UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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OFFICE OF
AIR AND RADIATION

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Dear Dr. Oliver:

Thank you for the opportunity to review and comment on your draft report. Attached please find detailed comments from me and members of my staff. Note that these comments reflect our opinions only and not necessarily those of our Agency.

As part of our review, we obtained and carefully read through all of your supporting references, as well as several other relevant peer-reviewed papers regarding wildfires in the Chernobyl Exclusion Zone (CEZ). In addition, we constructed spreadsheets containing the equations and parameter values you specify in your report and in IAEA SRS 19, and used these to check your calculations. Finally, we used the health physics computer code HotSpot (Version 2.07.1) (https://narac.llnl.gov/HotSpot/HotSpot.html) to cross check Gaussian plume projections, estimated airborne and ground surface activity concentrations, and predicted pathway-specific and total doses.

Overall, we believe that your screening level calculations based on the IAEA models and parameter values result in plausible first-order approximations of the potential upper-bound doses and risks to children (1 y) and adults at distances 25-150 km downwind from a catastrophic wildfire in the CEZ that releases large quantities of radionuclides from burning contaminated grasslands and forests. During our review of your analyses, we did, however, discover a number of calculation errors and missing exposure pathways that may result in underestimated doses and risks. We point these out in our detailed comments and suggest alternative values and approaches. Moreover, it is important to acknowledge that the neither the IAEA nor the HotSpot models are designed to estimate radiological impacts at distances greater than ~20 km, and that the IAEA models assume continuous discharges of radionuclides into the environment over several years, not episodic releases such as those caused by wildfires. While it

is likely that these limitations in both models will result in overestimates of doses and risks for short-term events impacting individuals at far distances downwind, we recommend that you discuss and possibly validate whether or not the IAEA models and parameter values are appropriate for your scenario.

Our primary recommendations are summarized as follows:

- Include scale maps showing the locations and areal extent of: (1) the source term/release point; (2) surface contamination contours for all radionuclides of concern; (3) contaminated grasslands and forests; (4) concentric rings centered on the source term at distances of 25, 30, 50, 75, 100, and 125 km; (5) projected plume deposition contours; and (6) potentially impacted population centers, crop lands, and surface water bodies. (See Graphics A and B for examples).

- Recalculate all estimated doses and risks at distances of 25, 30, 50, 75, 100, and 125 km in order to: (1) account for revised combustible inventories based on corrected concentration factors; (2) include a resuspension/inhalation exposure pathway; (3) include a surface water exposure pathway; (4) account for direct deposition in the computation of food ingestion doses; and (5) correct for revised dose conversion factors.

- If possible, find an actual wildfire event involving contaminated grasslands and forests in or surrounding the CEZ and evaluate its radiological impact on exposed populations in order to gauge the degree of conservatism inherent in your screening level assessments. We found one example mentioned in Hao et al. (2009) (http://www.fs.fed.us/rm/pubs_other/rmrs_2009_hao_w001.pdf). (See Graphic C). Unfortunately, this paper does not include details on the nature and impact of the wildfire event that occurred in western Ukraine on May 8, 2003, but we encourage you to seek these details, along with any radiological measurements and dose estimates made during the event, especially in Kiev.

We hope you find our comments and recommendations helpful.

Sincerely,

Jerome S. Puskin

Jerome S. Puskin, PhD
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