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Cooling of Dairy Plate Cooler Water Prior to Entry Into Surface Water – Two Case Studies

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Abstract Text:

The dairy industry routinely uses heat exchangers in the form of fresh-water plate coolers to chill milk quickly after it has been harvested from dairy cows. The heat exchange of from milk to water results in a change in water temperature from ~ 50 degrees F to 90+ degrees F. In some dairies this water is used for consumption by cows, in others the water is diverted away from the manure handling system. Two case studies were initiated at commercial dairies which diverted the plate cooler water via a rain gutter and subsequently through an underground drain-line for ~ ¼ mile to surface water (ditch or a back-eddy area of a local river). Concern had been expressed as to the potential increase in surface water temperature from the plate cooler water. Temperature sensors were placed within three feet of the tile-line connection to the surface water, and additional temperature sensors were placed in surface water and temperatures were monitored every for six months. Data indicated that the temperature of the plate cooler water had cooled from ~ 90 degrees F to ~ 55-65 degrees F after the transit of ~ ¼ mile underground. The transfer of plate cooler water via underground tile-line was an effective management strategy in providing cooling of warmed plate cooler water before entry to surface water.

Impact Statement:

The observations of this study have demonstrated that plate cooler water can be managed to not impact surface water temperature.