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OBI KODIAK, APDES MIXING ZONE APPLICATION, EFFLUENT COOLING OPTIONS PRACTICABILITY REPORT

November 8, 2021

Re: Additional information requested by ADEC pertaining to the practicability/feasibility of effluent cooling Options A, B and C outlined in OBI Kodiak's mixing zone application and antidegradation analysis. (Option A = fan cooling and refrigeration unit, Option B = fan cooling and mixing with seawater, and Option C = fan cooling and mixing with seafood processing water). Specifically, requesting an additional explanation clarifying why each option is not considered "Practicable", which is defined in 18 AAC 70.990(48) as "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."

Background

After receipt of the new APDES permit, OBI Environmental personnel requested that the engineering team consisting of VEI Consultants, Coffman Engineers and Travis Peterson Environmental Consulting, conduct studies to determine the most viable methods of meeting the requirements of the new discharge permit. The main problem was incorporating the retort cooling water into the plant effluent and ensuring that the temperature would not exceed the maximum temperature, 59° F, at the point of discharge, as required by AWQS and the new Kodiak Seafood Processors General Permit AKG521000.

Prior to developing cooling Options A, B and C, the following initial building blocks were put in place:

1. There is no beneficial use for this waste heat. The heat is available at a low temperature, (less than 170°F), and it is only available during summer months when there is no need for building heat. We considered preheating boiler feed water, but the quantity of boiler feed water was so small this was not practical.
2. We looked for options for cooling ponds or similar passive means of cooling the water and no practical means were found, except for mixing the retort water with the processing stream.
3. The most economical mechanical means of cooling the retort water was determined to be routing the retort water through Fan Coolers (dry coolers).
4. Due to the fact that the retort cooling water is discharged in batches of greater than 2000 gallons, all of the mechanical means of cooling the retort water, plus the commingling with the process water, require that the retort cooling water be stored and metered out to the system at a constant rate.

Based on these building blocks, all three of the cooling options selected for evaluation incorporate:

- Storage tanks to capture the periodic 2000-gallon retort discharges, and pumps sized to transfer the retort water at a constant flow rate.
- Fan coolers were used for each of the options.
- All options include mixing the retort water with the process water at constant rates.

Evaluation of Options

For clarity, we will review the Options in reverse order to determine the best option to consider.

- Option C—Fan cooling and mixing with seafood processing water:

- This option was included for "discussion". It was not capable of lowering the effluent temperature below 59°F and a mixing zone would be required with this option. It is not viable and not practicable.

- Option B—Fan cooling and mixing with seawater. This option would significantly increase the seawater intake and new pumps and intake would be required. Larger effluent pumps and a new outfall line would also be required.
  - This option only uses one stage mechanical cooling, as opposed to two stage cooling required with Option A. However, the new seawater pumps, the larger effluent pumps and new outfall line make this the most expensive option.
  - Even though this would meet the permit requirements and provide outfall temperatures below 59°F, the total quantity of heat would not be reduced and it would be discharged to the receiving water. Only Option A would reduce the quantity of heat discharged to the receiving water.
  - Reduced reliability--Based on some seawater temperature data, it is possible that during extreme high temperature periods, this option would not meet the 59°F water quality limit.
  - The additional cost, the reduced reliability, and the larger heat discharge make this option less desirable and not practicable.
- Option A—Fan cooling and refrigeration unit. This option uses two stage mechanical cooling.
  - This option is reliable and not dependent on seawater temperature.
  - The capital cost of this option is $629,000.
  - There is a significant amount of sophisticated equipment associated with this option and therefore we estimate that the 20-year present worth of the maintenance costs would approach $600,000.
  - The two-stage cooling system has 70 HP connected. This equates to an energy demand of 120,000 KWH per year.
  - The 20-year present worth of the operating cost (energy) would be $240,000.
  - Total present worth cost of this option is $1,469,000.
  - Despite the technical feasibility of this option, it comes at an extreme cost which is onerous to the seafood processor and the consumer, as compared to the minimal mixing zone temperature plume demonstrated by the Cormix model. We don't believe this option is practicable.

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