

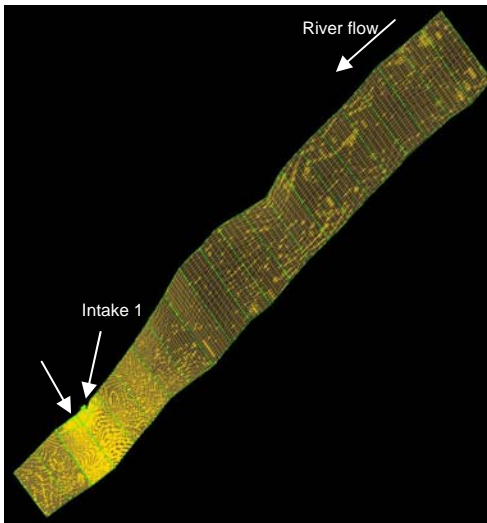
### Hydraulic Zone of Influence Determination In River

#### Background

Power plant water intakes may entrain some biological organisms with the cooling water. Determination of the environmental impact of a cooling water intake is required by the EPA. CFD can be used to determine a non-motile particles probability of entrainment.



TANNERS CREEK POWER STATION, OHIO RIVER



MODEL GEOMETRY

#### Objectives

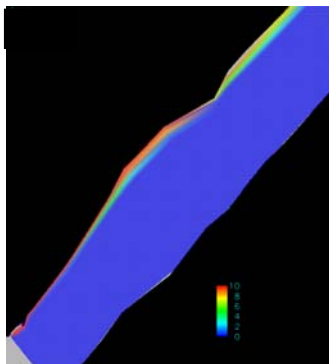
The objective of this study was to determine a non-motile organisms probability of entrainment by the Cooling Water Intake situated in a river. The demonstration project considered Tanners Creek Power Station on the Ohio River.

#### Approach

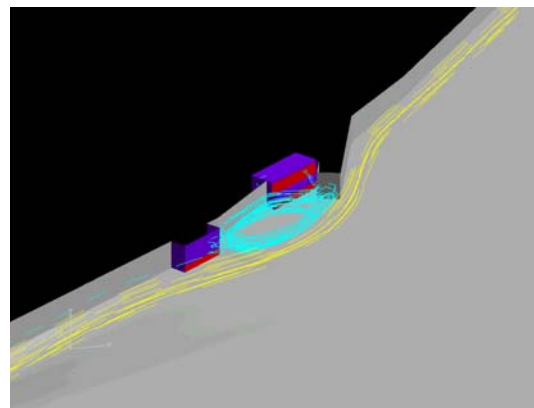
The Fluent software package was used to model the steady state flow field. The hot water discharge is downstream of the intake and therefore does not affect the flow field. Discrete particle tracking with random walk was used to determine the probability of entrainment.

#### Results

Model results show that Fluent can be used to predict the hydraulic zone of influence in a river with a steady state flow field. At Tanners Creek, currents induced by the intake are minimal compared to the river flow.



ENTRAINMENT PROBABILITY FOR POINTS  
NEAR INTAKE



ISOTHERMS GENERATED BY NUMERICAL  
SIMULATION