HI-STORE Clarification Questions

This document summarizes what Holtec understands to be the requested NRC clarifications, and summarizes Holtec's responses and updates to the associated documents

External Hazards

- Demonstrate that the explosion of the 20 inch pipeline either does not impact the nearby 6 inch pipeline or that the analysis covers the explosion of both and update description in SAR of where pipelines are as necessary.
    - HI-2210487 has been updated to address the crater created by the 20 inch pipeline rupture – see new Appendix B
    - This appendix calculates the crater size, based on the methodology in the provided technical paper
    - As outlined in Appendix B, the 6 inch pipeline is approximately 50 feet to the east of the 20 inch pipeline, and the calculation demonstrates that the crater radius is less than 25 feet
    - There is no impact from the 20 inch pipeline rupture on the 6 inch pipeline
    - The list of pipelines in the SAR, Section 2.2.2 has been updated to include the depth of the pipeline and reference to the distance between the two pipelines.
- Provide justification for the release rate used in BREEZE runs and the rationale for the calm air assumption
    - Section 8.1.1 of HI-2210487 has been updated to address this question.
    - The jet fire scenario uses the 1.5 m/s wind speed that is in the EPA guidance for giving the worst case consequences. If a higher wind speed is used, the gas would disperse more quickly and give smaller flame lengths, so the calm air provides the most conservative approach
    - For the jet fire scenario, the BREEZE software is built to calculate the maximum and average release rates based on the pipe information. The analysis also includes the assumption that the pipe interior is smooth which is conservative as it increases the release rate compared to a rough pipe.
- Section 3.0 of the HI report mentions a tree line that would disrupt the gas, but no significant tree line is found near the site
    - This description has been removed from the HI report, it was intended as a generic example, but does not apply to this specific site
- The use of the ideal gas law for the calculation of methane amount for the vapor cloud explosion raises questions about the length of pipe assumed to be released instantaneously -- why is only the straight line portion included?
    - The methodology for calculation of the mass of methane involved in a hypothetical vapor cloud explosion has been replaced with the use of the Lees equation
    - The updated Attachment A to HI-2210487 shows the calculation with the Lees methodology, which is based on the pressure and diameter of the pipe to calculate an equivalent diameter assuming a guillotine rupture and then combined with the properties of methane to calculate the mass of methane in the turbulent jet.
    - This same calculation was performed for both the 20 inch and 6 inch pipelines

  - The 20°F temperature in the pipelines were used since it is the lowest reasonable temperature expected in the pipeline. Since the quantity of methane in the flammable range is largest when the delta between the gas temperature and the ambient temperature is greatest, the lowest pipeline temperature and highest ambient temperatures are assumed.
- The NRC staff has conflicting information about the "Hanson #001" well pad, please clarify.
  - The item labeled as the Hanson well pad is actually a gas compressor station along the Lucid 6 inch pipeline, the SAR Section 2.2.2 has been updated accordingly
  - HI-2210487, Section 1.1.3 has also been updated to remove reference to the Hanson well pad
- In the Highway Truck Hazard Report, the rate of truck accidents was based on 2016 through 2019 – why is this appropriate instead of more or different years?
  - HI-2210620 has been updated with a new Attachment A which explains the calculations for truck accident rates
  - HI-2210620, Section 4.0 has also been updated to include a discussion of the years selected. This is based on the definition of a large truck being changed in 2016, so the earlier years consider different vehicles in determining the rate. In fact, if years back to 2009 are considered, the accident rate is lower, so the selected years is conservative.

Shielding

- There are two options for resolution: 1) to justify the MCNP errors or 2) revise documentation to utilize the 2000 hour occupancy time, ensuring that there are appropriate controls in place.
  - Holtec selected option 2, and a modified SAR Chapter 7 is provided which details explicitly the calculations performed.
    - Note that it is Holtec's opinion that Option 1 would also be possible, and that the concerns with MCNP can be successfully addressed. However, Holtec believes that it would be more appropriate to address this on a generic basis, rather than as part of application.
  - The calculations include contributions from the various sources on the site and also describe that the land surrounding the HI-STORE facility is not available for an individual to live full time, but may contain workers, so 2000 hours is appropriate for a "real individual"
  - The discussion of this approach is included in Section 7.4.2.1.
  - Additionally, since any of the conditions and assumptions may change during the operation of the facility, actions are needed to continually ensure regulatory limits are always met, and an item has been added to Table 10.3.1 to re-confirm that conditions and assumption remain appropriate, or to update the analyses accordingly.

Chapter 3 / Tech Specs

- Confirm the appropriate revision of the Tech Spec files is used for updates
  - The changes from the August 2021 submittal and April 2022 submittal have been combined into one consolidated tech spec document
- Review SAR Chapter 3 to ensure HI-PORT / VCT discussions are correct, as well as gantry crane language

- Updated Section 3.1.4.2 and 3.2.1.2 to better describe current operations and handling equipment requirements
- Updated the gantry crane language – similar updates were also made to Chapter 1 and the glossary

Structural

Chapter 5 has been updated throughout to address the reviewer questions, the SAR contains all the changes.

Flood

Section 1.1 has been updated to add clarification of the requirements for a VBS design that is constructed in continuous runs. This ensures that the VBS will be constructed in a manner that conservatively encompasses the flood calculation. While it was confirmed that the separated VBS blocks were designated with different manning's N numbers it could not be confirmed that the flow resolution of the flood modeling was high enough to accurately consider this. The most feasible construction methods for VBS support a continuous line so that has been specified to encompass any uncertainty in the model. Additionally, Subsection 2.4.3 has been updated to acknowledge the differences between modeling approach and actual VBS design.