



## Department of Energy

Washington, DC 20585

September 4, 2020

Mr. Sean Dunagan  
President and Project Manager  
Nuclear Waste Partnership, LLC  
4021 National Parks Highway  
Carlsbad, New Mexico 88220

WCO-2020-01

Dear Mr. Dunagan:

The Office of Enterprise Assessments' Office of Enforcement has completed its investigation into the facts and circumstances associated with a series of worker exposure events that occurred in August and October 2018 at the Waste Isolation Pilot Plant (WIPP). The Office of Enforcement conducted an investigation to determine the extent to which NWP was fulfilling its obligations for complying with the occupational exposure limits in 10 C.F.R. Part 851, *Worker Safety and Health Program*, and providing a safe and healthful work environment at WIPP.

NWP reported noncompliances associated with the worker exposure events and area monitoring results into the Department of Energy's (DOE) Noncompliance Tracking System (NTS) under reports NTS-EM-CBFO-NWP-WIPP-2019-0008700, *Heat Stress Program Implementation Weaknesses*, on February 28, 2019, and NTS-EM-CBFO-NWP-WIPP-2019-0008699, *Elevated Air Sample Results*, on March 4, 2019. Furthermore, between July 2018 and March 2019, Nuclear Waste Partnership, LLC (NWP) documented area monitoring results that indicated elevated levels of nitrogen dioxide (NO<sub>2</sub>) when operating diesel-powered equipment in the underground at WIPP.

The Office of Enforcement evaluated information associated with a series of worker overexposures to carbon tetrachloride (CCl<sub>4</sub>) and sulfur dioxide (SO<sub>2</sub>), and two events in which workers reported symptoms of heat stress. In addition, area-monitoring data revealed elevated levels of NO<sub>2</sub> from the operation of diesel powered equipment in the underground. The Office of Enforcement's investigation identified potential deficiencies in NWP's implementation of its industrial hygiene program, which included inadequate identification and assessment of hazardous chemicals and training for employees addressing such hazards; lack of timeliness in providing sample results to affected employees; and heat stress training that did not reflect NWP's current policies. In addition, NWP had not implemented the measures necessary to protect workers from overexposures to hazardous chemicals in accordance with the hierarchy of controls required by Part 851. DOE considers the worker overexposures



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described above to be of moderate safety significance or having a direct relationship on a worker's safety and health. While the worker overexposures were above regulatory thresholds established in Part 851, there was not a potential for death or serious physical harm to occur.

During the investigation, the Office of Enforcement learned that NWP faced challenges with obtaining accurate SO<sub>2</sub>, CCl<sub>4</sub>, and NO<sub>2</sub> results. NWP's sampling strategy for ensuring compliance with the *American Conference of Governmental Industrial Hygienists Threshold Limit Values* relied heavily on direct reading instrumentation and passive monitoring for breathing zone samples, as well as area sampling due its practicality, and because most of the work conducted at WIPP is dynamic in nature. However, the sampling and analytical methods were problematic due to issues with the accuracy of direct reading instrumentation; influences of changes in temperature, relative humidity, and pressure on monitoring results; and analytical methods that lacked sufficient sensitivity. Since these events, NWP has made changes to its sampling methodology and has chosen sampling and analytical methods that are less prone to error. NWP has committed to implementing a Hazard Abatement Plan, which incrementally reduces worker exposures to NO<sub>2</sub> in the underground at WIPP, and to the completion of a longer-term Compliance Attainment Plan, for meeting the occupational exposure limits required by Part 851.

In accordance with 10 C.F.R. § 851.41, *Settlement*, the Office of Enforcement has elected to resolve the potential regulatory violations with requirements enforceable under 10 C.F.R. Part 851, *Worker Safety and Health Program*, through execution of a Consent Order. In deciding to enter into this Consent Order, DOE placed considerable weight on NWP's identification of weaknesses in the industrial hygiene program, NWP's efforts to improve its work practices and policies, and NWP's comprehensive corrective actions that will provide for compliance with the occupational exposure limits required in the current version of 10 C.F.R. Part 851.

DOE reserves the right to re-open this investigation if it is later determined that NWP provided any false or materially inaccurate information. Further, if there is a recurrence of the industrial hygiene program deficiencies or failure to comply with the terms and conditions prescribed in the Consent Order (or other related actions that NWP subsequently determines to be necessary) to prevent recurrence, then the Office of Enforcement may pursue additional enforcement activity. The Office of Enforcement, the Office of Environmental Management, and the Carlsbad Field Office will continue to monitor NWP's implementation of worker safety and health requirements until the issues associated with this Consent Order are fully resolved.

Enclosed please find a signed copy of the Consent Order. Please sign, keep a copy for your records, and return the signed copy to the Office of Enforcement within one week from the date of receipt. Please follow all instructions specified

in the enclosure. By signing this Consent Order, NWP agrees to comply with all of the terms specified in section IV of the Consent Order and in the manner prescribed therein.

If you have any questions concerning this Consent Order, please contact me at (301) 903-7707 or your staff may contact Mr. Robert Hailstone, Director, Office of Worker Safety and Health Enforcement, at (301) 903-0100.

Sincerely,



Kevin L. Dressman

Director

Office of Enforcement

Office of Enterprise Assessments

Enclosure: Consent Order (WCO-2020-01)

cc: Reinhard Knerr, CB  
Michael Hendrickson, NWP

**Enclosure**

In the matter of ) Report No. NTS-EM-CBFO-NWP-WIPP-2019-0008699  
) NTS-EM-CBFO-NWP-WIPP-2019-0008700  
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Nuclear Waste Partnership, LLC )  
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) Consent Order WCO-2020-01

**CONSENT ORDER INCORPORATING AGREEMENT BETWEEN THE U.S.  
DEPARTMENT OF ENERGY AND NUCLEAR WASTE PARTNERSHIP, LLC.**

I

Nuclear Waste Partnership, LLC (NWP) is responsible for the management and operation of the Department of Energy's (DOE) Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico. NWP is the prime contractor under Contract No. DE-EM0001971 (Contract), entered into with the DOE's Carlsbad Field Office (CBFO).

II

In accordance with 10 C.F.R. Part 851, *Worker Safety and Health Program*, contractors must implement a comprehensive industrial hygiene program within their workplace. Title 10 C.F.R. § 851.23, *Safety and health standards*, requires contractors to comply with the *American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*. On December 18, 2017, DOE issued a Technical Amendment to Part 851 (Technical Amendment) that, among other changes, required contractors to comply with the 2016 version of the ACGIH Threshold Limit Values (TLV). The requirements of the Technical Amendment became effective January 17, 2018, and compliance was required starting January 17, 2019. The update reduced the exposure limits of various chemicals, including nitrogen dioxide (NO<sub>2</sub>), which went from an 8-hour time weighted average (TWA) of 3 parts per million (ppm) to 0.2 ppm. The short-term exposure limit (STEL) for sulfur dioxide (SO<sub>2</sub>) was also reduced, from 5 ppm to 0.25 ppm. The TWA for SO<sub>2</sub> of 2 ppm was eliminated.

On August 14, 2018, an NWP worker suffered symptoms of heat stress while performing planned maintenance on a diesel generator in a metal structure with inadequate ventilation above ground.

On August 29, 2018, an NWP mine worker suffered symptoms of heat stress during bolting operations in a radiologically-contaminated area in the underground.

NWP reported the noncompliances associated with both heat stress events into the DOE Noncompliance Tracking System (NTS) under report NTS-EM-CBFO-NWP-WIPP-2019-0008700, *Heat Stress Program Implementation Weaknesses*, dated February 28, 2019.

In March 2019, NWP identified the following series of instances that occurred in October 2018 during which workers were overexposed to carbon tetrachloride (CCl<sub>4</sub>), SO<sub>2</sub>, and NO<sub>2</sub>:

- On October 12, 2018, a facility shift manager was informed that a waste handler was overexposed to CCl<sub>4</sub> during waste handling activities in the Contact Handling Bay (CH Bay). NWP reported exposure levels above the 8-hour TWA and STEL for CCl<sub>4</sub>.
- On October 16, 2018, a facility shift manager was notified that lapel monitor data for an underground miner operating a diesel roof bolter indicated exposure levels above the 8-hour TWA of 2.0 ppm for SO<sub>2</sub>.
- On October 24, 2018, a facility shift manager was notified that an additional personal sample taken on October 2 in the CH Bay yielded a concentration in excess of the 8-hour TWA for CCl<sub>4</sub>. NWP identified limitations with the original analytical method chosen for quantifying CCl<sub>4</sub> and concluded that the results from the personal sample were inaccurate. As a result, as of November 8, 2018, NWP uses a more accurate analytical method (i.e., gas chromatography/mass spectrometry (GC/MS)), for determining 8-hour TWA personal exposures to CCl<sub>4</sub>. Since switching to GC/MS, NWP has not reported any exceedances of the 8-hour TWA.

NWP reported the noncompliances associated with the three overexposures into DOE's NTS under report NTS-EM-CBFO-NWP-WIPP-2019-0008699, *Elevated Air Sample Results*, dated March 4, 2019. In addition, between July 2018 and March 2019, NWP documented area-monitoring results that indicated elevated levels of NO<sub>2</sub> when operating diesel-powered equipment in the underground at WIPP. Prior to promulgation of the Technical Amendment, NWP reported NO<sub>2</sub> monitoring results that exceeded 4 ppm in the underground.

On January 29, 2019, the DOE Office of Enforcement notified NWP of its decision to investigate the facts and circumstances associated with potential deficiencies in the implementation of NWP's industrial hygiene program consistent with the requirements of Part 851.

DOE conducted an onsite investigation from March 12 through March 14, 2019. Telephone interviews were also conducted March 26 through March 27, 2019.

In an April 15, 2019, letter to the Office of Enforcement, NWP requested a Consent Order to settle this matter under investigation. NWP's request outlined actions being undertaken to improve its industrial hygiene program and ensure effective compliance with applicable requirements, including ACGIH standards, and NWP committed to a series of interim actions including:

- Selection and testing of advanced physiological monitoring equipment to provide real time information of worker heat stress in challenging environments and activities.
- Development and implementation of a sampling plan for the CH Bay to increase sampling and monitoring and to validate sample protocols.
- Enhanced ventilation and exhaust controls in the underground including fresh air dilution and exhaust redirection to well ventilated areas.
- Increased monitoring and sampling for air contaminants in the underground.
- Piloting the use of synthetic diesel fuel in the underground to further reduce hazardous constituents in diesel equipment exhaust.

On April 30, 2019, NWP issued the *Waste Isolation Pilot Plant (WIPP) Hazard Abatement Plan – NO<sub>2</sub>, Revision 7*, to document actions that NWP will implement to achieve compliance with the ACGIH exposure limit for NO<sub>2</sub> in the underground, in accordance with 10 C.F.R. 851.22, *Hazard prevention and abatement*. On December 5, 2019, NWP transmitted to CBFO a letter titled *Submittal of Waste Isolation Pilot Plant NO<sub>2</sub> Compliance Attainment Plan Revision 0, Dated December 4, 2019* (Compliance Attainment Plan). In the letter, NWP provided a long-term plan for meeting air quality standards under Part 851 in the underground at WIPP and a schedule for implementing three major milestones to meet that commitment.

On December 16, 2019, NWP issued a *Root Cause Analysis Report on Inadequate Deployment of Air Monitoring Instruments*, which was a condition of CBFO's approval of NWP's *Hazard Abatement Plan – NO<sub>2</sub>*. NWP concluded that air monitoring instruments had not been procured and deployed with adequate rigor and that the causal factors were indicative of deficiencies in industrial hygiene program implementation at WIPP. NWP identified three corrective actions to reduce the likelihood of similar conditions developing.

As of February 2020, NWP had implemented a number of the measures specified in the *WIPP Hazard Abatement Plan – NO<sub>2</sub>, Revision 7* to address NO<sub>2</sub> in the underground. Specifically, NWP prioritized acquisition of equipment with reduced or null source term NO<sub>2</sub> emissions; modified diesel engines meeting U.S. Environmental Protection Agency (EPA) Tier 3 diesel standards to meet EPA's Tier 4 final engine standards (Tier 4 final engine emissions have a substantial reduction of nitrogen oxides and particulate matter or black soot over Tier 3 engines); and implemented the use of auxiliary fans for increased dilution at the emission source.

Further, NWP conducted air flow testing and modeling in the underground under a variety of fan configurations (e.g., differing operating combinations of an Underground Ventilation Filtration System fan, Interim Ventilation System fans, and a Supplemental Ventilation System (SVS) fan) and identified several areas that required enhancements to improve ventilation. Ventilation enhancements included installation of auxiliary fans to eliminate low flow areas or to provide localized ventilation for specific activities such as bolting in an alcove; identification and sealing of air leaks at bulkheads; increasing the air flow set-point maximum at the SVS from 130,000

cfm to 150,000 cfm; and adjusting regulator positions to increase Panel 8 air flows from a nominal 50,000 cfm to 80,000 cfm.

NWP also developed and implemented a sampling plan for the underground to improve the accuracy and certitude of NWP's understanding of employee exposures to NO<sub>2</sub> as well as other diesel exhaust products using analytical sampling in accordance with established, peer-reviewed methodology; determine adequacy of engineering and administrative control measures; and to make adjustments to ventilation, and worker positioning in response to identification of deteriorating worker conditions based on defined action limits. From January 17, 2019, to December 23, 2019, NWP collected 169 breathing zone samples for NO<sub>2</sub> for a variety of activities including: (1) bolting, (2) haul truck operation, (3) forklift operation, (4) continuous miner operation, and (5) waste handling. Sampling results demonstrate a reduction in risk for NO<sub>2</sub> in the underground (e.g., none of the results exceeded values established in the NO<sub>2</sub> Abatement Plan).

NWP has completed all heat stress program improvements specified in *Nuclear Waste Partnership, LLC, Corrective Action Plan, Potential IH Program Weaknesses*, dated June 18, 2020, including procedural revisions to address physiological monitoring and work modifications to accommodate high heat situations to align with the 2016 ACGIH TLV requirements.

On March 6, 2020, CBFO approved *WIPP Hazard Abatement Plan, Revision 8*. NWP's Compliance Attainment Plan has been incorporated into the *WIPP Hazard Abatement Plan, Revision 8* as Attachment 1. NWP will be periodically updating the *WIPP Hazard Abatement Plan* as information and data is collected and evaluated. Based on this evaluation, priorities and implementation of abatement actions and schedules may be adjusted accordingly.

### III

Pursuant to 10 C.F.R. § 851.41, at any time during enforcement proceedings, DOE may resolve any or all outstanding issues with a Consent Order if the settlement is consistent with 10 C.F.R. Part 851, *Worker Safety and Health Program*.

To resolve potential noncompliances with worker safety and health requirements in the underground, and in consideration of NWP's adequate investigation, causal analyses, and comprehensive corrective actions to address industrial hygiene program deficiencies leading to the noncompliance conditions, DOE and NWP have reached agreement to resolve this matter through execution of this Consent Order.

### IV

Accordingly, the terms of this Consent Order are as follows:

In consideration of the mutual agreements set forth in this section, the sufficiency and adequacy of which are acknowledged by DOE and NWP (hereinafter the "Parties") if fully implemented by NWP, the following terms represent agreement by the authorized representatives of the

Parties to resolve by settlement the potential noncompliances at the Waste Isolation Pilot Plant, in lieu of an enforcement action that DOE may issue pursuant to 10 C.F.R. §§ 851.42-43.

1. NWP shall complete the following actions:

- a. Implement each of the measures described in the document entitled: *Nuclear Waste Partnership, LLC, Corrective Action Plan, Potential IH Program Weaknesses*, dated June 18, 2020, (*NWP Corrective Action Plan*).
- b. Implement measures to address heat stress program improvements specified in the *NWP Corrective Action Plan*, dated June 18, 2020, to prevent recurrence of heat stress related issues.
- c. Implement NWP's *Waste Isolation Pilot Plant (WIPP) Hazard Abatement Plan – NO<sub>2</sub> (WIPP Hazard Abatement Plan)*, Revision 8, dated February 26, 2020, and the identified abatement measures by each due date or per the schedule specified in the Plan. Upon CBFO approval of subsequent versions of the *WIPP Hazard Abatement Plan*, the most recent approved version including identified abatement measures and due dates/schedule supersede Revision 8 and become enforceable under this term.
- d. Provide the Office of Enforcement with a copy of any and all subsequent proposed revisions to *WIPP Hazard Abatement Plan* a minimum of 30 days prior to submittal to CBFO for approval.
- e. Provide the Office of Enforcement with any and all subsequent versions of *WIPP Hazard Abatement Plan* within 30 days of approval by CBFO.
- f. Provide the Office of Enforcement and CBFO with quarterly written updates on the status and results achieved after implementation of corrective actions identified in the *NWP Corrective Action Plan* and the actions identified in the *WIPP Hazard Abatement Plan*.
- g. Notify the Office of Enforcement and CBFO in writing of any actions in items 1a, 1b, or 1c above that requires an extension to the due date at least 30 calendar days before the due date specified.
- h. Notify the Office of Enforcement and CBFO upon completion of all actions specified in items 1a, 1b, and 1c above.
- i. Until completion of the actions specified in this Consent Order, provide the Office of Enforcement and CBFO with a quarterly summary and analysis of air quality measurements and worker occupational exposure assessments performed in the WIPP underground with a comparison to Part 851 exposure limits.
- j. Arrange for and complete an independent effectiveness review (i.e., consisting of a review team with the majority of the members from outside of NWP or its corporate affiliations) within six months of the completion of the *NWP Corrective Action Plan*, and

within six months of the completion of the *WIPP Hazard Abatement Plan*. NWP shall provide the results of the effectiveness reviews to the Office of Enforcement and CBFO within 30 days of their completion.

2. NWP agrees to return a signed copy of this Consent Order electronically via email, within one week from the date of receipt, to the Office of Enforcement.
3. The Effective Date of this Consent Order shall be the date upon which NWP signs this Consent Order.
4. In lieu of the issuance of an enforcement action pursuant to 10 C.F.R. §§ 851.42-851.43, DOE has entered into this Consent Order with NWP. In consideration of the \$100,000 contract fee action already taken relating to these potential noncompliances, and consistent with 10 C.F.R. § 851.5(c), no monetary remedy is included in this Consent Order.
5. This Consent Order shall constitute a full and final settlement of the potential noncompliances identified in the referenced NTS reports, subject to NWP's completion of all actions set forth in item 1 above to the satisfaction of CBFO and the Office of Enforcement.
6. "No cost," as defined in the Federal Acquisition Regulation, 48 C.F.R. § 31.205-47, incurred by, for, or on behalf of NWP relating to coordination and cooperation with DOE concerning the investigation of matters covered by this Consent Order, shall be considered allowable costs under the Contract. However, costs incurred by, for, or on behalf of NWP relating to the development and implementation of corrective actions, including costs associated with the effectiveness reviews required under item 1 above, may be considered allowable costs under the Contract.
7. This Consent Order does not preclude DOE from re-opening the investigation or issuing an enforcement action under 10 C.F.R. § 851.42 with respect to a potential noncompliance if:  
(a) after the Effective Date (as defined in item 3 above), DOE becomes aware of any false or materially inaccurate facts or information provided by NWP; (b) there is a recurrence of worker safety and health deficiencies similar to those identified above; or (c) NWP fails to complete all actions identified in item 1 above in a timely and effective manner to prevent recurrence.
8. Any modification to this Consent Order requires the written consent of both Parties.
9. NWP waives any and all rights to appeal or otherwise seek judicial or administrative review of the terms of this Consent Order. DOE retains the right to judicially enforce the provisions of this Consent Order by all available legal means.
10. This Consent Order is issued pursuant to DOE's authority under Section 234C of the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2282c), and the implementing provisions of Part 851 governing enforcement of worker safety and health requirements at DOE sites.

11. This Consent Order shall become a Final Order after the signed copy, referenced in item 3 above, is filed by the Office of Enforcement's Office of the Docketing Clerk.

On behalf of my respective organization, I hereby agree to and accept the terms of the foregoing Consent Order.

FOR U.S. Department of Energy

FOR Nuclear Waste Partnership, LLC

 Date 9/4/20  
Kevin L. Dressman  
Director  
Office of Enforcement  
Office of Enterprise Assessments

 Date 9/9/2020  
Sean Dunagan  
President and Project Manager  
Nuclear Waste Partnership, LLC