



MEETING SUMMARY

GREENS BAYOU POST-DREDGE MONITORING PLAN

AUGUST 8, 2007

A meeting was held on August 8, 2007 at the Texas Commission on Environmental Quality (TCEQ) offices in Austin, Texas, to discuss the post-dredge monitoring plan (PDMP) to be implemented in 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. The meeting agenda is included as attachment 2.

The purpose of the meeting was to address TCEQ's questions about the post-dredge monitoring program, as presented in the July 5, 2007 letter from Mark Erwin of TCEQ to Marty Fontenot of GBB, and to reach agreement between all parties on the scope and approach of the plan. The comment letter is included here as attachment 3. Marty Fontenot opened the meeting with a summary of the meeting's purpose and agenda, and with a summary of progress to date on construction of the confined disposal facility (CDF) and on remediation of the Harris County Flood Control District (HCFCD) Ditch. He expressed appreciation for the cooperative ESA process and the progress made to date. Judi Durda emphasized that to meet the dredging schedule, acceptance of the response action plan (RAP), and therefore of the post-dredge monitoring plan, was required by October 2007.

Richard Seiler summarized the ESA discussions held during the July 31 meeting. He said that an agreement in principle had been reached that would address benthic impacts based on a worst-case scenario. This agreement would require the restoration of 10 acres of marsh and, because this amount assumes complete loss of benthic services in the bayou, no reopener would likely ever be instituted. Judi Durda emphasized that the assumption of total loss of services meant that no further management actions were warranted, so no monitoring to address future benthic conditions were necessary. Vickie Reat asked if the Trustees present agreed with this assessment. Richard Seiler said that he generally agreed with this statement, but that the settlement proposal was based on impacts within the proposed dredged area footprint and in areas where protective concentration limits (PCLs) were exceeded. He stated that the Trustees might want to discuss the potential for post-dredging injuries in undredged areas where PCLs had not been exceeded prior to dredging. There was then a general discussion of whether or not the Trustees' proposal included consideration of post-dredging changes in the footprint of contamination, and whether or how the proposal might be modified if such considerations needed to be added. Jessica White suggested that the Trustees could consider a scenario in which there is total loss of services in the entire benthic habitat area. Richard Seiler said that resuspended sediment would be unlikely to lead to a total loss of services. Further discussion resulted in agreement that the Trustees should revise their settlement offer as needed to address their concerns,

with the goal of producing a settlement offer that eliminates the potential for a reopener or post-dredge monitoring of benthic conditions. With the understanding that the Trustees would produce such a settlement proposal for the ESA, all present agreed that the meeting could continue and focus only on TCEQ's concerns regarding risk to aquatic-dependent wildlife.

Dreas Nielsen presented a summary of the post-dredge monitoring strategy, as outlined in the March 2007 monitoring strategy document. This strategy is also represented in a more detailed form in the draft PDMP that is under development.

With regard to the sampling required by the Stipulation Agreements, it was pointed out that the term 'substantial completion of dredging' used in the strategy document came from the Stipulation Agreement itself, and was not clearly defined. The Companies are working with the understanding that this phrase refers to the completion of sediment removal from the bayou during the planned dredging operation, and is not based on any other activities related to dewatering or closure of the CDF. Ken Rike suggested that the timing of post-dredge monitoring events be clarified. After some discussion, it was agreed by all that the 6-month and 2-year sampling events refer to the period after dredging is complete. Therefore, the 2-year post-dredge sampling, if conducted, would occur 1.5 years after the 6 month sampling.

Richard Seiler asked whether ecological risk assessment samples collected outside of the Stipulation Agreement grid would also be composites. Dreas Nielsen said that single (non-composite) samples would be collected at those locations.

During the summary of the monitoring strategy, it was emphasized that because of uncertainty about what monitoring results will actually show, an adaptive management approach will be taken. Vickie Reat indicated that the planned sampling times was an issue, and it was agreed to discuss that issue after the summary of the design. Some additional detail about the statistical and risk assessment methods to be used was also presented. Linda Broach said that the use of area-weighted concentrations addressed her concern about statistical methods. The Trustees and other TCEQ staff had no further comment on the statistical methods. A simplified approach to determining ecological risks was presented, based on a linear relationship between DDx concentration and hazard quotients. Vickie Reat said that she was not sure that she understood the mathematics behind this approach. Judi Durda indicated that this approach was a shortcut calculation that would produce the same result as the complete risk assessment calculation.

Following the presentation of the general post-dredge monitoring strategy, specific issues identified by TCEQ were discussed, starting with the timing of sampling. Vickie Reat stated that she understood that sampling was to be conducted at six months for consistency with the Stipulation Agreement sampling, but did not understand the rationale for sampling at 2 and 5 years, particularly if previous modeling had indicated that recovery would take place in one year. Dreas Nielsen clarified that the one-year recovery period was based on

modeling that included only the 4,4' isomers of the DDx compounds, and that the two-year recovery time was based on modeling that includes the 2,4' isomers as well. Vickie Reat asked the Trustees if they had any comment, and they did not. Vickie Reat then agreed that a two-year monitoring period would be acceptable to her if that was the recovery period indicated by modeling, and the Trustees had no objection. She reiterated that she is still not comfortable with sampling at 5 years post-dredging if risk is found at 2 years. Linda Broach also stated that she was uncomfortable with the length of time between the second and third sampling events. Dreas Nielsen said that because recovery is expected at two years, if risks are found at that time, two years is effectively a point at which an adaptive management approach may be taken. Depending on what the data show at that time, the monitoring program may be continued as outlined, the monitoring program may be continued with modifications, or other management actions may be taken. There followed a discussion that concluded with general agreement that the PDMP should describe the need for a management decision if risks are present at two years, and eliminate a specific time for a third monitoring event.

Linda Broach asked how dredging and sampling information will be communicated to the Trustees and TCEQ by the Companies. Marty Fontenot noted that there will be third-party quality assurance review to assure that all RAP activities—including post-dredge monitoring—have been completed as planned, and that the QA report will go to the Port of Houston Authority (PHA) and TCEQ. Ken Rike stated that the Companies have no reservation about informing the Trustees prior to dredging and sampling activities, and that this could be done by e-mail. Linda Broach agreed that this would satisfy her concern about notification. Dreas Nielsen said that the reporting protocols will be documented in the PDMP.

Vickie Reat asked if specific management actions that might be taken at two years could be listed in the PDMP. There was consensus that although general types of management actions could be listed, all possible specific actions should not be listed. Vickie Reat said that her concern was that if no actions are listed, the result might be an indefinite continuation of monitoring, and that she was disinclined to have monitoring conducted indefinitely. Mark Erwin noted that the PDMP will be part of the RAP, and it is typical for a RAP to identify triggers for further action, but not to specifically describe those actions.

Vickie Reat said that for management decisions, there is an important difference between HQs based on no-observed-adverse-effects levels (NOAELs) and lowest-observed-adverse-effects levels (LOAELs), and asked which were used in the original risk assessment. Judi Durda replied that HQs based on both types of toxicity thresholds were computed, and that all were less than 1.0. The HQ for cormorant based on a NOAEL was 0.1, the highest HQ for all receptors. Vickie Reat stated that the type of management decision that is made is likely to depend on whether a LOAEL or NOAEL HQ exceeds 1.0. Judi Durda noted that the intent was to conduct risk assessments using post-dredge monitoring data sets in the same manner as the original risk assessment, using the same methods and receptors. There was

agreement that the PDMP should specify the risk assessment method in this way rather than attempting to specify management actions for each type and magnitude of HQ.

There also was discussion on the analytes to be included in the post-dredge monitoring. The companies' proposal is to analyze for DDx. Vickie Reat states that she was comfortable with that because DDx was the risk driver for wildlife in the Bayou risk assessment. Tammy Ash asked if the Trustees were comfortable with that. There were no objections and so it was agreed that the post dredge sampling would address only DDx.

The specific comments in Vickie Reat's memo that was attached to Mark Erwin's July 5 letter were then reviewed to determine whether each had been addressed satisfactorily. The following paragraphs are numbered to correspond to those comments.

1. It was agreed that "substantial completions" would be considered to refer to when the dredge cutterhead comes out of the water for the last time—i.e., when all the sediment to be dredged has been removed from the bayou.
2. The Companies emphasized that good statistical practice would be followed throughout, employing parametric statistics, preceded by data transformations as necessary, wherever practical. Mark Erwin asked if normality tests such as the Shapiro-Wilk test would be used, and was answered in the affirmative. Some of the Trustees said that they would want to have electronic copies of the monitoring data, and the Companies agreed to provide it.
3. It was reiterated that post-dredge monitoring samples would be collected at the same locations as the samples used for the original risk assessment. During the first post-dredge monitoring event, some of these are expected to coincide with locations of composite samples to be collected under the Stipulation Agreement.
4. Vickie Reat asked for clarification that post-dredge ecological risk assessments would be conducted using only data from the latest monitoring samples, not using all previously collected data. Judi Durda confirmed that the risk assessments would use only the latest data.
5. It was agreed that, as previously discussed, the PDMP would specify that the risk assessments be conducted using the same methods as used in the original risk assessment.
6. Vickie Reat said that this issue had been resolved with the agreement to establish a management decision point if risk is still present after the sampling at two years post dredging.
7. Vickie Reat asked if the monitoring plan would assess the impact of large storm events (comparable to Hurricane Alison). Judi Durda replied that the intent was to evaluate the bayou at specific points in time, including the effect of large and small events that occur within the preceding period. Vickie Reat asked if it might not be appropriate to re-evaluate monitoring, or even whether monitoring should be done,

following a large storm. Linda Broach responded that regardless of storm events, the presence of risk at two years post dredging should still be evaluated, and the results of the potential effects of a storm could be considered as part of the interpretation of the monitoring data. Vickie Reat indicated that this approach was satisfactory to her.

8. The Companies agreed that all monitoring data would be provided to TCEQ and the Trustees in an electronic format.

All of TCEQ's comments were resolved to the satisfaction of all participants. Judi Durda asked what needed to be done to ensure that TCEQ will be satisfied with the PDMP when it is officially submitted, to avoid delays associated with another cycle of comments and responses. Vickie Reat indicated that she would be able to review a draft in September. Judi Durda and Marty Fontenot suggested that the meeting minutes be used to codify the language to be used in a response to comments (included here as Attachment 4). Marty Fontenot asked if TCEQ and the Trustees could review and respond to the minutes within two weeks of receipt, and agency staff indicated that they expected to be able to do so.

Mark Erwin noted that some elements of the RAP are not consistent with the planned PDMP as agreed during this meeting. It was suggested that Reid Carscadden (Integral Consulting) review the RAP for consistency.

Marty Fontenot indicated that the Companies would commit to a date for submittal of the PDMP, and inform TCEQ and the Trustees of this date with submittal of these minutes.

The Trustees will schedule a conference call to discuss the formation of a new settlement proposal.

ATTACHMENT 1. LIST OF MEETING ATTENDEES



GREENS BAYOU ECOLOGICAL SERVICES ANALYSIS MEETING, AUGUST 8, 2007

ATTENDEES

Name	Organization	Phone	e-mail
Ken Rike	GBB	713-450-6514	ken.rike@syngenta.com
Matt Butcher	Aradis	206/325-5254	Matthew.Butcher@aradis-us.com
Alicia Fogg	Malcolm Pirnie	512/370-3860	afogg@pirnie.com
DREWS NIELSEN	INTEGRAL	206-230-9000	dnielsen@integralcorp.com
MARTY FONTENOT	GBB	713-450-8075	marty.fontenot@syngenta.com
FRANK RISSBY	ISIC	713-393-3770	frank.rissby@isicamerica.com
MARK ERWIN	TCEQ	512-239-2531	merwin@tceq.state.tx.us
Vickie Reat	TCEQ	512-239-6873	vreat@tceq.state.tx.us
Richard Seiler	TCEQ	512-239-2523	rseiler@tceq.state.tx.us

On phone:

Jessie White - NOAA
 Andy Tirpak - TAWD
 Tammy Ash - USFWS
 Linda Broach - TCEQ - Houston
 Jodi Darda - Integral
 France Webster - Malcolm Pirnie
 Tim Funnuzzi - Aradis BBL
 Alicia Fogg - Malcolm Pirnie

ATTACHMENT 2. MEETING AGENDA

Draft Agenda Meeting to Discuss Post Dredge Monitoring Plan for Greens Bayou

AUGUST 8, 2007

8:30 AM – 4:00 PM

- Basic Business
 - Introductions (All)
 - Meeting objectives (All)
 - Dredging program schedule – update (M. Fontenot)
 - ESA activities – update (Trustees, Companies)

- Overview of Proposed Sampling Program (Integral)

- Finalization of Approach (All)
 - Sample location and depth
 - Analytes
 - Monitoring frequency
 - Performance & exit criteria
 - Statistical evaluations
 - Trends
 - Risk comparisons
 - Other issues

- Summary of Agreements (All)

- Path Forward and Schedule (All)

ATTACHMENT 4. DRAFT RESPONSIVENESS SUMMARY

Following are responses to comments on the post-dredge monitoring strategy that were presented in the memorandum from Vickie Reat that was included in Mark Erwin's July 5, 2007 letter to Marty Fontenot. The responses are organized here in the manner parallel to the organization in Vickie Reat's memorandum. The comments are paraphrased here. A complete copy of the comment letter is presented as Attachment 3.

Comments Related to Benthic Habitat

The sampling plan should be designed to capture all of the information needed to justify the results of an ecological services analysis (ESA) based on risk to benthos.

It was agreed by all parties that post-dredge monitoring will collect data to evaluate potential risks to aquatic-dependent wildlife. Any issues related to injury or risk to benthic receptors will be addressed separately in the ESA.

Comments Related to the Proposed Sampling Intervals

We suggest a more rigorous sampling schedule, including sampling one year post dredge. Sediment sampling after 2 years should not be conducted. If performance criteria are not met at 2 years post-dredge, fish tissue sampling should be conducted.

It was agreed by all that an adaptive management strategy would be applied to interpretation of the post-dredge monitoring data. Sediment monitoring will occur 6 months after dredging is complete. If the results of the sediment sampling at 6 months post dredge indicate that DDx is elevated above pre-dredge conditions and hazard quotients exceed 1.0, a second sampling event will occur at 2 years post-dredge. If the results of the sampling at 2 years post-dredge indicate that aquatic dependent wildlife are at risk, a decision will be made on the need for additional management actions. Management actions to be considered at that time will include continued monitoring as outlined in the PDMP, continued monitoring with modifications, or other management actions. Risks will be evaluated using the methods and assumptions used in the previous risk assessment conducted for Greens Bayou.

General Comments Related to the Proposal

1. *The term "substantial completion of dredging" needs to be defined.*

For the purpose of scheduling post-dredge monitoring activities, "substantial completion of dredging" shall mean the completion of sediment removal from the

bayou. Other dredging-related activities, such as demobilization of the equipment and dewatering of the CDF may continue past this point without any effect on the scheduling of post-dredge monitoring.

2. *The statistical methods to be used to compare pre- and post-dredging conditions should be detailed.*

To assess bayou-wide chemical concentrations, area-weighted averages and variances will be computed for each data set. Parametric statistics will be used if the data conform to the distribution requirements. Data will be transformed appropriately, as necessary, to meet these assumptions, following an appropriate evaluation of the data distributions. Standard statistical methods will be used throughout. Statistical operations will be carried out using a command file that drives the statistical software; this command file and the associated data file(s) will be made available to TCEQ and the Trustees so that they can verify and replicate the analyses.

3. *A rationale should be provided for the selection of sampling locations for the ecological risk assessment other than those specified in the Stipulation Agreement.*

To ensure consistency between pre- and post-dredging risk assessments, the post-dredge monitoring samples will be collected at the same locations as the samples that were used for the original risk assessment, with the exception of the area off the HCFCD Ditch. Because more uniform conditions are expected to be present in that location following dredging and thin layer placement, a smaller number of samples will be collected in that area. During the first post-dredge monitoring event, some of the samples are expected to coincide with locations of composite samples to be collected under the Stipulation Agreement. The target locations of all samples will be specified in the PDMP.

4. *Will only the data from the latest sampling be used for post-dredge ecological risk assessments?*

Yes, each post-dredge ecological risk assessment (e.g., at 6 months and at 2 years) will be conducted using only data from the latest monitoring samples.

5. *Describe how the risk assessments will be conducted.*

The post-dredge risk assessments will be conducted using the same receptors, toxicity reference values, BSAFs, and other parameters and methods as were used in the original risk assessment.

6. *TCEQ is uncomfortable with the proposal that monitoring may be concluded if the temporal trend at five years is toward elimination of risk if there is nevertheless still some risk present at five years.*

The PDMP will specify that a management decision is to be made if risks are still present after two years, and will list general types of management actions that may be taken, including a continuation of the current monitoring program, a revision to

the monitoring program, or other actions to address or to better evaluate the residual ecological risk. No specific time for monitoring past two years, nor assessment criteria for such subsequent monitoring, will be included in the PDMP.

7. *Discuss how the impact of abnormal large storm events will be evaluated.*

No specific plans will be included in the PDMP for revision of the monitoring approach, or for insertion of another management decision point, if a major storm event (e.g., comparable to Hurricane Alison) occurs within the two-year period planned for the first two monitoring events.

8. *Monitoring data should be provided to TCEQ and the Trustees in an electronic format.*

All post-dredge monitoring data will be provided to TCEQ and the Trustees in an electronic format.