Data Submittal for Water Quality Monitoring Event #9 on 21 July 2003
Providence River and Harbor Maintenance Dredging Project

Event Monitored: CAD Cell 4R – high tide disposal on 21 July

Applicable Water Quality Certification Conditions:

- 26c – dissolved metals and TSS for a high tide disposal within the first 100 disposal events

Associated Files:

- Prov_R_9_summary – Microsoft Word document containing this summary
- Prov_R_9_tables – Microsoft Word document containing station and sample ID information (Table 9-1), and analytical results (Table 9-2)
- Prov_R_9_figure – pdf document showing the sampling locations (Figure 9-1)

Criteria Exceedences: None

Summary:

The ninth monitored disposal event took place on 21 July, at approximately the time of predicted high tide for Providence (4.3 feet at 1446). Dredged material taken from the top of cell 7R was released into cell 4R (see Figure 9-1) during a high water slack tide. At the time of the disposal event, two dredges were working in the area (see Figure 9-1). Dredge 55 was anchored and working in cell 6R removing parent material (disposed offshore). Dredge 51 was spudded and working in cell 7R, removing unsuitable maintenance material that was being disposed into cell 4R.

Ambient currents one-hour prior to the disposal event were small in magnitude and towards the north, indicating that the end of the flood tide was still ongoing. At the time of the disposal event, ambient currents were small in magnitude and mixed in direction, but had a net flow to the south, indicating that ebb tide was beginning.

Pre-disposal monitoring was performed at the end of the flood tide under the slack water current conditions described above. A reference sample was collected south of the dredging and disposal locations prior to disposal (UCR1 on Figure 9-1 and Table 9-1). Turbidity values ranged from 3 NTU to 5 NTU through the water column. Salinity ranged from approximately 21 PSU at the surface to 28 PSU near the bottom. Water samples were collected from within the identified dredging turbidity plume approximately 200 feet away from Dredge 51, prior to the disposal event (DRG1 on Figure 9-1).

The disposal event occurred at 1500, 14 minutes after the predicted high tide (1446), after which the scow was slowly maneuvered to the south of the disposal cell and back into position with Dredge 51 over cell 7R.

Similar to previous surveys, some discoloration and small patches of oil sheen were noted at the surface immediately following the disposal. The ADCP data collection system experienced technical difficulties for a period of time immediately following the disposal event. Field data collection activities were adjusted accordingly using intensive water quality profiling, featuring turbidity measurement, as the primary method for plume tracking.

Measurements collected immediately following the disposal event and relocation of the scow identified a plume limited to within and above cell 4R. Specifically, 30 minutes after the disposal event, turbidity measurements collected directly over the cell ranged from 3 NTU to 80 NTU and turbidity measurements collected outside of the boundaries of the cell ranged from 3 NTU to 7 NTU.

One hour after the disposal event, the disposal plume extended from the cell to approximately 500 feet down current (south) of the cell. The maximum turbidity value measured outside of the cell was 9 NTU at a distance of 250 feet down current of the cell. Within the cell, the maximum turbidity measurement was 20 NTU. No measurements above 10 NTU were obtained outside of the cell area throughout the survey and no discernable plume was tracked beyond 500 feet down current (south) of the cell.

The timing and location of compliance sample collection along the 1500-foot down current transect were based on measured current velocities and the calculated travel time and direction from the disposal cell (CM1 on Figure 9-1). Turbidity measurements at the 1500-foot down current compliance transect for metals ranged from 4 NTU to 7 NTU throughout the water column at the time of sampling. The location of sampling along the compliance transect was selected based on maximum acoustic backscatter measured by the ADCP. This location was directly down current of the Dredge 51 (Figure 9-1) and was likely impacted by the dredging operations and not the disposal.

Dredges 51 and 55 continued to work throughout the monitoring period, with Dredge 51 removing unsuitable maintenance material overlying cell 7R and Dredge 55 removing parent material from cell 6R .

Results of the analysis of TSS and dissolved metals are presented in Table 9-2. TSS levels were moderately elevated relative to background at the two down current stations, particularly down current of the dredge. Dissolved silver concentrations were below the reporting limit of 0.5 ug/L for all samples, well below the acute water quality criterion of 1.9 ug/L. Dissolved copper concentrations were all below the acute water quality criterion (4.8 ug/L) with concentrations ranging from 0.35 to 1.7 ug/L. Highest copper concentrations were reported for the surface samples at all three locations.