4 Removal and Assessment Activities

Section 4 presents a description of the completed removal activities conducted to date, the ongoing data-collection activities that are underway, and the data that has been collected to date.

4.1 Completed Response Activities

Removal activities were conducted by MCCC under the coordination of the Unified Command. At the height of the cleanup effort in mid November, MCCC had committed 500 personnel and 350 pieces of heavy equipment.

As the removal activities got underway, the newly formed SACS Team assumed an active role in overseeing and directing the removal activities, The primary objective of the SACS Team was to determine the extent of removal and restoration activities along the length of Coldwater Fork, Wolf Creek, and their tributaries. Subteams composed of a representative from EPA, the Commonwealth of Kentucky, the State of West Virginia, and MCCC conducted assessments on segments of each stream and identified:

- Areas requiring slurry removal and recommendations for conducting the removal;
- Areas requiring restoration and recommendations for conducting the restoration; and
- Areas where removal and/or restoration were completed.

4.1 .I Coldwater Fork

Work on Coldwater Fork and its affected tributaries was initiated on October 11, 2000. The material that exited the No. 2 North Mains Portal was a viscous slurry that progressed relatively slowly down Coldwater Fork. However, this also resulted in the material exceeding the stream banks in the upper portion of Coldwater Fork and Old Road Fork. Because of the slow progress of the material,

the slurry, and the heavier particles, in particular, were contained in Coldwater Fork by gabion weirs and rock-filter berms constructed in the streambed.

The material was removed using various techniques including long-boom excavators, dredges, vacuum trucks, tractor pumps, and pumping systems in the stream channel and excavators and front-end loaders on the inundated floodplains. Dredges were used in affected areas having sufficient water flows. The material was pumped directly to slurry cells or was loaded to trucks and transported to ponds constructed in areas adjacent to or near the stream. At the recommendation of EPA, hydrated lime was mixed with the slurry to dry and solidify it. Solidified material was transported to permanent slurry disposal areas. To reduce the movement of slurry downstream, rock-filter berms were constructed at numerous locations throughout the watershed. Vacuum trucks were used to remove slurry that concentrated in front of the berms. Filter dams constructed of straw bales and sediment curtains were also placed within the stream to contain slurry.

The furthest downstream gabion weir and pumping station constructed in Coldwater Fork was the Cain Weir, approximately 8 miles downstream from the No. 2 North Mains Portal. This effectively contained the entire watershed. Pumps were installed at the Cain Weir to remove slurry and water from the stream. The water was pumped to two adjacent constructed cells where it passed through multiple filter curtains. Clean water was discharged from the other end of the cell and returned to the stream approximately 300 feet downstream of the weir.

4.1.1 .l Current Status

MCCC continues to remove small, isolated deposits of slurry on stream banks by washing with stream water. Additionally, the Cain Weir and cells are still in place and operating. The need for continued use will be evaluated. This is the only release-related temporary structure remaining on Coldwater Fork. All impacted areas of Coldwater Fork and its tributaries have been or are undergoing hydroseeding for temporary restoration using a seed mix approved by the initial SACS Team. The final stream restoration survey is ongoing.

Based on the extensive removal work done in Coldwater Fork to date, and the oversight provided by the SACS Team, MCCC anticipates that no additional removal activities other than those outlined above will be required in Coldwater Fork. Restoration activities for this area are outlined in Section 7.1.1.

4.1.2 Wolf Creek

Work on Wolf Creek and its affected tributaries was also initiated on October 11, 2000. The material that exited the South Mains Portal appeared to have had a much lower viscosity than that in Coldwater Fork. In the upper portions of Wolf Creek, the material exceeded the stream banks, however in the lower portion of the creek the material remained within the banks. Material was more difficult to remove from Wolf Creek due to its lower viscosity, higher flows, and the deep incision of the stream. The material was removed in a manner similar to that used on Coldwater Fork, using long-boom excavators and front-end loaders on the inundated floodplains. Additionally, based on direction from the UC, no active removal was conducted on the upper reaches of Big Andy Branch due to its steep banks, limited slurry deposits, and presence of a high-pressure volatile hydrocarbon line. Monitoring for the success of natural attenuation is ongoing.

Multiple gabion weirs and rock-filter berms were constructed on Wolf Creek for slurry containment and removal. A high capacity pumping station was also established at Peter Cave Mining Company (formerly Wolf Creek Collieries Company) to facilitate slurry removal at the No. 3 Weir.

4.1.2.1 Current Status

As of March 20.2001, removal has been completed on Upper Wolf Creek. Removal work is ongoing on Lower Wolf Creek from Carcass Branch downstream. Weir Nos. 1,2, and 3 are still in place with high capacity pumps at the furthest upstream Weir (No. 3) pumping water and slurry to the existing Peter Cave Mining Company impoundment. The necessity for continued use of the Weir and pumps will be evaluated. All impacted areas of Upper Wolf Creek have been hydroseeded for temporary restoration with a seed mix designed by the SACS Team.

Based on the extensive removal work done in this area to date and the oversight provided by the SACS Team, MCCC anticipates that no additional removal activity will be required in Upper Wolf Creek. Restoration activities for this area are outlined in Section 7.1.1.

4.1.3 Rockcastle Creek

Multiple hay-bale filter dams were constructed on the Rockcastle Creek segment from Cain Weir to below the City of Inez. Vacuum trucks were used to collect sediment that had concentrated in front of the hay-bale dams. Turbidity curtains were also placed in Rock-

castle Creek to contain the slurry. This Work Plan is designed to establish the guidelines for additional assessment, removal, and restoration activities, as required by the Order.

4.1.4 Tug Fork and Big Sandy Rivers

Activities conducted to date on these water bodies include collection of water samples and slurry depth measurements. This Work Plan is designed to establish the guidelines for additional assessment, removal, and restoration activities, as required by the Order.

4.1.5 Other Activities

A number of downstream public water intakes were temporarily shut down due to high turbidity. Public drinking water intakes that were temporarily closed include facilities located at Kermit, Inez, Ft. Gay, Louisa, and Kenova. Initially MCCC provided drinking water (bottled or tanker truck) to all affected communities. To meet longer-term needs, MCCC installed temporary lines from alternative water sources to service Kermit, Inez, Ft. Gay, Louisa. and Kenova water plants.

The only community unable to access water through their residential plumbing system was Louisa, KY, which was impacted for five days. Water from tanker trucks and bottled water was made available to these residents until an alternate temporary water supply was established.

By the end of February, all original community water intakes were back online.

4.2 Data Collection

Data collection for physical, chemical, and biological parameters, directed at various media (water, sediment, slurry, soil, and biota) within the Big Sandy River Basin (e.g., Coldwater Fork, Rockcastle Creek, Wolf Creek, Tug Fork, and Big Sandy River), has been ongoing since the spill event by MCCC, their contractors, and federal and state agencies. MCCC implemented an independent sampling schedule during initial spill response activities, with a goal of determining early trends and effects to the watershed from slurry entrainment and cleanup activities. Sampling for a variety of analytes from approximately 80 stations has been conducted in Coldwater Fork, Rockcastle Creek, Wolf Creek, Tug Fork, Big Sandy River, and their tributaries (See Figures 2, 3, 4, 5, and 6 and Table 1). A vast amount of chemical, hydrogeological, and biological information has been generated as a result of all of these activities including the following:

- Chemical and Physical Data
  - Water quality analysis (turbidity, total suspended solids, etc.);
  - Inorganic analyte analysis;
  - Organic analyte analysis;
  - Flocculent analysis; and
  - Drinking water parameter analysis.

- Hydrogeological Data
  - Stream flow measurements;
  - Stream cross-section surveys;
  - Flood analysis; and
  - Slurry depth measurements.

- Biological Data
  - Benthic macroinvertebrate surveys;
  - Fish sampling;
  - Fish toxicity studies; and
  - Seed germination studies.

Table 1 Sample Station per Stream Segment

Watershed	Number of Sample Stations
Coldwater Fork	16
Wolf Creek	24
Rockcastle Creek	20
Tug Fork River	12
Big Sandy River	12

Subsequent sampling efforts throughout the basin have been directed at assessing the effectiveness of the cleanup and restoration activities occurring in the upper portions of the basin.

Currently samples are routinely being collected on Coldwater Fork, Wolf Creek, and Tug Fork. Parameters and sampling frequency presently being collected are identified in Table 2. At significant precipitation events if turbidity at Kermit equals or exceeds 500 Neflometric Turbidity Units (NTUs), sample frequency is conducted at a rate of once per day for three days (see Table 2).

The sample locations are:

- Coldwater Fork
  - at the discharge from Cain Cell;
    downstream from the Cam Cell discharge; and
  - at the confluence with Blacklog Fork.

- Wolf Creek
  - directly downstream of Weir No. 1 (Lovely Weir).

- Tug Fork
  - upstream of confluence with Wolf Creek; and
  - downstream at the Kermit bridge.

This program is being conducted in accordance with direction from the KY Division of Water. The scope and nature of this program will continue to be evaluated with the KY Division of Water as removal activities are conducted.

Table 2 Current Sampling Regime

Parameter	Measurement Frequency	Sample Type
Flow	1/day	Instantaneous
Total Recoverable Iron	1/week	Grab
Total Iron	1/week	Grab
Total Manganese	1/week	Grab
Total Suspended Solids	1/week	Grab
Oil and grease	1/week	Grab
Alkalinity	1/week	Grab
Acidity	1/week	Grab
Turbidity	1/day	Grab
Conductivity	1/week	Grab

In addition, ongoing efforts are underway to gather available data sources, and assess the usefulness of the parameters measured. Historical data information on such things as flow rates, water quality, slurry loading, or biological integrity and use attainability within stream reaches will be gathered, as available, from state and federal agencies (databases) to establish baseline, pre-spill conditions In addition, the identification of other potential contaminant sources that could impair the resources will be conducted.

It is anticipated that data directly related to in-stream water, slurry, and slurry concentrations or volumes will be the most relevant information. As such, most of the effort will be directed at obtaining and assimilating this type information into usable formats (e.g., electronic, tabular, or visual).