UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Washington, DC 20460

January 13, 2021

OFFICE OF
AIR AND
RADIATION

Mr. Reinhard Knerr
Manager
Carlsbad Field Office
U.S. Department of Energy
P.O. Box 3090
Carlsbad, New Mexico 88221-3090

Dear Mr. Knerr:

This letter addresses the proposed test by the Department of Energy (DOE) of the 700C ventilation fan at the Waste Isolation Pilot Plant (WIPP).

Prior to certain incidents at the WIPP in 2014, the DOE operated the subject ventilation fan, identified as the 700C ventilation fan, to exhaust WIPP air flow. The DOE used the sampling location Station A to capture emissions from the exhaust air prior to the 2014 incidents. In 2014, after the incidents, the DOE ceased operating the 700C and other 700 series ventilation fans and none have been restarted since that time. The DOE currently proposes to modify operations at the WIPP by restarting the 700C ventilation fan, at least to the initial extent of a four-hour test of the fan, with the expressed goal of recommencing its operation in future.

The EPA has reviewed the information concerning the planned four-hour test of the 700C ventilation fan provided by the DOE in early December 2020 and the additional information provided at the Agency's subsequent request, including updated information on the current operating condition of air sampling equipment located at Station A.

The DOE maintains that the effective dose equivalent associated with emissions from the four-hour test of the 700C ventilation fan will be less than 1% of the emission standard set out in 40 CFR part 61, subpart H. The materials submitted by the DOE Carlsbad Field Office (CBFO) and the information provided in communications between Agency staff and CBFO staff appear to support the DOE position that emissions will be below the regulatory limits. Additionally, the Agency anticipates that the WIPP facility will be able to accurately measure any radionuclide emissions from the facility due to the fan restart by sampling facility air emissions at Station A. The shrouded probes and associated sampling equipment were approved as an acceptable method of demonstrating compliance at the time of WIPP's initial certification in 1998, and CBFO has submitted recent documentation indicating that this sampling equipment will continue to accurately measure any radionuclide emissions from the facility. The Agency expects that effluent air will be sampled at Station A throughout the test, and that results of the analysis will be included in annual emissions reporting. In addition, the DOE's plan to sample the exhaust for radioactivity in real time will provide important information that can confirm the expectation of low radioactive emissions.

This evaluation applies only to the four-hour test described in documents submitted to the Agency. Details of the review are included as an enclosure. If your staff have any questions, please contact Jonathan Walsh at (202) 343-9238 or walsh.jonathan@epa.gov.

Sincerely,

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Date: 2021.01.13 16:29:42 -05'00'

Lee Ann B. Veal
Director
Radiation Protection Division

Enclosure

cc: Myles Hall, DOE/CBFO
Mike Brown, DOE/CBFO
Anderson Ward, DOE/CBFO
Justin Marble, DOE/HQ
Edgard Espinosa, DOE/HQ
Ricardo Maestas, NMED
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David Garcia, EPA Region 6
Guy Donaldson, EPA Region 6
Harry Shah, EPA Region 6
Erik Christianson, EPA Region 6
EPA WIPP Team
EPA Docket

ENCLOSURE

EPA Review of Planned Test of WIPP Fan 700C:

EPA technical staff have reviewed documentation provided by the Department of Energy Carlsbad Field Office (CBFO) related to a proposed test restart of Fan 700C. The Nuclear Waste Partnership (NWP) document *Evaluation of a 4-hr Test of the Unfiltered Ventilation at the Waste Isolation Pilot Plant* (Rev 0, August 2020), transmitted to the EPA by email on November 20, 2020, provides a brief history of changes to the WIPP underground ventilation system (UVS), including the motivation for a test restart of Fan 700C and basic test parameters. On December 4, 2020, CBFO provided additional documents related to the planned test requested by the EPA. A series of teleconferences were held between EPA and CBFO on January 5, 6, and 7, and CBFO provided to the EPA additional records requested during those calls.

Fan 700C is a part of the WIPP facility's original ventilation system. It has not been operated since the February 14, 2014 radiological contamination incident. Although it has not been physically modified, operation of Fan 700C would be the first instance since the 2014 incident in which air from the contaminated portions of the WIPP facility is exhausted directly to the environment without filtration. Station A was the location of record for measurements used to comply with 40 CFR part 61, Subpart H requirements when Fan 700C was in operation. The EPA has reviewed whether the site retains the ability to accurately measure radionuclide air emissions from the facility at Station A, and to use those measurements to demonstrate compliance with the EPA's public dose limits found 40 CFR part 191, Subpart A and 40 CFR part 61, Subpart H. To this end, the EPA reviewed the documentation provided by CBFO related to the proposed test.

Potential Radionuclide Emissions:

The DOE has assessed potential radionuclide emissions from a restart of Fan 700C using multiple methods. Each of these assessments indicate that emissions due to the fan restart, and specifically the 4-hour test, are expected to be much lower than levels which could result in public doses that exceed the 10 mrem annual dose limit set by 40 CFR part 61.

Subsequent to the radionuclide release event in 2014, WIPP has continued to use Station A to sample air emissions from the underground before the air is filtered and exhausted at Station B. Sample filters from Station A were collected on a daily basis, and each filter counted for gross alpha and beta. WIPP compared these counts to action levels which were set to correspond to 1% of the regulatory standard (i.e., 0.1 mrem annual dose to the maximally exposed offsite individual, or MEI). RES 20-202, Attachment 1, *Station A gross alpha/beta data (January 1, 2019 through August 14, 2019)* shows that gross alpha and beta counts from the daily sample filters are typically more than an order of magnitude below the action level. This indicates that even if the rate of radionuclide emissions is increased due to the increase in airflow through the contaminated parts of the underground (from ~120,000 to ~240,000 cubic feet per minute), unfiltered emissions due to the operation of Fan 700C are still expected to be extremely low.

The DOE has additionally evaluated the amount of radioactive contamination which may be present in the exhaust system and modeled possible emissions and resultant doses. The document BC-RP-0129, *Radiological Air Emissions Evaluation of the Restart of the 700 Fans for 40 CFR 61 Subpart H*, included as Attachment 3 to RES 20-202, includes a dose assessment using EPA's CAP88 computer model, with a source term of approximately 0.114 Ci of radioactive contamination estimated to have

been deposited in the aboveground ductwork (based on measurements taken at Station A and Station B during the 2014 incident), resulting in a projected annual dose of approximately 0.005 mrem to a receptor at the SW corner of the WIPP site. Noting that this calculation does not account for all contamination which may be present throughout the facility, an even more conservative method would be to assume that all of the radioactive material present in the drum which ruptured during the February 14, 2014 incident is available for release. Using the estimate of 7.1 Ci of Am-241 for the initial contents of drum 68660 given in *Evaluation of a 4-hr Test of the Unfiltered Ventilation at the Waste Isolation Pilot Plant*, the physical state factor from 40 CFR Part 61 Appendix D of 0.001 for solid particulates, and the dose conversion factor 44.5 for Am-241 (given in Table 3 of BC-RP-0129), the potential annual dose at the facility fence line is 0.315 mrem. It should be noted that this is an unrealistic, bounding calculation for several reasons. The radionuclide source term of 7.1 Ci of Am-241 is an overestimate of the total radionuclide contents of drum 68660, according to its Waste Data System Container report (Figure 1). Most contamination in the underground is not available to the ventilation circuit, and the short duration of the test will additionally limit actual radionuclide emissions. CBFO has indicated that no personnel will be present at the receptor location used and that any member of the public will be farther away than the modeled receptor. Changing any of these parameters to be more realistic would result in a lower projected dose to the MEI. Emissions due to testing Fan 700C can reasonably be expected to be much lower than levels which could result in a dose to the MEI in excess of the standard.

Measuring Radionuclide Emissions to the Air:

Before the 2014 contamination incident, Fan 700C was routinely an exhaust point of unfiltered air from the facility. Station A and its associated sampling equipment were designed to sample radionuclides from air exhausted by Fans 700 A, B, and C. Specifically, the shrouded probes used to collect air samples at Station A were designed to collect representative samples over the range of exhaust airflows created by operating different fan configurations, including the operation of a single 700-series fan, as will be the case during the test. The sampling equipment used at Station A was approved by the Agency prior to operation of the WIPP and has been the subject of regular EPA inspections.

Although the 2014 incident disrupted the maintenance of Station A, it has since been restored to full operation. In response to EPA's request, CBFO has provided maintenance records showing that the sampling equipment is currently fully maintained and calibrated (RES 21-100, Enclosure 1, *Recent Station A Maintenance History*). *Fan Startup & Testing: Air Emissions and Ambient Environmental Air Surveillance Sampling Plan*, 02RC-001, Rev. 0, indicates that both samplers present at Station A will be operated during the test. No alteration to either Station A or Fan 700C has taken place. Station A can be expected to provide representative samples of facility air exhausted at Fan 700C.

There will be some additional contribution to emissions due to radioactive contamination in the aboveground ductwork between Station A and Fan 700C. *Fan Startup & Testing: Air Emissions and Ambient Environmental Air Surveillance Sampling Plan*, 02RC-001, Rev. 0 describes two additional sampling systems, similar in nature to those used at Station A, which have been installed at the outlet of Fan 700C. Samples taken by these systems, together with sampling at Station A, appear to be adequate to quantify all radionuclide emissions from the test. *Sampling Plan for the 700C Fan Startup and Testing*, TBD 20-003, Rev. 3, describes how a network of portable air samples and continuous air monitors will be used during the test to provide a further level of protection to test personnel.

Figure 1. WIPP Waste Data System Contents of Ruptured Drum (source: DOE)

WDS WASTE DATA SYSTEM

Waste Isolation Pilot Plant
Container Data Report

CHAVEZ, RICK
January 04, 2021 06:50 PM
Page 4 of 9

Container: LA00000068660
Type: 1 - 55 gal

Current Status
Extended Status: APPROVED CERT EMPLACED
Container Status: CERTIFICATION DATA APPROVED
Certification Date: 01/21/2014
Waste Handling Code: CH
Disposal Date: 01/31/2014

Radionuclides

Radionuclide	Activity (Ci)	Activity Uncert (Ci)	Mass (g)	Mass Uncert (g)
AM-241	2.200E00	3.400E-01	6.410E-01	9.798E-02
CS-137	<LLD	<LLD	<LLD	<LLD
NP-237	2.580E-05	4.450E-06	3.660E-02	6.241E-03
PU-238	2.080E-02	3.220E-03	1.220E-03	1.861E-04
PU-239	4.630E-01	7.140E-02	7.460E00	1.135E00
PU-240	1.210E-01	1.860E-02	5.310E-01	8.087E-02
PU-241	2.000E00	3.100E-01	1.950E-02	2.981E-03
PU-242	1.050E-05	1.620E-06	2.650E-03	4.081E-04
SR-90	<LLD	<LLD	<LLD	<LLD
U-233	<LLD	<LLD	<LLD	<LLD
U-234	4.630E-05	1.290E-05	7.450E-03	2.041E-03
U-235	1.150E-06	3.200E-07	5.310E-01	1.461E-01
U-238	<LLD	<LLD	<LLD	<LLD