



Humboldt Bay Municipal Water District TRF Power Resiliency Generator Project BCA Narrative

1. Introduction

The problem to be mitigated is an electrical failure at the HBMWD Turbidity Reduction Facility that prevents the treatment of the drinking water for a large portion of the population of Humboldt County. The Humboldt Bay Municipal Water District (HBMWD or District), a regional wholesale water provider, supplies water to approximately 88,000 people in the Humboldt Bay area, including in the cities of Arcata, Blue Lake, and Eureka as well as the Fieldbrook/Glendale, Manila, McKinleyville, and Humboldt Community Services Districts.

The District currently has a 100kW emergency generator at the facility that will run the chemical pumps, so if the power outage is of short duration, the facility can still meet the treatment requirements. However, the existing generator was not sized large enough to allow for the operation of the backwash facilities. If there is a power outage for more than approximately five hours or less at the TRF, depending on the turbidity of the water and where the system is in the backwash cycle (by which time, multiple filters won't be functioning), then the treatment plant cannot function and potable water cannot be distributed to customers. This situation occurred during the recent power outage experienced during the February 2019 storms that affected Humboldt County. The existing backwash pumps were not included on the original emergency generator circuit because they are two 250-horsepower pumps, plus two 75-hp airwash pumps, which exceed the load capacity of the existing generator. The heaters for the Chemical Building are two, 10kW heaters, and the sludge pumps are two 20-hp pumps, plus two 0.5-hp collector pumps. All of this additional load was much more than the original emergency generator could handle and it was thought that the treatment plant could successfully operate for short durations without these components, which is true, provided that the Raney Well water is high quality with minimal turbidity. However, longer outages, even as short as an hour or two depending on the turbidity of the water from the collectors and where the filter/backwash cycle stands when the power goes out, can lead to breakthrough of turbidity through the filters and make it impossible to deliver water that meets the state mandated treatment standards. NOTE: For the purposes of the BCA, it was assumed that the plant could meet minimal treatment requirements for approximately 5 hours before no longer being able to produce potable water meeting drinking quality standards. However, in most cases, the plant could not operate for 5 hours without experiencing breakthrough.

To mitigate this problem a new 750kW generator will be added to the TRF to power the backwash pumps, the airwash pumps, the sludge pumps and other facilities required for the system to fully function.

2. BCA Model Inputs

Comments for many inputs are included throughout the BCA report generated from the BCA Version 6.0. The following sections include some additional explanation of the model inputs in several categories.

2.1 Historical Damages Before Mitigation

All power outage data used in the BCA model was from HBMWD's TRF SCADA system. As noted above and in the comments within the BCA model, it was assumed that the site can meet minimal treatment requirements for approximately 5 hours after a power outage and still be able to produce water treated to State mandated standards. Therefore, only power outages that exceeded 5 hours were included in the BCA model. And for each power outage included the "Potable Water Impact" duration was reduced by 5 hours. A "Data: TRF Power Outages" table is included as the data backup information for the Historical Damages inputs

2.2 Expected Damages After Mitigation

As instructed by CalOES, the recurrence intervals generated from the Historical Damages inputs, using the "View Annualized Results" button, were used in the Expected Damages After Mitigation. The remaining impact (days) was assumed to be 5% of the Historical Damages impacts, also as recommended by CalOES.

2.3 Benefit-Cost Summary Results

Using the FEMA default value of water service per person per day, the number of customers served by HBMWD and the extensive lengths of several power outages affecting the treatment facility (with the first 5 hours excluded), the Benefit Cost Ratio (BCR) is 40.49.