

Abstract Submitted
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Accidental Turbulent Discharge Rate Estimation from Videos¹

ERIC IBARRA², University of California at Berkeley, FRANKLIN SHAFFER, NETL, Department of Energy, ÖMER SAVAŞ, University of California at Berkeley — A technique to estimate the volumetric discharge rate in accidental oil releases using high speed video streams is described. The essence of the method is similar to PIV processing, however the cross correlation is carried out on the visible features of the efflux, which are usually turbulent, opaque and immiscible. The key step in the process is to perform a pixelwise time filtering on the video stream, in which the parameters are commensurate with the scales of the large eddies. The velocity field extracted from the shell of visible features is then used to construct an approximate velocity profile within the discharge. The technique has been tested on laboratory experiments using both water and oil jets at $Re \approx 10^5$. The technique is accurate to 20%, which is sufficient for initial responders to deploy adequate resources for containment. The software package requires minimal user input and is intended for deployment on an ROV in the field.

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