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Document Title: BGCAPP GB Hydrolysate Transportation Risk Assessment BGCAPP VX Hydrolysate Transportation Risk Assessment			**Version/Draft (# or date):** GB Hydrolysate TRA (Final, Rev.3, Dec 2020) VX Hydrolysate TRA (Final, Rev. 0, Jan 2021)
Reviewer(s)/Date: Terry Tincher (TT), CDC, 2/9/2021			**Originator:** Leidos **Document Number:** RM-20-008 (GB); RM-20-013 (VX)
Cmt #	**Applies to**	**Comment**	**Proposed Resolution**
1	**GB TRA/ VX TRA**	**Section 3.4 Loading and Unloading**, page 6 for GB and page 7 for VX, mentions a Standard Operating Procedure (SOP) for loading hydrolysate at the Blue Grass Chemical Agent Pilot Plant (BGCAPP) but no reference is given or listed in Appendix B. It is CDC's understanding an SOP has now been issued. The document title and number should be included and referenced in both documents for completeness.	It is our understanding that BGCAPP is currently working on the SOP for loading hydrolysate into tankers. Once the SOP is drafted, and the job hazard analysis and operator training is completed and tracked as a performance objective and criteria, the final version of the SOP will be released (currently estimated by spring/summer 2021). As stated in Section 1.1, separate documents (including SOPs) addressing "loading and unloading operations" will be prepared.
2	**GB TRA/ VX TRA**	**Section 3.5**, page 7 for GB and page 8 for VX, the NECDF Transport Safety Plan is referenced, with the requirements listed below it. This document and safety plan was published in 2007 and is almost 14 years old. Has it been verified to be current with respect to requirements and that there are no changes that could impact it?	We are proposing to add the following clarification after the introductory paragraph of Section 3.5: "The requirements/operational measures outlined in this section were originally developed for transport of VX hydrolysate from NECDF in 2007, but are currently considered valid as representative requirements. However, as stated in Section 1.1, separate documents will be prepared to cover transportation and emergency response planning and procedures. As such, a project-specific Transportation Plan for shipping the BGCAPP GB and VX hydrolysates—incorporating specific requirements, if any, from the state, CDC, and/or community—will be prepared by the selected transporter and submitted to PEO ACWA prior to shipment."
3	**GB TRA/ VX TRA**	**Section 3.5 Description of Additional Specific Transport Requirements, Qualifications of drivers for hydrolysate transport will include the following**: page 8 for GB and page 9 for VX bullet two states: Drivers will be certified by their employer to have good safety records. Is there a standard definition used for "good safety record"? What is acceptable? Is there a DOD, DA, or insurance regulation that states the definition?	We are proposing to revise the referenced statement as follows: "Drivers will be DOT certified for hazmat transport."

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4	**GB TRA**	**In Table 6-7, Scenario 2, Consequence**. I think it would be clearer to say that the concentration of GB does not reach either the 10-min or the 2-hour AEGL-1 concentration rather than saying they concentrations are less than the control and isolation zones.	We are assuming that the reference to 10-min concentration is a typo since we are using a 30-min concentration standard (based on 30 minutes to perform the evacuation, as stated). As described in Section 4.2, "The hazard is characterized in terms of hazard distances, which are the distances necessary for the chemical concentration to fall below specific concentration levels, as it disperses. For GB (and VX), the concentration levels are based on established Acute Exposure Guideline Levels (AEGLs). For example, the 30-minute AEGL-1 hazard distance is the distance required for the GB (or VX) concentration to fall below the 30-minute AEGL-1 concentration. Hazard distances are calculated using a plume dispersion model, specifically, the Army-sponsored D2PC software (Whitacre et al. 1987)." Scenario 2 includes a fire scenario as well as a portion of the hydrolysate as an evaporative scenario. However, in order to address the comment, we are proposing to add a note to Table 6-7, clarifying the following: "The concentration of GB (or VX) and relevant chemicals does not reach the 30-min/2-hour AEGL-1/PAC-1 concentrations at 50/200 meters, respectively."

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5	**VX TRA**	**Section 2 DESCRIPTION OF WASTE TO BE SHIPPED** page 2, second paragraph states: (highlights added) *The samples discussed in the VX Hydrolysate Characterization memo were well-mixed samples taken from the reactor, which had static mixers and recirculation loops. VX hydrolysate, when not being mixed, separates into two layers: an upper organic layer and a lower aqueous layer. The memo estimated the top organic layer to be 1.18 percent of the hydrolysate on average. The constituents in the top layer are flammable, although the mixed hydrolysate is not flammable.* Is there a test done on the shipment to determine if it is flammable? With the VX hydrolysate expected to be stored for several months, possibly until the end of the VX rockets, will BGCAPP be able to ensure the contents are mixed to prevent separation and shipment of a flammable load, which is not evaluated in this TRA?	We are not aware of any DOT requirement to test or track individual layers in a tanker truck. Resource Conservation and Recovery Act (RCRA) regulations require a representative sample of the waste to be obtained for analysis/characterization. As stated in the reference (CMA 2007), the Newport hydrolysate was tested according to DOT regulations and was classified as a corrosive material (Hazard Class 8). The Newport hydrolysate was previously shipped to a TSDF as a Class 8 corrosive waste. We are proposing to add the following to Section 2, after the second paragraph: "Each batch produced in the Agent Neutralization System will be checked for flammability before it is transferred out to the Hydrolysate Storage System (HSS). The mixing system in the HSS tanks ensures that the tank stays mixed up to the point the hydrolysate is pumped into tankers. The line to transfer the hydrolysate to the truck loading system is downstream of the static mixer, to ensure a representative sample of the HSS tank. Stratification is not a concern to the TSDF, as they are able to accept a wide range of organic percentages." <<Continued next page>>

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5 cont'd	**VX TRA**	<<Continued from prior page>>	Notwithstanding the above, the VX Hydrolysate TRA did touch upon the aspects of a flammable load shipment, and envisioned burning of the top organic layer, if present (see Section 6.2.2, "The flammable organics in the top layer will catch on fire and be consumed. The other organics will be released into the fire." The TRA further states that "Based on the criteria used in the WebPuff dispersion model (WebPuff Version 5.4) for VX, it is estimated that 97.5 percent of the total organic mass released will be consumed." We are proposing to elaborate further on this aspect as follows: "At a liquid temperature of 100°C, the evaporation model indicates that 100 percent of the highly volatile chemical (DIPA) is released, even if present in a mixture rather than in a separate top layer. Therefore, in either case, all of the DIPA vapors will be released and will combust in the fire and be consumed to 97.5 percent." Therefore, the fire scenario evaluated in the TRA addresses shipment of a "flammable load" (top layer) as well as a non-flammable mixed load.

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6	**VX TRA**	**Table 4-4**. For the 2-hour AEGL-1, it looks like they used k for the 10 to 30-minute extrapolation instead of deriving a k from the 1-hour concentration or using the 4 to 8-hour k extrapolation, which is what seemed to be done for the AEGL-3. (All AEGL-2 concentrations had the same k.). What is the rationale?	We re-calculated the k values using the 1-hour concentrations and extrapolated to derive the 2-hour AEGLs. For AEGL-2, the k values listed in the NRC reference are the same for all durations. We are assuming that this may be due to unavailability of relevant data. We are following the methodology that NRC used to derive the AEGLs. The results are as follows: 2-hr AEGL-1: 0.0001 mg/m^3 2-hr AEGL-2: 0.002 mg/m^3 (no change) 2-hr AEGL-3: 0.007 mg/m^3 (no change) We will correct the 2-hr AEGL-1 value where it appears in the text and tables. However, this does not affect the results.
7	**VX TRA**	**Table 6-7, Consequence**. I think it would be clearer to say that the concentration of VX does not reach either the 10-min or the 2-hour AEGL-1 concentration rather than saying they concentrations are less than the control and isolation zones.	Please see response to comment 4.