79 FR 29809 (May 23, 2014)); (4) Salini-Impregilo/Healy Joint Venture for the completion of the Northeast Boundary Tunnel in Washington, DC (85 FR 27767, (May 11, 2020)); (5) McNally/Kiewit SST Joint Venture for the completion of the Shoreline Storage Tunnel Project in Cleveland, Ohio (88 FR 15080, March 10, 2023); (6) Traylor-Shea Joint Venture for the completion of the Alexandria River Renew Tunnel Project in Alexandria Virginia and Washington DC (88 FR 15080, March 10, 2023); and (7) Ballard Marine Construction for the completion of the Bay Park Tunnel Project (89 FR 8442, February 7, 2024). The proposed alternate conditions in this notice are nearly identical to the alternate conditions of the previous permanent variances.[3] OSHA is not aware of any

[1] The decompression tables in Appendix A of subpart S express the working pressures as pounds per square inch gauge (p.s.i.g.). Therefore, throughout this notice, OSHA expresses the p.s.i. value specified by 29 CFR 1926.803(e)(5) as p.s.i.g., consistent with the terminology in appendix A, table 1 of subpart S.

[2] See the definition of ''Affected employee or worker'' in section VII.C of this Notice.

[3] The previous tunnel construction variances allowed further deviation from OSHA standards by

Continued

injuries or other safety issues that arose from work performed under these conditions in accordance with the previous variances.

IV. Applicable OSHA Standard and the Relevant Variance

A. Variance From Paragraph (f)(1) of 29 CFR 1926.803, Requirement To Use OSHA Decompression Tables

OSHA's compressed-air standard for construction requires decompression in accordance with the decompression tables in Appendix A of 29 CFR 1926, subpart S (see 29 CFR 1926.803(f)(1)). As an alternative to the OSHA decompression tables, the applicant proposes to use newer decompression schedules (the 1992 French Decompression Tables) that rely on staged decompression and supplement breathing air used during decompression with air or oxygen (as appropriate).[4] The applicant asserts decompression protocols using the 1992 French Decompression Tables for air or oxygen as specified by the Integrated Pipeline Tunnel Project-specific HOM are safer for tunnel workers than the decompression protocols specified in appendix A of 29 CFR 1926 subpart S. Accordingly, the applicant commits to following the decompression procedures described in that HOM, which requires Ballard to follow the 1992 French Decompression Tables to decompress compressed air workers (CAWs) after they exit the hyperbaric conditions in the working chamber.

Depending on the maximum working pressure and exposure times, the 1992 French Decompression Tables provide for air decompression with or without oxygen. Ballard asserts that oxygen decompression has many benefits, including (1) keeping the partial pressure of nitrogen in the lungs as low as possible; (2) keeping external pressure as low as possible to reduce the formation of gas bubbles in the blood; (3) removing nitrogen from the lungs and arterial blood and increasing the rate of nitrogen elimination; (4) improving the quality of breathing during decompression stops so that workers are less tired and to prevent bone necrosis; (5) reducing decompression time by approximately 33 percent as compared to air decompression; and (6) reducing inflammation.

In addition, the project-specific HOM requires a physician, certified in hyperbaric medicine, to manage the medical condition of CAWs during hyperbaric exposures and decompression. A trained and experienced man-lock attendant is also required to be present during hyperbaric exposures and decompression. This man-lock attendant is to operate the hyperbaric system to ensure compliance with the specified decompression table. A hyperbaric supervisor, who is trained in hyperbaric operations, procedures, and safety, directly oversees all hyperbaric interventions, and ensures that staff follow the procedures delineated in the HOM or by the attending physician.

B. Variance From Paragraph (g)(1)(iii) of 29 CFR 1926.803, Automatically Regulated Continuous Decompression

Ballard seeks a permanent variance from the OSHA standard at 29 CFR 1926.803(g)(1)(iii), which requires automatic controls to regulate decompression. As noted above, the applicant is conducting the staged decompression according to the 1992 French Decompression Tables under the direct control of the trained man-lock attendant and under the oversight of the hyperbaric supervisor.

Breathing air under hyperbaric conditions increases the amount of nitrogen gas dissolved in a CAW's tissues. The greater the hyperbaric pressure under these conditions and the more time spent under the increased pressure, the greater the amount of nitrogen gas is dissolved in the tissues. When the pressure decreases during decompression, tissues release the dissolved nitrogen gas into the blood system, which then carries the nitrogen gas to the lungs for elimination through exhalation. Releasing hyperbaric pressure too rapidly during decompression can increase the size of the bubbles formed by nitrogen gas in the blood system, resulting in decompression illness (DCI), commonly referred to as ''the bends.'' This description of the etiology of DCI is consistent with current scientific theory and research on the issue.

The 1992 French Decompression Tables, proposed for use by the applicant, provide for stops during worker decompression (*i.e.,* staged decompression) to control the release of nitrogen gas from tissues into the blood system. Studies show that staged decompression, in combination with other features of the 1992 French Decompression Tables such as the use of oxygen, result in a lower incidence of DCI than the use of automatically regulated continuous decompression.[5] In addition, the applicant asserts that staged decompression administered in accordance with its HOM is at least as effective as an automatic controller in regulating the decompression process because the HOM requires a hyperbaric supervisor who directly supervises all hyperbaric interventions and ensures that the man-lock attendant, who is a competent person in the manual control of hyperbaric systems, follows the schedule specified in the decompression tables, including stops.

C. Variance From Paragraph (g)(1)(xvii) of 29 CFR 1926.803, Requirement of Special Decompression Chamber

The OSHA compressed-air standard for construction requires employers to use a special decompression chamber of sufficient size to accommodate all CAWs being decompressed at the end of the shift when total decompression time exceeds 75 minutes (see 29 CFR 1926.803(g)(1)(xvii)). Use of the special decompression chamber enables CAWs to move about and flex their joints to prevent neuromuscular problems during decompression.

Space limitations in the TBM do not allow for the installation and use of an additional special decompression lock or chamber. The applicant proposes that

permitting employee exposures above 50 p.s.i.g., based on the composition of the soil and the amount of water that will be above the tunnel for various sections of this project. The current permanent variance includes substantively the same safeguards as the variances that OSHA granted previously even though employees will not be exposed to pressures higher than 27 p.s.i.g.

[4] In 1992, the French Ministry of Labour replaced the 1974 French Decompression Tables with the 1992 French Decompression Tables, which differ from OSHA's decompression tables in appendix A by using: (1) staged decompression as opposed to continuous (linear) decompression; (2) decompression tables based on air or both air and pure oxygen; and (3) emergency tables when unexpected exposure times occur (up to 30 minutes above the maximum allowed working time).

[5] See, *e.g.,* Dr. Eric Kindwall, EP (1997), Compressed air tunneling and caisson work decompression procedures: development, problems, and solutions. *Undersea and Hyperbaric Medicine,* 24(4), pp. 337–345. This article reported 60 treated cases of DCI among 4,168 exposures between 19 and 31 p.s.i.g. over a 51-week contract period, for a DCI incidence of 1.44% for the decompression tables specified by the OSHA standard. Dr. Kindwall notes that the use of automatically regulated continuous decompression in the Washington State safety standards for compressed-air work (from which OSHA derived its decompression tables) was at the insistence of contractors and the union, and against the advice of the expert who calculated the decompression table and recommended using staged decompression. Dr. Kindwall then states, ''Continuous decompression is inefficient and wasteful. For example, if the last stage from 4 p.s.i.g. . . . to the surface took 1h, at least half the time is spent at pressures less than 2 p.s.i.g. . . ., which provides less and less meaningful bubble suppression . . . .'' In addition, Dr. Kindwall addresses the continuous-decompression protocol in the OSHA compressed-air standard for construction, noting that ''[a]side from the tables for saturation diving to deep depths, no other widely used or officially approved diving decompression tables use straight line, continuous decompressions at varying rates. Stage decompression is usually the rule, since it is simpler to control.''

it be permitted to rely on the man-locks and staging chamber in lieu of adding a separate, special decompression chamber. Because only a few workers out of the entire crew are exposed to hyperbaric pressure, the man-locks (which, as noted earlier, connect directly to the working chamber) and the staging chamber are of sufficient size to accommodate all of the exposed workers during decompression. The applicant uses the existing man-locks, each of which adequately accommodates a three-member crew for this purpose when decompression lasts up to 75 minutes. When decompression exceeds 75 minutes, crews can open the door connecting the two compartments in each man-lock (during decompression stops) or exit the man-lock and move into the staging chamber where additional space is available. The applicant asserts that this alternative arrangement is as effective as a special decompression chamber in that it has sufficient space for all the CAWs at the end of a shift and enables the CAWs to move about and flex their joints to prevent neuromuscular problems.

V. Decision

After reviewing the proposed alternatives, OSHA has determined that the applicant's proposed alternatives, on the whole, subject to the conditions in the request and imposed by this permanent variance, provide measures that are as safe and healthful as those required by the cited OSHA standards addressed in section IV of this notice.

In addition, OSHA has determined that each of the following alternatives are at least as effective as the specified OSHA requirements:

A. 29 CFR 1926.803(f)(1)

The applicant has proposed to implement equally effective alternative measures to the requirement in 29 CFR 1926.803(f)(1) for compliance with OSHA's decompression tables. The HOM specifies the procedures and personnel qualifications for performing work safely during the compression and decompression phases of interventions. The HOM also specifies the decompression tables the applicant proposes to use (the 1992 French Decompression Tables). Depending on the maximum working pressure and exposure times during the interventions, the tables provide for decompression using air, pure oxygen, or a combination of air and oxygen. The decompression tables also include delays or stops for various time intervals at different pressure levels during the transition to atmospheric pressure (*i.e.,* staged decompression). In all cases, a physician certified in hyperbaric medicine will manage the medical condition of CAWs during decompression. In addition, a trained and experienced man-lock attendant, experienced in recognizing decompression sickness or illnesses and injuries, will be present. Of key importance, a hyperbaric supervisor, trained in hyperbaric operations, procedures, and safety, will directly supervise all hyperbaric operations to ensure compliance with the procedures delineated in the project-specific HOM or by the attending physician.

Prior to granting the seven previous permanent variances to Traylor JV, IHP JV, Tully/OHL JV, Salini-Impregilo/Healy JV, McNally/Kiewit SST JV, Traylor Shea JV, and Ballard Marine Bay Park Tunnel New York, OSHA conducted a review of the scientific literature and concluded that the alternative decompression method (*i.e.,* the 1992 French Decompression Tables) Ballard proposed would be at least as safe as the decompression tables specified by OSHA when applied by trained medical personnel under the conditions imposed by the permanent variance.

Some of the literature indicates that the alternative decompression method may be safer, concluding that decompression performed in accordance with these tables resulted in a lower occurrence of DCI than decompression conducted in accordance with the decompression tables specified by the standard. For example, H.L. Anderson studied the occurrence of DCI at maximum hyperbaric pressures ranging from 4 p.s.i.g. to 43 p.s.i.g. during construction of the Great Belt Tunnel in Denmark (1992–1996).[6] This project used the 1992 French Decompression Tables to decompress the workers during part of the construction. Anderson observed 6 DCI cases out of 7,220 decompression events and reported that switching to the 1992 French Decompression tables reduced the DCI incidence to 0.08% compared to a previous incidence rate of 0.14%. The DCI incidence in the study by H.L. Anderson is substantially less than the DCI incidence reported for the decompression tables specified in appendix A.

OSHA found no studies in which the DCI incidence reported for the 1992 French Decompression Tables were higher than the DCI incidence reported for the OSHA decompression tables.[7]

OSHA's experience with the previous seven variances, which all incorporated nearly identical decompression plans and did not result in safety issues, also provides evidence that the alternative procedure as a whole is at least as effective for this type of tunneling project as compliance with OSHA's decompression tables. The experience of State Plans[8] that granted variances (Nevada, Oregon and Washington)[9] for hyperbaric exposures occurring during similar subaqueous tunnel-construction work provide additional evidence of the effectiveness of this alternative procedure.

B. 29 CFR 1926.803(g)(1)(iii)

The applicant developed, and proposed to implement, an equally effective alternative to 29 CFR 1926.803(g)(1)(iii), which requires the use of automatic controllers that continuously decrease pressure to achieve decompression in accordance with the tables specified by the standard. The applicant's alternative includes using the 1992 French Decompression Tables for guiding staged decompression to achieve lower occurrences of DCI, using a trained and competent attendant for implementing appropriate hyperbaric entry and exit procedures, and providing a competent hyperbaric supervisor and attending physician certified in hyperbaric medicine to oversee all hyperbaric operations.

In reaching this conclusion, OSHA again notes the experience of previous nearly identical tunneling variances, the experiences of States with OSHA-approved State Plans, and a review of the literature and other information noted earlier.

[6] Anderson HL (2002). Decompression sickness during construction of the Great Belt tunnel, Denmark. *Undersea and Hyperbaric Medicine,* 29(3), pp. 172–188.

[7] Le Péchon JC, Barre P, Baud JP, Ollivier F (September 1996). Compressed air work—French Tables 1992—operational results. *JCLP Hyperbarie Paris, Centre Medical Subaquatique Interentreprise, Marseille: Communication a l'EUBS,* pp. 1–5 (see Ex. OSHA–2012–0036–0005).

[8] Section 18 of the OSH Act, Congress expressly provides that States and U.S. territories may adopt, with Federal approval, a plan for the development and enforcement of occupational safety and health standards. OSHA refers to States and territories which have developed and are operating their own job safety and health programs as ''States with OSHA-approved State Plans.'' Their programs must be at least as effective in providing safe and healthful employment and places of employment as the Federal standards (29 U.S.C. 667).

[9] These State variances are available in the docket for the 2015 Traylor JV variance: Exs. OSHA–2012–0035–0006 (Nevada), OSHA–2012–0035–0005 (Oregon), and OSHA–2012–0035–0004 (Washington).

C. 29 CFR 1926.803(g)(1)(xvii)

The applicant developed, and proposed to implement, an effective alternative to the use of the special decompression chamber required by 29 CFR 1926.803(g)(1)(xvii). The TBM's man-lock and working chamber appear to satisfy all of the conditions of the special decompression chamber, including that they provide sufficient space for the maximum crew of three CAWs to stand up and move around, and safely accommodate decompression times up to 360 minutes. Therefore, again noting OSHA's previous experience with nearly identical variances including the same alternative, OSHA preliminarily determined that the TBM's man-lock and working chamber function as effectively as the special decompression chamber required by the standard.

Based on a review of available evidence, the experience of State Plans that granted variances (Nevada, Oregon, and Washington) [10] for hyperbaric exposures occurring during similar subaqueous tunnel-construction work, and the information provided in the applicant's variance application, OSHA is granting the permanent variance.

Pursuant to Section 6(d) of the Occupational Safety and Health Act of 1970 (29 U.S.C. 655(d)), and based on the record discussed above, the agency finds that when Ballard complies with the conditions of the following order, the working conditions of the workers are at least as safe and healthful as if it complied with the working conditions specified by paragraphs (f)(1), (g)(1)(iii), and (g)(1)(xvii) of 29 CFR 1926.803. Therefore, Ballard must: (1) comply with the conditions listed below under ''Conditions Specified for the Permanent Variance'' for the period between the date of this notice and completion of the Lower Olentangy Tunnel Project; (2) comply fully with all other applicable provisions of 29 CFR part 1926; and (3) provide a copy of this **Federal Register** notice to all employees affected by the conditions, including the affected employees of other employers, using the same means it used to inform these employees of the application for a permanent variance. Additionally, this order will remain in effect until one of the following conditions occurs: (1) completion of the Lower Olentangy Tunnel Project; or (2) OSHA modifies or revokes this final order in accordance with 29 CFR 1905.13.

[10] These state variances are available in the docket: Exs. OSHA–2012–0035–0006 (Nevada), OSHA–2012–0035–0007 (Oregon), and OSHA–2012–0035–0008 (Washington).

VI. Description of the Specified Conditions for the Permanent Variance

The conditions for the variance are set out in the Order at the end of this document. This section provides additional detail regarding the conditions in the Order.

Condition A: Scope

The scope of the permanent variance limits coverage to the work situations specified. Clearly defining the scope of the permanent variance provides Ballard, Ballard's employees, potential future applicants, other stakeholders, the public, and OSHA with necessary information regarding the work situations in which the permanent variance applies. To the extent that Ballard exceeds the defined scope of this variance, it will be required to comply with OSHA's standards. This permanent variance applies only to the applicant, Ballard, and only to the remainder of construction work on the Lower Olentangy Tunnel Project.

Condition B: List of Abbreviations

Condition B defines abbreviations used in the permanent variance. OSHA believes that defining these abbreviations serves to clarify and standardize their usage, thereby enhancing the applicant's and its employees' understanding of the conditions specified by the permanent variance.

Condition C: Definitions

The condition defines a series of terms, mostly technical terms, used in the permanent variance to standardize and clarify their meaning. OSHA believes that defining these terms serves to enhance the applicant's and its employees' understanding of the conditions specified by the permanent variance.

Condition D: Safety and Health Practices

This condition requires the applicant to develop and submit to OSHA an HOM specific to the Lower Olentangy Tunnel Project at least six months before using the TBM for tunneling operations. The applicant must also submit, at least six months before using the TBM, proof that the TBM's hyperbaric chambers have been designed, fabricated, inspected, tested, marked, and stamped in accordance with the requirements of ASME PVHO–1.2019 (or the most recent edition of *Safety Standards for Pressure Vessels for Human Occupancy*). These requirements ensure that the applicant develops hyperbaric safety and health procedures suitable for the project.

The submission of the HOM enables OSHA to determine whether the safety and health instructions and measures it specifies are appropriate to the field conditions of the tunnel (including expected geological conditions), conform to the conditions of the variance, and adequately protect the safety and health of the CAWs. It also facilitates OSHA's ability to ensure that the applicant is complying with these instructions and measures. The requirement for proof of compliance with ASME PVHO–1.2019 is intended to ensure that the equipment is structurally sound and capable of performing to protect the safety of the employees exposed to hyperbaric pressure. The applicant has submitted the HOM and proof of compliance with ASME PVHO–1.2019.

Additionally, the condition includes a series of related hazard prevention and control requirements and methods (*e.g.,* decompression tables, job hazard analyses (JHA), operations and inspections checklists, incident investigation, and recording and notification to OSHA of recordable hyperbaric injuries and illnesses) designed to ensure the continued effective functioning of the hyperbaric equipment and operating system.

Condition E: Communication

This condition requires the applicant to develop and implement an effective system of information sharing and communication. Effective information sharing and communication are intended to ensure that affected workers receive updated information regarding any safety-related hazards and incidents, and corrective actions taken, prior to the start of each shift. The condition also requires the applicant to ensure that reliable means of emergency communications are available and maintained for affected workers and support personnel during hyperbaric operations. Availability of such reliable means of communications enables affected workers and support personnel to respond quickly and effectively to hazardous conditions or emergencies that may develop during TBM operations.

Condition F: Worker Qualification and Training

This condition requires the applicant to develop and implement an effective qualification and training program for affected workers. The condition specifies the factors that an affected worker must know to perform safely during hyperbaric operations, including how to enter, work in, and exit from hyperbaric conditions under both

normal and emergency conditions. Having well-trained and qualified workers performing hyperbaric intervention work is intended to ensure that they recognize, and respond appropriately to, hyperbaric safety and health hazards. These qualification and training requirements enable affected workers to cope effectively with emergencies, as well as the discomfort and physiological effects of hyperbaric exposure, thereby preventing worker injury, illness, and fatalities.

Paragraph (2)(e) of this condition requires the applicant to provide affected workers with information they can use to contact the appropriate healthcare professionals if the workers believe they are developing hyperbaric-related health effects. This requirement provides for early intervention and treatment of DCI and other health effects resulting from hyperbaric exposure, thereby reducing the potential severity of these effects.

Condition G: Inspections, Tests, and Accident Prevention

Condition G requires the applicant to develop, implement, and operate a program of frequent and regular inspections of the TBM's hyperbaric equipment and support systems, and associated work areas. This condition helps to ensure the safe operation and physical integrity of the equipment and work areas necessary to conduct hyperbaric operations. The condition also enhances worker safety by reducing the risk of hyperbaric-related emergencies.

Paragraph (3) of this condition requires the applicant to document tests, inspections, corrective actions, and repairs involving the TBM, and maintain these documents at the jobsite for the duration of the job. This requirement provides the applicant with information needed to schedule tests and inspections to ensure the continued safe operation of the equipment and systems, and to determine that the actions taken to correct defects in hyperbaric equipment and systems were appropriate, prior to returning them to service.

Condition H: Compression and Decompression

This condition requires the applicant to consult with the designated medical advisor regarding special compression or decompression procedures appropriate for any unacclimated CAW and then implement the procedures recommended by the medical advisor. This proposed provision ensures that the applicant consults with the medical advisor, and involves the medical advisor in the evaluation, development, and implementation of compression or decompression protocols appropriate for any CAW requiring acclimation to the hyperbaric conditions encountered during TBM operations. Accordingly, CAWs requiring acclimation have an opportunity to acclimate prior to exposure to these hyperbaric conditions. OSHA believes this condition will prevent or reduce adverse reactions among CAWs to the effects of compression or decompression associated with the intervention work they perform in the TBM.

Condition I: Recordkeeping

Under OSHA's recordkeeping requirements in 29 CFR part 1904 regarding Recording and Reporting Occupational Injuries and Illnesses, the employer must maintain a record of any recordable injury, illness, or fatality (as defined by 29 CFR part 1904) resulting from exposure of an employee to hyperbaric conditions, or any other work condition, by completing the OSHA Form 301 Incident Report and OSHA Form 300 Log of Work-Related Injuries and Illnesses. The applicant did not seek a variance from this standard and therefore Ballard must comply fully with those requirements.

Examples of important information to include on the OSHA Form 301 Injury and Illness Incident Report (along with the corresponding questions on the form) are:

Q14

- the task performed;
- the composition of the gas mixture (*e.g.,* air or oxygen);
- an estimate of the CAW's workload;
- the maximum working pressure;
- temperature in the work and decompression environments;
- unusual occurrences, if any, during the task or decompression

Q15

- time of symptom onset;
- duration between decompression and onset of symptoms

Q16

- type and duration of symptoms;
- a medical summary of the illness or injury

Q17

- duration of the hyperbaric intervention;
- possible contributing factors;
- the number of prior interventions completed by the injured or ill CAW;

and the pressure to which the CAW was exposed during those interventions.[11]

Condition J below adds additional reporting responsibilities, beyond those already required by the OSHA standard. The applicant is required to maintain records of specific factors associated with each hyperbaric intervention. The information gathered and recorded under Condition J, in concert with the information provided under Condition I (using OSHA Form 301 Injury and Illness Incident Report to investigate and record hyperbaric recordable injuries as defined by 29 CFR 1904.4, 1904.7, and 1904.8 -.12), enables the applicant and OSHA to assess the effectiveness of the permanent variance in preventing DCI and other hyperbaric-related effects.

Condition J: Notifications

Under the notifications condition, the applicant is required, within specified periods of time, to notify OSHA of: (1) any recordable injury, illness, in-patient hospitalization, amputation, loss of an eye, or fatality that occurs as a result of hyperbaric exposures during TBM operations; and in-patient hospitalization, amputation, loss of an eye or fatality that occurs during other operations must also be reported pursuant to 29 CFR 1910.39(a); (2) provide OSHA a copy of the hyperbaric exposures incident investigation report (using OSHA Form 301 Injury and Illness Incident Report) of these events within 24 hours of the incident; (3) include on OSHA Form 301 Injury and Illness Incident Report information on the hyperbaric conditions associated with the recordable injury or illness, the root-cause determination, and preventive and corrective actions identified and implemented; (4) provide the certification that affected workers were informed of the incident and the results of the incident investigation; (5) notify OSHA's Office of Technical Programs and Coordination Activities (OTPCA) and the OSHA Area Office in Columbus, Ohio within 15 working days should the applicant need to revise the HOM to accommodate changes in its compressed-air operations that affect Ballard's ability to comply with the conditions of the permanent variance; and (6) provide OTPCA and the OSHA Area Office in Columbus, Ohio, at the end of the project, with a report evaluating the effectiveness of the decompression tables.

[11] See 29 CFR 1904 Recording and Reporting Occupational Injuries and Illnesses *(http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9631);* recordkeeping forms and instructions *https://www.osha.gov/recordkeeping/forms.*

It should be noted that the requirement for completing and submitting the hyperbaric exposure-related (recordable) incident investigation report (OSHA 301 Injury and Illness Incident Report) is more restrictive than the current recordkeeping requirement of completing OSHA Form 301 Injury and Illness Incident Report within 7 calendar days of the incident (1904.29(b)(3)). This modified, more stringent incident investigation and reporting requirement is restricted to intervention-related hyperbaric (recordable) incidents only. Providing rapid notification to OSHA is essential because time is a critical element in OSHA's ability to determine the continued effectiveness of the variance conditions in preventing hyperbaric incidents, and the applicant's identification and implementation of appropriate corrective and preventive actions.

Further, these notification requirements also enable the applicant, its employees, and OSHA to assess the effectiveness of the permanent variance in providing the requisite level of safety to the applicant's workers and based on this assessment, whether to revise or revoke the conditions of the permanent variance. Timely notification permits OSHA to take whatever action may be necessary and appropriate to prevent possible further injuries and illnesses. Providing notification to employees informs them of the precautions taken by the applicant to prevent similar incidents in the future.

Additionally, this condition requires the applicant to notify OSHA if it ceases to do business, has a new address or location for the main office, or transfers the operations covered by the permanent variance to a successor company. In addition, the condition specifies that the transfer of the permanent variance to a successor company must be approved by OSHA. These requirements allow OSHA to communicate effectively with the applicant regarding the status of the permanent variance and expedite the agency's administration and enforcement of the permanent variance. Stipulating that the applicant is required to have OSHA's approval to transfer a variance to a successor company provides assurance that the successor company has knowledge of, and will comply with, the conditions specified by the permanent variance, thereby ensuring the safety of workers involved in performing the operations covered by the permanent variance.

VII. Order

As of the effective date of this final order, OSHA is revoking the interim order granted to the employer on March 27, 2024 (89 FR 21274) and replacing it with a permanent variance order. Note that there are not any substantive changes in the conditions between the interim order and this final order.

OSHA issues this final order authorizing Ballard to comply with the following conditions instead of complying with the requirements of 29 CFR 1926.803 (f)(1), (g)(1)(iii), and (g)(1)(xvii). These conditions are:

A. Scope

The permanent variance applies only when Ballard stops the tunnel-boring work, pressurizes the working chamber, and the CAWs either enter the working chamber to perform an intervention (*i.e.,* inspect, maintain, or repair the mechanical-excavation components), or exit the working chamber after performing interventions.

The permanent variance applies only to work:

1. That occurs in conjunction with construction of the Lower Olentangy Tunnel Project, a tunnel constructed using advanced shielded mechanical-excavation techniques and involving operation of a TBM;
2. In the TBM's forward section (the working chamber) and associated hyperbaric chambers used to pressurize and decompress employees entering and exiting the working chamber; and
3. Performed in compliance with all applicable provisions of 29 CFR part 1926 except for the requirements specified by 29 CFR 1926.803 (f)(1), (g)(1)(iii), and (g)(1)(xvii).
4. This order will remain in effect until one of the following conditions occurs: (1) completion of the Lower Olentangy Tunnel Project; or (2) OSHA modifies or revokes this final order in accordance with 29 CFR 1905.13.

B. List of Abbreviations

Abbreviations used throughout this permanent variance includes the following:

1. CAW—Compressed-air worker
2. CFR—Code of Federal Regulations
3. DCI—Decompression Illness
4. DMT—Diver Medical Technician
5. TBM—Earth Pressure Balanced Micro-Tunnel Boring Machine
6. HOM—Hyperbaric Operations Manual
7. JHA—Job hazard analysis
8. OSHA—Occupational Safety and Health Administration
9. OTPCA—Office of Technical Programs and Coordination Activities

C. Definitions

The following definitions apply to this permanent variance, Ballard's project-specific HOM, and all work carried out under the conditions of this permanent variance.

1. Affected employee or worker—an employee or worker who is affected by the conditions of this permanent variance, or any one of his or her authorized representatives. The term ''employee'' has the meaning defined and used under the Occupational Safety and Health Act of 1970 (29 U.S.C. 651 *et seq.*).

2. Atmospheric pressure—the pressure of air at sea level, generally 14.7 pounds per square inch absolute (p.s.i.a.), 1 atmosphere absolute, or 0 pounds per square inch gauge (p.s.i.g.).

3. Compressed-air worker—an individual who is specially trained and medically qualified to perform work in a pressurized environment while breathing air at pressures not exceeding 27 p.s.i.g.

4. Competent person—an individual who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.[12]

5. Decompression illness—an illness (also called decompression sickness or ''the bends'') caused by gas bubbles appearing in body compartments due to a reduction in ambient pressure. Examples of symptoms of decompression illness include, but are not limited to: joint pain (also known as the ''bends'' for agonizing pain or the ''niggles'' for slight pain); areas of bone destruction (termed dysbaric osteonecrosis); skin disorders (such as cutis marmorata, which causes a pink marbling of the skin, or in people with darker skin tones, the rash will appear as a marbled or lacy dark brown or purplish color); spinal cord and brain disorders (such as stroke, paralysis, paresthesia, and bladder dysfunction); cardiopulmonary disorders, such as shortness of breath; and arterial gas embolism (gas bubbles in the arteries that block blood flow).[13]

Note: Health effects associated with hyperbaric intervention, but not considered symptoms of DCI, can include: barotrauma (direct damage to air-containing cavities in the body such as ears, sinuses, and lungs);

[12] Adapted from 29 CFR 1926.32(f).

[13] See Appendix 10 of ''A Guide to the Work in Compressed-Air Regulations 1996,'' published by the United Kingdom Health and Safety Executive available from NIOSH at *http://www.cdc.gov/niosh/docket/archive/pdfs/NIOSH-254/compReg1996.pdf.*

nitrogen narcosis (reversible alteration in consciousness that may occur in hyperbaric environments and is caused by the anesthetic effect of certain gases at high pressure); and oxygen toxicity (a central nervous system condition resulting from the harmful effects of breathing molecular oxygen (O_2) at elevated partial pressures).

6. Diver Medical Technician—Member of the dive team who is experienced in first aid.

7. Earth Pressure Balanced Tunnel Boring Machine—the machinery used to excavate a tunnel.

8. Hot work—any activity performed in a hazardous location that may introduce an ignition source into a potentially flammable atmosphere.[14]

9. Hyperbaric—at a higher pressure than atmospheric pressure.

10. Hyperbaric intervention—a term that describes the process of stopping the TBM and preparing and executing work under hyperbaric pressure in the working chamber for the purpose of inspecting, replacing, or repairing cutting tools and/or the cutterhead structure.

11. Hyperbaric Operations Manual—a detailed, project-specific health and safety plan developed and implemented by Ballard for working in compressed air during the Lower Olentangy Tunnel Project.

12. Job hazard analysis—an evaluation of tasks or operations to identify potential hazards and to determine the necessary controls.

13. Man-lock—an enclosed space capable of pressurization, and used for compressing or decompressing any employee or material when either is passing into, or out of, a working chamber.

14. Medical Advisor—medical professional experienced in the physical requirements of compressed air work and the treatment of decompression illness.

15. Pressure—a force acting on a unit area. Usually expressed as pounds per square inch (p.s.i.).

16. p.s.i.—pounds per square inch, a common unit of measurement of pressure; a pressure given in p.s.i. corresponds to absolute pressure.

17. p.s.i.a.—pounds per square inch absolute, or absolute pressure, is the sum of the atmospheric pressure and gauge pressure. At sea-level, atmospheric pressure is approximately 14.7 p.s.i.a. Adding 14.7 to a pressure expressed in units of p.s.i.g. will yield the absolute pressure, expressed as p.s.i.a.

18. p.s.i.g.—pounds per square inch gauge, a common unit of pressure; pressure expressed as p.s.i.g. corresponds to pressure relative to atmospheric pressure. At sea-level, atmospheric pressure is approximately 14.7 p.s.i.a. Subtracting 14.7 from a pressure expressed in units of p.s.i.a. yields the gauge pressure, expressed as p.s.i.g. At sea level the gauge pressure is 0 p.s.i.g.

19. Qualified person—an individual who, by possession of a recognized degree, certificate, or professional standing, or who, by extensive knowledge, training, and experience, successfully demonstrates an ability to solve or resolve problems relating to the subject matter, the work, or the project.[15]

20. Working chamber—an enclosed space in the TBM in which CAWs perform interventions, and which is accessible only through a man-lock.

D. Safety and Health Practices

1. Ballard must implement the project-specific HOM submitted to OSHA as part of the application (see OSHA–2024–0003–0003). The HOM provides the minimum requirements regarding expected safety and health hazards (including anticipated geological conditions) and hyperbaric exposures during the tunnel-construction project.

2. Ballard must demonstrate that the TBM on the project is designed, fabricated, inspected, tested, marked, and stamped in accordance with the requirements of ASME PVHO–1.2019 (or most recent edition of *Safety Standards for Pressure Vessels for Human Occupancy*) for the TBM's hyperbaric chambers.

3. Ballard must implement the safety and health instructions included in the manufacturer's operations manuals for the TBM, and the safety and health instructions provided by the manufacturer for the operation of decompression equipment.

4. Ballard must ensure that there are no exposures to pressures greater than 27 p.s.i.g.

5. Ballard must ensure that air or oxygen is the only breathing gas in the working chamber.

6. Ballard must follow the 1992 French Decompression Tables for air or oxygen decompression as specified in the HOM; specifically, the extracted portions of the 1992 French Decompression tables titled, ''French Regulation Air Standard Tables.''

7. Ballard must equip man-locks used by employees with an air or oxygen delivery system, as specified by the HOM for the project. Ballard is prohibited from storing in the tunnel any oxygen or other compressed gases used in conjunction with hyperbaric work.

8. Workers performing hot work under hyperbaric conditions must use flame-retardant personal protective equipment and clothing.

9. In hyperbaric work areas, Ballard must maintain an adequate fire-suppression system approved for hyperbaric work areas.

10. Ballard must develop and implement one or more job hazard analysis (JHA) for work in the hyperbaric work areas, and review, periodically and as necessary (*e.g.,* after making changes to a planned intervention that affects its operation), the contents of the JHAs with affected employees. The JHAs must include all the job functions that the risk assessment indicates are essential to prevent injury or illness.

11. Ballard must develop a set of checklists to guide compressed-air work and ensure that employees follow the procedures required by the permanent variance (including all procedures required by the HOM approved by OSHA for the project, which this permanent variance incorporates by reference). The checklists must include all steps and equipment functions that the risk assessment indicates are essential to prevent injury or illness during compressed-air work.

12. Ballard must ensure that the safety and health provisions of this project-specific HOM adequately protect the workers of all contractors and subcontractors involved in hyperbaric operations for the project to which the HOM applies.

E. Communication

1. Prior to beginning a shift, Ballard must implement a system that informs workers exposed to hyperbaric conditions of any hazardous occurrences or conditions that might affect their safety, including hyperbaric incidents, gas releases, equipment failures, earth or rockslides, cave-ins, flooding, fires, or explosions.

2. Ballard must provide a power-assisted means of communication among affected workers and support personnel in hyperbaric conditions where unassisted voice communication is inadequate.

(a) Ballard must use an independent power supply for powered communication systems, and these systems have to operate such that use or disruption of any one phone or signal location will not disrupt the operation of the system from any other location.

[14] Also see 29 CFR 1910.146(b).

[15] Adapted from 29 CFR 1926.32(m).

(b) Ballard must test communication systems at the start of each shift and as necessary thereafter to ensure proper operation.

F. Worker Qualifications and Training

Ballard must:

1. Ensure that each affected worker receives effective training on how to safely enter, work in, exit from, and undertake emergency evacuation or rescue from, hyperbaric conditions, and document this training.

2. Provide effective instruction on hyperbaric conditions, before beginning hyperbaric operations, to each worker who performs work, or controls the exposure of others, and document this instruction. The instruction must include:

(a) The physics and physiology of hyperbaric work;

(b) Recognition of pressure-related injuries;

(c) Information on the causes and recognition of the signs and symptoms associated with decompression illness, and other hyperbaric intervention-related health effects (*e.g.,* barotrauma, nitrogen narcosis, and oxygen toxicity);

(d) How to avoid discomfort during compression and decompression;

(e) Information the workers can use to contact the appropriate healthcare professionals should the workers have concerns that they may be experiencing adverse health effects from hyperbaric exposure; and

(f) Procedures and requirements applicable to the employee in the project-specific HOM.

3. Repeat the instruction specified in paragraph (G) of this condition periodically and as necessary (*e.g.,* after making changes to its hyperbaric operations).

4. When conducting training for its hyperbaric workers, make this training available to OSHA personnel and notify the OTPCA at OSHA's national office and OSHA's Columbus, Ohio Area Office before the training takes place.

G. Inspections, Tests, and Accident Prevention

1. Ballard must initiate and maintain a program of frequent and regular inspections of the TBM's hyperbaric equipment and support systems (such as temperature control, illumination, ventilation, and fire-prevention and fire-suppression systems), and hyperbaric work areas, as required under 29 CFR 1926.20(b)(2), including:

(a) Developing a set of checklists to be used by a competent person in conducting weekly inspections of hyperbaric equipment and work areas; and

(b) Ensuring that a competent person conducts daily visual checks and weekly inspections of the TBM.

2. Ballard must remove any equipment that is found to constitute a safety hazard until Ballard corrects the hazardous condition and has the correction approved by a qualified person.

3. Ballard must maintain records of all tests and inspections of the TBM, as well as associated corrective actions and repairs, at the job site for the duration of the tunneling project and for 90 days after the final project report is submitted to OSHA.

H. Compression and Decompression

Ballard must consult with its attending physician concerning the need for special compression or decompression exposures appropriate for CAWs not acclimated to hyperbaric exposure.

I. Recordkeeping

In addition to completing OSHA Form 301 Injury and Illness Incident Report and OSHA Form 300 Log of Work-Related Injuries and Illnesses, Ballard must maintain records of:

1. The date, times (*e.g.,* time compression started, time spent compressing, time performing intervention, time spent decompressing), and pressure for each hyperbaric intervention.

2. The names of all supervisors and DMTs involved for each intervention.

3. The name of each individual worker exposed to hyperbaric pressure and the decompression protocols and results for each worker.

4. The total number of interventions and the amount of hyperbaric work time at each pressure.

5. The results of the post-intervention physical assessment of each CAW for signs and symptoms of decompression illness, barotrauma, nitrogen narcosis, oxygen toxicity or other health effects associated with work in compressed air for each hyperbaric intervention.

J. Notifications

1. To assist OSHA in administering the conditions specified herein, Ballard must:

(a) Notify the OTPCA and the OSHA Area Office in Columbus, Ohio at *www.osha.gov/contactus/byoffice* of any recordable injury, illness, or fatality (by submitting the completed OSHA Form 301 Injury and Illness Incident Report) [16] resulting from exposure of an employee to hyperbaric conditions, including those that do not require recompression treatment (*e.g.,* nitrogen narcosis, oxygen toxicity, barotrauma), but still meet the recordable injury or illness criteria of 29 CFR 1904. The notification must be made within 8 hours of the incident or 8 hours after becoming aware of a recordable injury, illness, or fatality; a copy of the incident investigation (OSHA Form 301 Injuries and Illness Incident Report) must be submitted to OSHA within 24 hours of the incident or 24 hours after becoming aware of a recordable injury, illness, or fatality. In addition to the information required by OSHA Form 301 Injuries and Illness Incident Report, the incident-investigation report must include a root-cause determination, and the preventive and corrective actions identified and implemented.

(b) Provide certification to OTPCA and the OSHA Area Office in Columbus, Ohio within 15 working days of the incident that Ballard informed affected workers of the incident and the results of the incident investigation (including the root-cause determination and preventive and corrective actions identified and implemented).

(c) Notify the OTPCA and the OSHA Area Office in Columbus, Ohio within 15 working days and in writing, of any change in the compressed-air operations that affects Ballard's ability to comply with the conditions specified herein.

(d) Upon completion of the Lower Olentangy Tunnel Project, evaluate the effectiveness of the decompression tables used throughout the project, and provide a written report of this evaluation to the OTPCA and the OSHA Area Office in Columbus, Ohio.

Note: The evaluation report must contain summaries of: (1) The number, dates, durations, and pressures of the hyperbaric interventions completed; (2) decompression protocols implemented (including composition of gas mixtures (air and/or oxygen), and the results achieved; (3) the total number of interventions and the number of hyperbaric incidents (decompression illnesses and/or health effects associated with hyperbaric interventions as recorded on OSHA Form 301 Injuries and Illness Incident Report and OSHA Form 300 Log of Work-Related Injuries and Illnesses, and relevant medical diagnoses, and treating physicians' opinions); and (4) root causes of any hyperbaric incidents, and preventive and corrective actions identified and implemented.

(e) To assist OSHA in administering the conditions specified herein, inform the OTPCA and the OSHA Area Office

[16] See 29 CFR 1904 (Recording and Reporting Occupational Injuries and Illnesses) (*http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9631*); recordkeeping forms and instructions *https://www.osha.gov/recordkeeping/forms.*

in Columbus, Ohio as soon as possible, but no later than seven (7) days, after it has knowledge that it will:

(i) Cease doing business;

(ii) Change the location and address of the main office for managing the tunneling operations specified herein; or

(iii) Transfer the operations specified herein to a successor company.

(f) Notify all affected employees of this permanent variance by the same means required to inform them of its application for a permanent variance.

2. This permanent variance cannot be transferred to a successor company without OSHA approval.

OSHA hereby grants a permanent variance to Ballard Marine Construction for the

completion of the Lower Olentangy Tunnel Project in Columbus, Ohio.

VIII. Authority and Signature

Douglas L. Parker, Assistant Secretary of Labor for Occupational Safety and Health, 200 Constitution Avenue NW, Washington, DC 20210, authorized the preparation of this notice. Accordingly, the agency is issuing this notice pursuant to 29 U.S.C. 655(d), Secretary of Labor's Order No. 8–2020 (85 FR 58393, Sept. 18, 2020), and 29 CFR 1905.11.

Signed at Washington, DC, on September 3, 2024.

Douglas L. Parker,

Assistant Secretary of Labor for Occupational Safety and Health.

[FR Doc. 2024–22002 Filed 9–25–24; 8:45 am]

BILLING CODE 4510–26–P

NATIONAL SCIENCE FOUNDATION

Networking and Information Technology Research and Development Request for Information on a National Plan for Cyber-Physical Systems Resilience

AGENCY: Networking and Information Technology Research and Development (NITRD) National Coordination Office (NCO), National Science Foundation.

ACTION: Request for information.

SUMMARY: On behalf of Office of Science and Technology Policy (OSTP), the NITRD National Coordination Office seeks public input for the creation of a National Plan for Cyber-Physical Systems Resilience Research (the Plan). The goal of the plan is to shape a whole-of-government research and development (R&D) plan related to cyber-physical resilience across systems that may be local, regional, or national in scope. As defined in the President's Council of Advisors on Science and Technology (PCAST) Report, *Strategy for Cyber-Physical Resilience: Fortifying Our Critical Infrastructure for a Digital World,* cyber-physical systems are defined as physical systems that rely on computing technologies for sensing, analysis, tracking, controls, connectivity, coordination, and human-system interaction. The *National Climate Resilience Framework defines resilience as the* ability to prepare for threats and hazards, adapt to changing conditions, and withstand and recover rapidly from adverse conditions and disruptions. From the perspective of the RFI, the system recovery period and performance are acceptable from a social and technical perspective. These definitions will be used for the purposes of this RFI, but respondents are welcome to provide alternate definitions if cyber-physical systems have a different meaning in their industry or field, along with the scientific rationale for specific use-cases. The Plan is scheduled to be released in 2025.

DATES: Interested persons are invited to submit comments on or before 11:59 p.m. (ET) on October 26, 2024.

ADDRESSES: Comments submitted in response to this RFI may be sent by any of the following methods:

- *Email: CPSR-ftacRFI@nitrd.gov;* Email submissions should be machine-readable and not be copy-protected. Submissions should include ''RFI Response: Cyber-Physical Systems Resilience R&D Plan'' in the subject line of the message.
- *Mail:* Attn: Melissa Cornelius, 2415 Eisenhower Avenue, Alexandria, VA 22314, USA.

Instructions: Response to this RFI is voluntary. Each individual or institution is requested to submit only one response. Submissions must not exceed 10 pages in 12 point or larger font, with a page number provided on each page. Responses must include the name of the person(s) or organization(s) filing the comment and the following statement: ''This document is approved for public dissemination. The document contains no business-proprietary or confidential information. Document contents may be reused by the government in the National Cyber-Physical Systems Resilience R&D Strategic Plan and associated documents without attribution.''

Responses to this RFI may be posted online at *https://www.nitrd.gov/.* Therefore, we request that no business proprietary information, copyrighted information, or sensitive personally identifiable information be submitted as part of your response to this RFI.

In accordance with FAR 15.202(3), responses to this notice are not offers and cannot be accepted by the Government to form a binding contract. Responders are solely responsible for all expenses associated with responding to this RFI.

FOR FURTHER INFORMATION CONTACT: David Alexander, David Corman, Kristin Ludwig, Melissa Cornelius, Martin Stanley at *CPSR-ftacRFI@nitrd.gov* or (202) 459–9674. Individuals who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 1–800–877–8339 between 8 a.m. and 8 p.m., eastern time, Monday through Friday, except for U.S. Federal Government holidays.

SUPPLEMENTARY INFORMATION: The (PCAST) released its report, *Strategy for Cyber-Physical Resilience: Fortifying our Critical Infrastructure for a Digital World.* The report makes recommendations to formulate a National Plan for Cyber-Physical Resilience Research. The goal is to enable focused research across Federal programs that increase the likelihood of successful research results, but more importantly help ensure that such results will transition into practice. In response to this, the Fast-Track Action Committee (FTAC) on Cyber-Physical Systems Resilience (CPSR) is developing a National Cyber Physical Systems Resilience (R&D) Strategic Plan (the Plan) which will define research needs that will strengthen our national capability to cyber-physical resilience; identify the gaps; and define research needs, and investment priorities spanning across multiple time horizons. The Plan will coordinate cross-agencies priorities. Responsible innovation in cyber physical resilience could provide significant benefits for the American people especially as systems need to adapt to emergent behaviors or operating conditions far exceeding design specifications.

Information Requested: This RFI seeks input to shape a whole-of-government effort on research and development that will strengthen cyber-physical resilience.

In the context of this RFI, we refer to threats to include cybersecurity, physical, natural disasters including extreme weather events or other hazards such as earthquakes, and the potential for adversary use of AI to disrupt systems as well as deceive human operators of critical infrastructure systems.

Threat-agnostic approaches for resilience are of special interest. As part of the input, we are primarily concerned with the ability of cyber-physical