

Certified Mail, Return Receipt Requested # 7160 3901 9849 8054 6561

August 9, 2007

Ms. Jessica C. White  
Coastal Protection and Restoration Division  
NOAA/NOS/Office of Response and Restoration  
1445 Ross Avenue  
Dallas, TX 75202-2733

**Ref: Meeting Summary – Greens Bayou  
Ecological Services Analyses – June 5 – 6, 2007  
GB Biosciences (GBB) Corporation  
Greens Bayou Plant, Houston Texas  
Hazardous Waste Permit No: HW-50205  
Compliance Plan No: CP-50205  
TCEQ S.W.R. No: 30522  
EPA I.D. No: TXD000836486**

Dear Ms. White,

The purpose of this correspondence is to provide the State of Texas and Federal Natural Resource Trustees and Texas Commission on Environmental Quality (TCEQ) an official copy of the summary of the jointly held technical meeting at the TPWD offices in Austin on June 5 – 6, 2007.

The Trustees, TCEQ and representatives from GBB, ISK Magnetics, OCC/Tierra Solutions and their consultant team who attended the meeting reviewed the attached summary. All of the comments were incorporated in the summary. The summary was written by GBB consultant, Integral. Also enclosed is the attendee list for the June 5 – 6, 2007 meeting. The next scheduled meeting is July 31, 2007 in Austin.

GBB and the other stakeholders appreciate the opportunity to continue working with the Trustees and TCEQ in a cooperative manner to bring an acceptable and environmentally sound resolution relative to Greens Bayou.

Please feel free to contact me at 713-450-8075 if you need additional information regarding the GB Plant Site or Greens Bayou.

Sincerely,

Martin M. Fontenot, Jr. Q.E.P.  
GB Biosciences Corporation  
Site Remediation Manager

CC: Mr. Frank Rigsby  
ISK Magnetics, Inc.  
2237 Haden Road  
Houston, TX 77015

Mr. David Rabbe  
Tierra Solutions, Inc.  
Two Tower Center Blvd., 10<sup>th</sup> Floor  
East Brunswick, NJ 08816

Electronic Copies:  
All Attendees



## **MEETING SUMMARY GREENS BAYOU ECOLOGICAL SERVICES ANALYSIS JUNE 5-6, 2007**

### **INTRODUCTION**

A meeting was held on June 5 and 6 2007, at the Texas Commission on Environmental Quality (TCEQ) offices in Austin, Texas, to discuss technical approaches to be used for the ecological services analysis (ESA) to be conducted for Greens Bayou. Meeting attendees included representatives from GB Biosciences (GBB) and ISK Magnetics (ISKM) (the Companies); their consultant team; TCEQ, and state and federal natural resource trustees (Trustees). A list of attendees is included as Attachment 1.

At the meeting, several technical aspects of the ESA were to be discussed and finalized if possible, and concrete restoration alternatives evaluated. The meeting started with a review of the project timeline and a recap of the work done to date. The agenda also included discussion of several technical aspects of the ESA approach, and discussion of compensation alternatives. A copy of the draft meeting agenda is included as Attachment 2.

### **AGENDA TOPICS**

#### **Project Timeline and Review of ESA Work to Date**

The dredging timeframe established by GBB's agreement with the Port of Houston Authority (PHA) was presented by Marty Fontenot, and the implications for completion of the ESA reviewed. The agreement between PHA and GBB calls for completion of the dredging by May of 2008. To meet this schedule, dredging must be started by January of 2008. Before dredging can be begun, Condition 4 of the Corps permit must be met, which calls for completion of an agreement regarding injury and compensation. To allow time for the permit process (including 30 days for public notice), October 2007 therefore is a realistic deadline for the Companies and Trustees to conclude an agreement on the ESA. Marty Fontenot also announced that he will be retiring by the end of 2007.

ESA work to date was summarized; the status of various elements include:

- Agreement on area and times addressed
- Agreement on services addressed
- Conceptual agreement on baseline
- Calculation of sediment accumulation rates—a white paper has been provided to the Trustees
- Initial discussion of benthic service baseline
- Initial discussion of DDT service loss
- Consensus on use of PCL of 157 ppb as a threshold for effects
- Initial discussion of CDF habitat loss
- Preliminary review of possible compensation alternatives.

## **Status of the MOA**

Both GBB and ISKM have signed the MOA. The effective date of the MOA is May 21. Occidental Chemical Corporation (OCC) has not signed yet, possibly as a consequence of a recent reorganization within OCC. None of the meeting participants was aware of the likelihood or timeline for signature by OCC. The Trustees (or their counsel) are continuing to urge OCC to sign the MOA, and believe that OCC or their representatives should not participate in the ESA settlement process until the MOA is signed.

NOAA has also not yet signed the MOA. Jessica White will try to get NOAA to sign the agreement as soon as possible, but assured the Companies that NOAA will sign it by the end of the fiscal year (September).

The tolling agreement was also discussed. The Trustees have submitted an invoice for costs through October 2006. Work from November 2006 through the present will be invoiced separately. The Companies need payment instructions, and the Trustees agreed to provide this information. GBB will pay and settle separately.

## **Status and Schedule for CDF Construction and Dredging**

Marty Fontenot indicated that the Response Action Plan (RAP) and Post-Dredge Monitoring Plan (PDMP) are anticipated to be finalized by the end of June. However, TCEQ's agreement and approval of these documents are required, and GBB is working with Vicki Reat, Linda Broach, and Mark Irwin to obtain the required approval.

Judi Durda asked if the Trustees anticipated that settlement of the ESA would require additional post-dredge monitoring in addition to that which is currently being planned to meet the requirements of the PHA agreement and TCEQ's concerns regarding ecorisk. Richard Seiler stated that the Trustees would not tie any requirement for

additional remediation from post-dredge monitoring to the ESA, although a standard reopener clause would be part of the settlement agreement—such a reopener would apply only to the benthic area addressed by the ESA.

## **Development of List of Agreements per the MOA**

The Companies and Trustees concur that the following items might be included in a list of agreements to be developed, per the MOA:

- Past injuries will be assessed from 1981
- Benthic habitat is the resource of concern (benthic habitat is defined as a sediment depth of 0 to 6 inches and a water depth of +2 to -10 feet)
- The ISK pond is outside the scope of the ESA.

The Trustees consider that the use of 157 ppb total DDx (the PCL) as an injury threshold should also be included in the development of a list of agreements, per the MOA. Because of the legal constraints imposed upon such agreements by the MOA, and because the Companies believe that the PCL may not be an actual threshold of effects in Greens Bayou, the Companies prefer to regard the use of the PCL as a consensus rather than an agreement per the MOA's definition. There was some discussion of the distinction between MOA agreements, which the Companies defined as having legal force beyond the cooperative ESA process, and less formal consensus agreements, which the Companies defined as agreements to which both Companies and Trustees may choose to adhere to for the purposes of the cooperative ESA process. The Trustees want to further consider the distinction between MOA agreements and consensus agreements.

The process of formalizing MOA agreements was also discussed. The Trustees agreed to consider the three agreements listed above and possibly prepare a document to formalize these agreements by the next meeting. It was agreed that Company and Trustee members of this technical committee could sign such a document to formalize the agreements.

## **Baseline Habitat Value**

During previous discussions of baseline habitat value, the Trustees presented the results of their survey of expert opinion on the relative value of bayou habitat and other coastal habitats (using fully functioning salt marsh as the most highly valued habitat). There was some discussion of the actual numeric value of this relative habitat valuation, with ratios of both 4.5:1 and 5:1 being discussed. The Trustees indicated that in past assessments, fully functional bayou was valued at providing 20% of marsh services. The Companies presented information on other stressors in Greens Bayou, focusing on increasing usage of the northern shoreline for barge moorage, and the resulting impacts from grounding, prop wash, and shading. The Hylebos Waterway in Commencement Bay, Washington, was cited as a parallel example, where NOAA's NRDA assessment determined that benthic habitat was valued at 11 percent of fully functioning intertidal habitat as a result of the presence of log rafts and overwater structures. It was stated that the level of stress varies

across the depth of the sediment, and that productivity likely varies relative to location and depth. To account for the stressors in the bayou it was suggested that we could re-evaluate the relative weight of the habitat conversion. During the discussion, Wendell Mears indicated that barges were typically grounded for one-third of their length or width: approximately 15 feet if moored parallel to the shoreline (typically the case upstream of the HCFC Ditch), and approximately 35 feet if moored perpendicular to the shoreline (typically the case downstream of the HCFC Ditch). Wendell Mears indicated that barge mooring would continue into the indefinite future because MegaFleet has just renewed its contract with PHA. The group acknowledged the need to identify areas where barges are moored and to estimate the area covered by the barges.

The Port's recent emplacement of rip-rap to shore up the foot of the GDDA dike was also discussed as another physical factor affecting the size and/or value of the benthic habitat in Greens Bayou. Wendell Mears indicated that the rip-rap was placed between depths of +8 to -1 foot MLT and covered with gravel and sediment to reduce damage to barges that are grounded in that area. The Companies will calculate the area of benthic habitat that was affected by this action. The Trustees will consider how this action affects the area of benthic habitat for which the Companies are responsible.

Richard Seiler stated that the Trustees had been wrestling with how to address such additional effects on habitat value, but had not focused on it. It was stated that the ESA would address impacts associated with the remediation required of GBB, and that the rip-rap placement was not associated with the remediation effort, but only with the decommissioning of the GDDA, which was due to it being full and of no further use to the Port of Houston.

The Companies agreed to provide the Trustees with a copy of the NOAA document describing habitat valuation in the Hylebos Waterway, and to compute the area of the benthic habitat that is potentially affected by barge grounding.

### **Trustees' Assessment of Concentration-Related Injury Levels**

Jessica White presented the Trustees' assessment of service losses based on chemical concentrations. Service losses for total DDx were based on the pMax approach developed by Jay Field. For hexachlorocyclohexane, chlorobenzene, and hexachlorobenzene, service losses were based on exceedances of PCL and Effects Range-Median (ERM) values. For the latter three chemicals, the PCL was taken to be the midpoint between the first and second effects levels, and service loss was assumed to be 5 percent between the PCL and the ERM, 20 percent between the ERM and two times the ERM, 25 percent between two and three times the ERM, 30 percent between three and four times the ERM, etc. Service losses from multiple chemicals were considered to be additive (e.g., 20 percent service loss from one chemical and 30 percent service loss from another chemical is considered to be a 50 percent service loss), and capped at 95 percent. The Trustees presented the results of their computation of concentration-related service losses for all assessment polygons, using the highest concentration found among all surface sediment samples from each

polygon. These estimates of concentration-related service loss were 3.351 acres within the DMMUs and 3.547 acres outside the DMMUs, for a single year.

Dreas Nielsen recommended that the Trustees consider the method used for combining multiple service losses that has been used previously by NOAA, which is to convert service loss to service level, combine the service levels independently (i.e., multiplicatively), and then convert the result back to a service loss. The Companies agreed to provide a reference for this calculation method, and the Trustees agreed to provide a reference for their method of combining service losses.

The Companies will evaluate the Trustees' assessment of concentration-related injuries.

The Companies presented a summary of DDT degradation based on literature and site-specific data, as presented in an expert report prepared by CPF Associates. This analysis resulted in an estimate of a 17-year half-life for degradation of DDT in Greens Bayou sediments. The Trustees agreed that this estimate was consistent with literature estimates that they had obtained of degradation rates of individual DDX compounds. Based on their own literature survey, the Trustees proposed use of half-lives of 6 years for hexachlorocyclohexane and hexachlorobenzene, and 2 years for chlorobenzene. The Companies and the Trustees agreed to share citations or copies of the documents that each had relied on.

Following the presentation of degradation rates, there was a discussion on how to use that data. It was discussed that degradation rate could be used to calculate recovery in areas which are not dredged. In areas that are dredged, sedimentation rate would play a larger role in recovery.

## **Assessment of Depth-Related Injury Levels**

The method used to calculate sediment accumulation rates (as originally presented by Don Hayes during the December 2007 meeting) was reviewed, and results presented. This information was in the white paper previously submitted to the Trustees. There was some discussion of the calculation methods. Richard Seiler noted that several of the bathymetric profiles indicate that channel dredging included areas that are not strictly within the channel boundaries, and suggested that changes in sediment accumulation rates would not be linear over the width of the side-channel area. The Companies agreed to calculate sediment accumulation rates separately for the deep (dredged) and shallow areas outside of the channel, and to present the results as a curve or function relating sediment accumulation rate to depth.

There was considerable discussion of the effect on benthic habitat value of water depths less than ten feet but greater than the pre-dredging depth. It was acknowledged that dissolved oxygen is an important factor for habitat value at depth. There was a suggestion to look for other site to determine how service loss was associated with depth – particularly where dredging was done. Proposals included assuming that benthic habitat was valued the same at all depths less than or equal to ten feet, assuming that the benthic habitat value

was zero when the water depth was greater than ten feet. Another proposal suggested that once the depth reaches 10 feet, recovery of benthos begins, and recovery is variable between 10 feet and the average depth, depending on the depth profile of the segment. The latter two proposals incorporated an assumption that habitat value changes linearly between a water depth of 10 feet and the original water depth. The suggestion was made that the habitat value at a depth of 10 feet, relative to the pre-dredging habitat value, depended on the actual pre-dredging water depth. To further evaluate how such a consideration might be applied, the Companies agreed to calculate the average pre-dredging water depth within the +2 to -10 foot range of the assessment polygons. It was also suggested that a sensitivity analysis should be run to identify data gaps in benthic habitat (particularly in areas impacted by barges).

## **ESA Calculation Approach**

The Trustees and Companies discussed the timeframe of the ESA, which would start at 1981. The approach to calculating the 1981 horizon was also discussed, and 3 methods were suggested. One approach is to use the concentrations in the sediment core existing in the 1981 horizon (as calculated by sedimentation rate to determine depth). Another approach is to use the surface sediment data and then back calculate the concentrations to the 1981 levels based upon half-life or degradation rates of the chemicals. The final approach suggested was to use the surfacel data and then calculate the concentrations to the 1981 levels based upon a straight line model. It was acknowledged that there was a need to look at the core data to determine whether it is sufficient for use in the first approach. There was a suggestion to use the highest surface concentration to represent the past levels if there is not sufficient data in the cores. Another suggestion was to use the current surface or first surface concentration to get an average of multiple locations in the area – using post hurricane Allison data only. The Trustees prefer the reasonably conservative approach of using the highest surface concentration and then back calculating to 1981 levels.

Other areas discussed included using the discount rate of 3%, and a timeframe of 1981 to 30 years in the future. Spatial considerations include DMMUs, undredged areas, and possibly areas with sediment core data.

## **CDF Footprint and Potentially Injured Habitat**

The Trustees and Companies both anticipate that compensation for habitat at the CDF area will be accomplished differently than compensation for the benthic habitat service losses. The Trustees have identified 3 types of habitat in the CDF and borrow areas, including wet prairie, uplands/grassland, and forested wetland. The Trustees suggested that habitat used for restoration should be scaled based upon threat of development and service flows and that compensation for the CDF area would most likely be a preservation project. The quality of the habitat in the CDF and borrow area should be considered relative to the restoration habitat. Don Pitts indicated that the upland/ grassland habitat could potentially be compensated for following CDF revegetation. Don Pitts reviewed aerial photos of the

site from several years. The 2002 infrared (IR) photo shows a pattern of vegetation that was interpreted by Andy Sipocz as wetland. Visible-spectrum photographs from other years show other patterns of vegetation. Don Pitts said that the Trustees would convert the areas of three different habitat types present to an equivalent area of forested wetland, which is the habitat type with the highest value. He indicated that in previous assessments the ground cover part of forested habitat was assigned a value that is 0.2 % of forested wetland, and that Spring Creek might be an appropriate compensation site.

The treatment of the borrow pit area that had been included only through the 30 percent design phase was discussed. The Companies reiterated their position that because that area will not in fact be used for CDF construction and because that area had historically been open, no compensation is required. The Trustees reiterated their position that because trees were cleared from the area in 2005 in anticipation of its use for CDF construction, compensation is required. Agreement was not reached on whether or how to account for the borrow pit area. The Companies agreed to provide the Trustees with the 30 percent design boundary of the borrow pit area in the format of a geographic information system (GIS) shape file.

## Restoration Options

The Trustees identified the following sites at which restoration or compensation for injured benthic habitat are feasible within the time frame of the Greens Bayou settlement:

- Sheldon Lake State Park (construction of up to 300 acres of emergent marsh, clearing of tallow, and bald cypress enhancement)
- Carpenters Bayou (habitat acquisition or conservation easement)
- San Jacinto State Park (wetland restoration or construction)
- Baytown Nature Center (improvement)
- Spring Creek (improvement and preservation)
- East Harris County (greenbelt – preservation)
- Greens Bayou mudflat areas (restoration)
- Greens Bayou upstream
- Port of Houston habitat area.

The following sites were suggested as appropriate for compensation for forested habitat:

- Carpenter's Bayou
- Spring Creek (improvement and preservation)
- Greens Bayou upstream.

TPWD (Andy Tirpak) will work on valuing these habitats so that they can be used in the ESA. TPWD will also compile information on costs associated with the various

acquisition, restoration, and preservation options. The Trustees will also provide the Companies with contact information for these sites, and will arrange site visits. The Company contact for these site visits will be Frank Rigsby of ISK Magnetics. (713-393-3770). The contact for Spring Creek is Jennifer Lorenz at the Legacy Land Trust (713-524-2100).

## **ACTION ITEMS**

The following action items were identified during the meeting.

### **Companies**

1. GBB will pay the Trustees' invoice after payment instructions have been received.
2. Integral will provide Trustees with a copy of the Hylebos report that illustrates NOAA's treatment of over-water structures and log rafts.
3. Integral will compute modified area to account for barge grounding and share with the Trustees.
4. Integral will compute the benthic area covered by the rip-rap along the GDDA.
5. Integral will calculate sediment deposition rate nearer to the shore.
6. The Companies will send Trustees a copy of the paper illustrating the calculation of DDT half-life for Greens Bayou.
7. The Companies will calculate the average depth of assessment area polygons to support further analysis of depth limitations on habitat services.
8. The Companies will provide the Trustees with a shape file of the borrow area as in the permit application.
9. Integral will provide the Trustees with examples of where a "multiplicative" approach to service loss calculation has been used.
10. Companies will prepare meeting minutes, and will send action items to Trustees on 6/7.

### **Trustees**

1. The Trustees will provide invoice payment instructions to GBB
2. The Trustees will review the Hylebos document and render an opinion on service losses due to barges.
3. The Trustees (Andy Tirpak) will assign values to the habitats of the various restoration alternatives that were outlined and compile cost information, as available.
4. The trustees will provide documentation/citations of sites where the "additive" approach to service losses has been used.

5. The trustees will provide the references for the half-life values recommended for the other COCs
6. The Trustees (Don Pitts) will provide GBB with their estimates of acreages of different habitats at the CDF, and their equivalent in terms of forested wetland – plus backup information re the multipliers used to convert to forested wetland.
7. Trustees will consider, and possibly prepare, a signatory sheet for the three MOA agreements, to be signed for the next meeting.

**ATTACHMENT 1  
LIST OF ATTENDEES**



GREENS BAYOU ECOLOGICAL SERVICES ANALYSIS MEETING, JUNE  
 5-6, 2007

ATTENDEES

| Name            | Organization | Phone        | e-mail                           |
|-----------------|--------------|--------------|----------------------------------|
| Frances Webster | MPI-ISKM     | 713-960-7424 | fwebster@pirnie.com              |
| MARTY Fontenot  | GBA          | 713-450-8075 | marty.fontenote@syngenta.com     |
| Frank Rigby     | ISKM         | 713-393-3720 | rigbyf@iskamericas.com           |
| Jessica White   | NOAA         | 214-665-2217 | jessica.white@noaa.gov           |
| Tammy Ash       | USFWS        | 361-994-9005 | Tammy-ash@fws.gov                |
| John Wilder     | TCEQ         | 512-239-2579 | jwilder@tceq.state.tx.us         |
| Don Pitts       | TPWD         | 512-912-7154 | don.pitts@tpwd.state.tx.us       |
| Judi Durda      | Integral     | 410-573-1982 | jdurda@integral-corp.com         |
| Ken Rike        | GBA          | 713-450-6514 | ken.rike@syngenta.com            |
| Dennis Nielsen  | Integral     | 206-230-9600 | dnielsen@integral-corp.com       |
| Andy Turpak     | TPWD         | 281-534-0132 | andy.turpak@tpwd.state.tx.us     |
| Richard Seiler  | TCEQ         | 512-239-2523 | rseiler@tceq.state.tx.us         |
| Johanna Gregory | TPWD         | 512-912-7103 | johanna.gregory@tpwd.state.tx.us |
| Wendell Mears   | GBA/PHA      | 832-518-2412 | wdmears@gba-inc.com              |
| ROXANA HERRERA  | PHA          | 713-670-2814 | rherrera@paha.com                |

## **ATTACHMENT 2 AGENDA**

### **Tuesday, June 5**

#### **10:00 – 10:30**

Introductions, review of ESA work to date, summary of meeting objectives, and review of agenda

#### **10:30 – 10:45**

Status of the MOA (Companies and Trustees)

- Signatures, notification, and effective date
- Payment of past assessment costs of Trustees

#### **10:45 – 11:00**

Status and schedule for CDF construction and dredging of the Bayou (Companies)

#### **11:00 – 11:45**

Development of list of agreements per the MOA

- Trustees' list of proposed agreements, and rationale
- Companies' list of proposed agreements, and rationale
- Discussion and determination of a final list of agreements
- Process and schedule for signoff on the list of agreements

#### **11:45 – 12:30**

Baseline habitat value

- Review of previous Trustee recommendation
- Accounting for barge moorage
- Habitat variations throughout the Bayou

#### **12:30 – 1:30**

Lunch

#### **1:30 – 2:15**

Trustees' assessment of concentration-related injury levels

- Total DDx
- Other chemicals

#### **2:15 – 3:15**

Assessment of concentration-related injury levels (continued)

- Chemical degradation rates
- Discussion

**3:15 – 4:15**

Separate Trustee and Company breakout sessions to discuss progress toward agreement on concentration-related injury levels.

**4:15 – 4:30**

Break

**4:30 – 4:45**

Joint discussion of status of progress toward agreement on concentration-related injury levels, and definition of next steps.

**4:45 – 5:15**

Assessment of depth-related injury levels

- Trustee recommendations
- Discussion

**5:15 – 6:00**

Summary of ESA calculation approach

- Time frame (past and future)
- Discount rates
- Spatially distinct areas within the Bayou
- Integration of injuries for multiple chemicals and for depth
- Integration of benthic habitat and CDF habitat injuries

**6:00 – 6:15**

Summary of action items

Clarification of issues from the day's discussions

Revisions to next day's agenda