RATIONALE FOR CONSIDERING RESTART AND TEMPORARY USE OF 700C VENTILATION SYSTEM

WIPP Nuclear Waste Partnership

An AMENTUM-led partnership with BWXT and ORANO

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RATIONALE FOR CONSIDERING RESTART AND TEMPORARY USE OF 700C VENTILATION SYSTEM AND DOE STRATEGY TO ASSURE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Note to Readers

This document is intended to provide background and a consistent foundation for CBFO and NWP staff communications regarding the decision to proceed with restart of the 700C fan and resultant unfiltered air discharge to the environment.

Overview - Discussion of Risk Tradeoff Decision-making

After having describing best estimate calculations for the potential release of contamination associated with the restart of the 700C ventilation fan, discussed in detail in a separate technical paper, and summarized as follows:

- Radiological sampling and monitoring estimates up to 5.92E-06 curies of removable activity could be released during testing
- Operation of the 700C fan has been estimated to have the possibility of delivering a resultant dose to the Maximally Exposed Offsite Individual (MEOSI) of less than 0.005 millirem per year, approximately 0.05 percent of the EPA allowable limit.

The next step in the narrative is placing this risk in perspective. As emphasized by the CRESP team, the decision to restart the 700C ventilation fan was a risk-to-benefit decision.

Characterization of risks is with respect to two factors: (i) what is the type of hazard/risk, and (ii) what are the effected populations. When looking at the hazards and impacted populations, there is an underlying challenge to putting across the risk-to-benefit argument, along with the risk tradeoff information associated with the subject decision. With start-up of 700C and establishment of unfiltered airflow, the trade-off appears to be as follows: a reduction in risk due to respirable chemical contaminants to WIPP underground workers is being "traded off" against the potential for increased radiological contamination to the environment (and much more remotely, potential exposure to the public); thus, two different hazards and two different populations/receptors. In this scenario, the worker benefit is tangible and substantial – increased air flow will immediately improve air quality, thus the health and safety of all staff assigned to underground operations. The risk on the other hand carries uncertainty regarding realization of the risk and the affected populations. Even if the risk is realized the consequences to WIPP Site surface workers and environmental impacts are expected to be minimal, if even detectable. It is important also to consider from a time at risk perspective that operation of unfiltered ventilation is only a temporary (2 year approximate) interim improvement until the Safety Significant Confinement Ventilation System (SSCVS) comes on line.

In summary, the benefits are improved safety and comfort for underground workers, and improved WIPP operating efficiency and schedule for DOE and its contractors. In a broader view, the benefit to a more efficient WIPP is reduction in "time at risk" of thousands of cubic meters of TRU waste in storage around the DOE Complex which can be more promptly placed underground into safe, permanent, isolation.

It is also important to communicate that this is not a simply a risk-to-risk and benefit situation. CBFO and NWP will put in place a risk mitigation strategy that mitigates the potential hazard of the spread of contamination. The actions of that mitigation strategy, along with the impacts, is important to be conveyed and is detailed later in this document. In summary, WIPP is employing a phased approach to testing ramping up from hours initially to several days, comprehensive sampling and monitoring, limited access of non-essential personnel, and multiple administrative controls enabling rapid response and action if unexpected conditions arise.

In the following section, the hazard/risks and affected populations are discussed. It is critical that staff have a consistent understanding of why WIPP is making the decision to restart 700C producing unfiltered air discharge. There are clearly potential risks but when mitigated risks are balanced against the local and global benefits, the recommendation becomes straightforward.

Benefits to Restart of 700C and Unfiltered Ventilation:

1. Improved Worker Safety Margin
    a. Establishment of unfiltered ventilation will increase underground airflow increasing the rate of removal of diesel exhaust chemical contaminates. This reduces the chemical exposure hazard to workers.
    b. New rules (revisions to 10 CFR 851, implemented in 2019) have placed more stringent requirements, particularly on elements of diesel exhaust—most equipment used in the underground is powered by diesel engines (although some limited electric-powered equipment is available). In addition to the improved worker safety margin, mitigation of the chemical exposure hazard facilitates regulatory compliance.

2. Improved Mission Efficiency
    a. Enhancing the ventilation rate increases the allowable operation of diesel-driven equipment in the underground, increasing the rate at which:
        i. New salt can be mined;
        ii. Bolting and Ground Control to enhance the stability of the back and ribs, to assure worker safety, can be accomplished; and,
        iii. TRU waste received on-site can be promptly emplaced.
    b. Enhancing the ventilation rate decreases the number of work pauses caused by personnel monitor alarms due to transient increases in exhaust emissions.
    c. Establishment of unfiltered airflow avoids the impractical alternative of re-equipping to all electric-power equipment in the underground. Incremental improvement in air quality is currently being made with replacement of diesel mining equipment with electric. To achieve the equivalent air quality improvement associated with establishment of unfiltered airflow, substantial investment would be required and the timeframe to achieve the conversions goes well past the current approximate 2 year need timeframe prior to SSCVS operation. Recent estimates are of the order of $50M and 5 years to complete a near full-scale changeover to all electric mine operation. The resultant avoided costs ensures more resources for productivity and efficiency initiatives.
    d. Improved WIPP operating efficiency increases the rate at which other DOE sites can ship TRU waste to WIPP—avoiding:
        i. Extended time periods for TRU waste to be in interim storage configurations at multiple DOE sites posing risk to workers, the public, and the environment; and,
        ii. Potential delays to TRU waste remediation efforts at DOE sites.

Drawbacks to Unfiltered Ventilation Restart:

1. Potential for release of contamination during operations poses risks to WIPP Site workers, the public, and the environment. Mitigation approaches:
    a. Short duration testing is intended to provide an initial benchmark of the amount of contamination likely to be released, as discussed in a separate paper, this amount of contamination is expected to be very low.
    b. WIPP procedures will not permit waste emplacements during unfiltered ventilation, and therefore these actions are not expected to cause an unfiltered release.

c. Vehicles/equipment having liquid-combustible capacity will be prohibited from entering Panel 7 during unfiltered ventilation operations.
d. In the event of elevated airborne activity alarms in the Panel 7 exhaust drift, the CMR Operator will shut down unfiltered ventilation.
e. Ongoing sampling and monitoring during testing and into operation will continue.
f. To address a potential concern regarding the structural integrity of the 700 C system due to increased loads associated with salt accumulation in the ducts and corrosion that may have occurred during the past 6 years, WIPP completed a structural analysis of the ductwork and supports concluding no elevated risk exists.

<u>Discussion of DOE Test and Implementation Strategy to Minimize Risk</u>

1. Planned Controlled Test of Unfiltered Ventilation
    a. An initial 4 hour test, accompanied by monitoring evaluation, followed by a 5 day test, accompanied by a second round of monitoring evaluation, are planned prior to a decision to return the 700 C system to limited, routine operation. This test plan provides an opportunity, under controlled conditions, to understand the mechanical condition of the 700C ventilation equipment and discern the potential for contamination releases under the return to use of this ventilation system.
    b. Monitoring for this eventuality includes
        i. Contamination monitoring at predetermined, representative sites on a specified regular basis; and,
        ii. Underground Continuous Air Monitoring Systems (CAMS) and above-ground ventilation monitoring to provide indication of whether any legacy contamination is being disturbed.
    c. Test procedures with clear assignment of responsibilities and shutdown criteria will be developed.
    d. The 4-hour controlled test and then the 5-day test (incremental reassessment) will assist in determination of whether:
        i. Remediation of the salt piles in the ventilation ducts, and/or
        ii. Application of fixative inside the ducts, or
        iii. No action on the salt pile in the ductwork is necessary
        iv. Whether to proceed with unfiltered ventilation for up to 2 years.
2. Operating procedures and safety requirements will be revised.
    a. They will require a shift to filtered ventilation when emplacing waste
    b. Test procedures and revisions to operating procedures will be reviewed for consistency with the WIPP Documented Safety Analysis (DSA) along with the Radiation Protection Program (e.g., USQ review); and
    c. The test program, procedure changes, technical studies will be the subject of Readiness Assessment, scoped consistent with DOE Order 425.1D.
3. Construction of a high capacity, filtered ventilation system is in-process and scheduled to be complete in 2023.