Alcoa Completes Remedial Options Pilot Study – Evaluation Underway

Alcoa Inc., with oversight from the US Environmental Protection Agency (EPA), conducted a Remedial Options Pilot Study during the summer and fall of 2005 to further evaluate potential remedial options for a stretch of the lower Grasse River near its Massena West Plant in Massena, New York. Alcoa and EPA have been working together to develop a comprehensive clean up approach to address the sediments in this area of the river that are impacted by polychlorinated biphenyls, or PCBs, and the Remedial Options Pilot Study is part of this collaborative process. The multiple components of the study – removing sediment by dredging; covering areas of the river bed by capping; monitoring conditions in the river before, during, and after the work; and conducting longer-term post-construction monitoring in 2006 – were selected and developed to build upon previous work and address outstanding issues associated with the evaluation, selection, and effectiveness of a final remedy. Locations of the primary elements of the study are shown on the figure below. Alcoa has drafted a report describing the results of the work completed in 2005 and the lessons learned, and submitted the report to EPA in the late spring of 2006. This document is currently under review.

As a follow up to the field activities conducted in 2005, Alcoa will implement an additional pilot study in the river in fall 2006. This study involves the direct addition of activated carbon to sediments in order to bind up the PCBs and make them unavailable for uptake by fish in the river. Details regarding this study are provided in the insert update.

In addition to the in-river work completed in 2005, the project team is also evaluating a variety of options to manage potential impacts associated with severe ice jams, since an ice jam in the spring of 2003 increased water velocities and caused the scouring of sediments in some portions of the study area. The ice control evaluation is ongoing, and results will be used in the development of a final remedy for the site.

For More Information

If you are interested in more detailed information than what is included in this summary, please visit one of the information repositories established for the project.

Massena Public Library
41 Glenn Street
Massena, New York 13662
(315) 769-9094

USEPA
290 Broadway, 18th Floor
New York, New York 10007-1866
Call for an appointment: (212) 637-4217

St. Regis Mohawk Tribe
Environmental Division
82 Indian Village Road
Akwesasne, New York 13655
Contact Ken Jock, Division Director
for an appointment: (518) 358-5937

For a comprehensive history of work at the Grasse River Study Area, visit the project website at: www.thegrasseriver.com

For More Information

If you have specific questions about the activities at the Grasse River Study Area or would like to be added to the project mailing list, please contact one of the project representatives listed below:

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Alcoa and EPA produce the Superfund Program Update periodically to provide an overview of activities associated with the Grasse River Study Area, including key elements of the process and the next steps in the program. This update provides a description of each element of the Remedial Options Pilot Study, the work that took place during 2005, and describes the activated carbon pilot study that Alcoa is planning for fall 2006 (see insert). If you have questions or would like to provide comments on the activities described in this update, contact one of the project representatives listed above.
The primary contaminant of concern in the lower Grasse River is PCBs. The results of the most recent human health risk assessment – developed in 2001 – indicated that consumption of fish from the lower Grasse River is the primary driver of potential risks at this site. In the near term, this potential risk is being addressed by the New York State Department of Health’s fish consumption advisory, which recommends that people eat no fish taken from the lower Grasse River. In support of a long-term solution, Alcoa has sampled 164 sediment samples from the Grasse River sediments, surface water, and biota since the early 1990s and began evaluating potential remedial alternatives by performing two in-river pilot studies. In 1995, Alcoa completed a Non-Time-Critical Removal Action (NTCAR), which resulted in the removal of sediments from a 1-acre area directly offshore of the main wastewater discharge outfall from the plant. Alcoa performed a pilot study in 2003 in a 7-acre area to evaluate the feasibility and effectiveness of various approaches to subaqueous (underwater) capping. Following the completion of these activities, Alcoa developed the Remedial Options Pilot Study of the site that was submitted to USEPA in June 2002.

Data collected in 2001 and 2002 indicated that the subaqueous cap was intact, there was no evidence of PCBs moving into or through the cap, and a variety of organisms were recolonizing the capped area. However, monitoring of the river in the spring of 2003 revealed that the cap, and in some areas the underlying sediment, had been disturbed. A severe ice jam, which occurred in the lower Grasse River in the spring of 2003, increased water velocities and caused the scouring of sediments in some portions of the study area. The ice jam-related scour was not expected, and the pilot cap had not been designed to withstand the forces generated by the severe ice jam event.

Dredging

Dredging efforts in the main channel of the river were designed to remove buried PCB-containing sediments, assess the implementability of dredging, and evaluate the effectiveness of removal efforts. Dredging began in June 2005, and continued through September 2005. The least sediment had been removed from areas that were originally anticipated. After dredging, sediments were identified. A layer of sediment, a variety of issues complicated removal of the remaining materials. The river bottom was irregular and uneven, and dredge operators frequently encountered hard bottom, rocks, or debris – all of which resulted in equipment damage. These problems were compounded. Inefficiencies typically more water is dredged with the sediments, and excess water has to be separated. Significant time was lost to silt curtain maintenance due to weather and other factors. Finally, the results of daily water sampling indicated periodic exceedances of action levels that necessitated operational and equipment modifications. Collectively, all these issues significantly reduced dredging productivity. Alcoa incorporated a variety of modifications to address these complications and maintain progress toward the project goals. Although these adjustments were beneficial, the larger productivity rates and other difficulties were limiting and as a result, only about 40% of the targeted sediments were removed from the main channel.

Capping

After dredging, the removal areas were covered, or capped, with a clean mixture of sand and topsoil to limit the potential for exposure to remaining PCB-impacted sediments. In the main channel and northern near shore area, approximately 1 foot of sand and topsoil was placed.

Caps were also placed in two areas that were not dredged. A thin layer cap, consisting of 3 to 6 inches of sand and topsoil was placed in the southern near shore area to cover the toe of the existing sediments. In addition, an armored cap was placed in an approximate 1-acre area of the dredging sampling area. The armored cap, which was designed specifically to resist the faster water flows and scour associated with ice jams, consisted of a layer of sand and topsoil, a coarser filter layer, and then a layer of large rocks. The various caps will be monitored to determine the effectiveness of the different approaches, and to assess if the armor stones provide additional permanence or protection from ice-related scour.

Monitoring

A variety of monitoring efforts were conducted to support the study. These included:

- Conducting profilometry surveys to characterize the shape of the river bottom and the depth of sediments. These surveys were done before dredging to establish a baseline, during dredging to assess progress, and after dredging and capping activities to evaluate the effectiveness of the efforts. In general, the results during and after dredging indicated that the sediment levels, significant amounts of targeted sediment remained, and the irregular nature of the river bottom with boulders and rock outcrops in some areas limited the effectiveness of the hydraulic dredge.
- Collecting more than 800 water samples for PCB and solids analysis. While there were no problems with concentrations of solids during the project, PCB action levels were exceeded on 8 days. When these exceedences were measured, additional samples were collected near the dredge area to better understand the situation, and changes in operations (such as slowing the dredging operations, altering removal methods, and limiting times of operations) were implemented to address the issue.
- Collecting more than 100 air samples for analysis of PCBs, particulate matter, and other compounds. There were no exceedances of the action levels for PCBs or other compounds. Some elevated levels of particulate matter were measured, but further assessment revealed the exceedances were not related to the project.
- Collecting 144 fish samples for PCB analysis. PCB levels in fish tissue were clearly higher than 2004 results for smallmouth bass, brown bullhead, and spottail shiner. Post-NTCAR fish monitoring conducted in 1995 also showed increased fish tissue PCB levels; a downward trend was observed within a couple of years. Future monitoring efforts will be necessary to put the ROPS results in perspective and address the question of whether these increases are temporary and if the previously observed downward trend in PCB concentrations will be re-established.
- Monitoring was also carried out to gauge impacts associated with odor, noise, and lighting impacts. No issues associated with these efforts were reported.

Longer-term monitoring efforts have been performed in 2006; the results of which are under evaluation.

Conclusions and Next Steps

The Remedial Options Pilot Study was successful in a variety of ways despite the numerous difficulties encountered. Significant information was developed regarding the uniqueness and complexity of the site conditions and various technologies (including dredging and capping) respond to these conditions. Progress was made in the river, as a portion of the originally targeted PCB-containing sediments was removed from an ice scour prone area of the river.

The information gathered and lessons learned as a result of this study and the 2006 pilot study (see insert) will be used to revise the 2002 Analysis of Alternatives (AA) Report and develop a final remedial design for the site. After the AA Report is approved, EPA will prepare a Proposed Plan that will identify the final remedial design for the lower Grasse River. The public will have the opportunity to comment on the Proposed Plan, and then EPA will formalize the selection of the remedy in a Record of Decision. After the Record of Decision is issued, the selected remedial approach will be implemented.
The primary contaminant of concern in the lower Grasse River is PCBs. The results of the most recent human health risk assessment – developed in 2001 – indicated that consumption of fish from the lower Grasse River is the primary driver of potential risks at this site. In the near term, this potential risk is being addressed by the New York State Department of Health’s fish consumption advisory, which recommends that people eat no fish taken from the lower Grasse River. In support of a long-term solution, Alcoa has sampled Grasse River sediments, surface water, and biota since the early 1990s and began evaluating potential remedial alternatives by performing two in-river pilot studies. In 1995, Alcoa completed a Non-Time-Critical Removal Action (NTCRA), which resulted in the removal of sediments from a 1-acre area directly offshore of the main wastewater discharge outfall from the plant. Alcoa performed another pilot study in 2003 in a 7-acre area to evaluate the feasibility and effectiveness of various approaches to subaqueous (underwater) capping. Following the completion of these activities, Alcoa developed a Draft of Alternatives Report for the site that was submitted to USEPA in June 2002.

Data collected in 2001 and 2002 indicated that the subaqueous cap was intact, there was no evidence of PCBs moving into or through the cap, and a variety of organisms were re-colonizing the capped area. However, monitoring of the river in the spring of 2003 revealed that the cap, and in some areas the underlying sediment, had been disturbed. A severe ice jam, which occurred in the lower Grasse River in the spring of 2003, increased water velocities and caused the scouring of sediments in some portions of the study area. The ice jam-related scour was not expected, and the pilot cap had not been designed to withstand the forces generated by the severe ice jam event.

### Remedial Options Pilot Study – Overview & Results

The 2003 ice jam and EPA’s and Alcoa’s response to the event revealed that despite the extensive studies undertaken to date, there are still some factors that need to be more clearly understood to answer outstanding questions and develop a comprehensive, effective remedy for the site. To this end, EPA and Alcoa agreed to perform the Remedial Options Pilot Study during the 2005 construction season (May through November). The elements of the study are as follows:

- **Dredging**: Dredging in the main channel of the river (including the side slopes) and in the northern near shore area;
- **Placing various types of sediment caps (1-foot thick, thin, and armored) in different locations in the river,**: Including conditions in the river before, during, and after dredging and capping activities;
- **Designing and constructing an ice control structure (not completed as part of the 2005 study activities).**

### Dredging

Dredging efforts in the main channel of the river were designed to remove buried PCB-containing sediments, assess the implementability of dredging, and evaluate the effectiveness of removal efforts. Dredging began in June 2005, and the majority of the less sediment had been removed by the end of August 2005. After dredging was completed, a sand and topsoil layer, a variety of issues complicated removal of the remaining materials. The river bottom was irregular and uneven, and dredge operators frequently encountered hard bottom, rocks, or debris – all of which resulted in equipment damage. These problems were compounded by the fact that sediment concentrations were typically higher in the river, the fact that sediment was typically more water is dredged with the sediments, and the solids in water has been separated. Significant time was lost to silt curtain maintenance due to weather and other factors. Finally, the results of daily water sampling pre-dredging indicated periodic exceedances of action levels that necessitated operational and equipment modifications. Collectively, all these issues significantly reduced dredging productivity. Alcoa incorporated a variety of modifications to address these complications and maintain progress towards the project goals. Although these adjustments were beneficial, the lower productivity rates and other difficulties were limiting and as a result, only about 60% of the targeted sediments were removed from the main channel.

### Sediment Removal

Sediment removal was also carried out in a northern near shore area, as there are unique considerations associated with removal in these shallow waters where water is typically less than 5 feet deep. No significant issues were encountered in the northern near shore area, and the targeted sediments were removed.

### Capping

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In addition to the in-river work completed in 2005, the project team is also evaluating a variety of options to manage potential impacts associated with severe ice jams, since an ice jam in the spring of 2003 increased water velocities and caused the scouring of sediments in some portions of the study area. The ice control evaluation is ongoing, and results will be used in the development of a final remedy for the site.
Alcoa Inc., with oversight from the US Environmental Protection Agency (EPA), will conduct a study in the fall of 2006 to evaluate the effectiveness of applying and mixing activated carbon in the lower Grasse River sediments downstream from its Massena West Plant. Throughout the project, Alcoa has been researching and evaluating new technologies for remediation, and promising results obtained through laboratory testing work indicate that this approach merits a pilot study. The technology proposed for this pilot study consists of adding activated carbon to the upper layer of the sediments and monitoring over a multi-year period to determine effectiveness. Work at the site will begin in September and continue through October of this year. This fact sheet presents a summary of the activated carbon pilot study and includes information relating to community health and safety during the study.

Why Carbon?

The lower Grasse River is currently under a fish consumption advisory from the New York State Department of Health due to elevated polychlorinated biphenyl (PCB) levels found in fish. Results from previous Grasse River investigations indicate that the major source of PCBs to Grasse River fish is from the river sediments. Sources to the river sediments have been controlled through remediation efforts at the Massena West Plant (see September 2006 Superfund Program Update).

Carbon is widely used to treat drinking water and, in fact, is used at the Massena plants to remove PCBs from Alcoa’s river discharges. Several recent laboratory studies have shown that the addition of activated carbon to sediments can reduce the bioavailability of PCBs in sediments to fish and other river-dwelling organisms. The carbon dose is not toxic to humans, fish, or other organisms. The PCBs sorb onto the carbon particles and become trapped, making them unavailable to the fish. This, in turn, is expected to result in the reduction of PCB levels in both water and fish of the lower Grasse River. Only a thin layer of carbon is necessary to achieve this result.

Study Area Location and Application Techniques

The activated carbon pilot study (ACPS) will be performed in an approximate 0.5-acre area located in the main channel of the lower Grasse River approximately 2 miles downstream of the Route 131 bridge. A silt curtain will be used on the downstream and center channel sides of the in-river work area to control carbon from leaving the work site.

The ACPS area will be divided into three separate test plots to evaluate different application techniques and mixing methods. The application techniques were developed over a several month period and were tested on land at the
Contractor’s facility prior to use in a river setting. The two application techniques that will be tested include: 1) a “roto-tiller;” and 2) a “tine sled.”

Both pieces of equipment have several nozzles to inject the carbon slurry (carbon mixed with water) to the sediments. The roto-tiller has the ability to mix the carbon into the top few inches of sediment via several rotating tines. It also can be used to simply inject the carbon without mechanical mixing. In this case, microscopic benthic organisms that live in the sediment would mix the carbon into the sediment over time. Carbon mixing with the tine sled occurs through the use of several “fingers” that extend into the sediment as the sled is dragged along the river bottom. Both pieces of equipment are enclosed and covered (not shown in the tine sled pictured above) to reduce the amount of disturbance from the mixing operation.

Monitoring will be performed prior to the study to determine baseline conditions, during the study to evaluate the application process, and over time after the study to determine the effectiveness of the carbon in reducing PCB availability in the sediments. Monitoring will consist of the collection of water, sediment, and benthic organisms.

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**Community Health and Safety During the Study**

Construction activities during the study are expected to take place during daylight hours, five days per week (excluding weekends) over September and October. As a result, a variety of health and safety issues must be anticipated, and measures taken to minimize impacts to the community. Throughout the study, Alcoa will evaluate water quality, noise levels, impacts on recreational boating, and site security. If monitoring activities indicate a potential concern, Alcoa and EPA will work together to address the issue as quickly as possible.

- **Water Quality:** Water quality will be monitored daily at several locations upstream, adjacent to, and downstream of the work area. Samples will be collected from multiple depths within the water column and analyzed for PCBs and total suspended solids along with turbidity (a measure of water clarity).

- **Noise Levels:** Noise levels will be assessed throughout the study. Sounds associated with the operation of heavy equipment will be controlled to the extent possible. Since activities will be performed during daylight hours, nuisance noise is expected to be minimal.

- **Recreational Boating:** Boaters may encounter working vessels/barges and other equipment associated with study-related activities. Navigation in an area along the river’s southern shore will remain unrestricted throughout the project, and efforts will be taken to promote public safety and awareness. The U.S. Coast Guard and the U.S. Border Patrol will be notified. A no-wake zone will be established near the work area, lighted buoy and buoy markers will be placed on the river, and notices to recreational boaters will be posted at local marinas and other locations in the community.

- **Site Security:** Potential shore-based concerns will only exist within the confines of the Alcoa property, which is off-limits to the public. To prevent trespassing, vandalism, or accidental entry, site security measures will be employed. Unauthorized personnel will not be permitted to enter the site.

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**For More Information**

If you would like additional information or want to be added to the project mailing list, please contact:

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