Comments from the Glynn Environmental Coalition on the June 20, 2006, Environmental Protection Agency Region 4, Final Response to the Recommendations and Final Report for the Hercules 009 Landfill OIG/Ombudsman Report *'Appropriate Testing and Timely Reporting Are Needed at the Hercules 009 Landfill Superfund Site Brunswick, Georgia"*

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Re: Comment from the Glynn Environmental Coalition on the June 20, 2006, EPA Region 4, Final Response to the Recommendations and Final Report for the Hercules 009 Landfill OIG/Ombudsman Report Appropriate Testing and Timely Reporting Are Needed at the Hercules 009 Landfill Superfund Site Brunswick, Georgia (Report 2005-P-00022, September 26, 2005); Assignment 2004-124.

Mr. McKechnie,

Enclosed, please find comments from the Glynn Environmental Coalition (GEC) on the June 20, 2006, Environmental Protection Agency (EPA) Region 4, Final Response to the Recommendations and Final Report for the Hercules 009 Landfill OIG/Ombudsman Report Appropriate Testing and Timely Reporting Are Needed at the Hercules 009 Landfill Superfund Site Brunswick, Georgia (Report 2005-P-00022, September 26, 2005); Assignment 2004-124. We trust the EPA Office of Inspector General will take the following comments into consideration in formulating the final OIG response to EPA Region 4.

The enclosed comments include reviews of the EPA Region 4 Response by R. Kevin Pegg, Ph.D., and Kathleen Burns Ph.D., and are included in the GEC comments by reference.

Sincerely,

Bill Owens, President

CC: Chris Baughman
Enclosures

Comments from the Glynn Environmental Coalition on the June 20, 2006, Environmental Protection Agency Region 4, Final Response to the Recommendations and Final Report for the Hercules 009 Landfill OIG/Ombudsman Report Appropriate Testing and Timely Reporting Are Needed at the Hercules 009 Landfill Superfund Site Brunswick, Georgia (Report 2005-P-00022, September 26, 2005)

1. The OIG identified under quantification of chlorinated camphene as a problem at the Hercules 009 Landfill Superfund Site, and numerous other sites across the nation. Even when chlorinated camphene was present, the TTF method either reported none present or only quantified a small amount of the chlorinated camphene compounds indicated by the chromatogram. The question that MUST be answered is, "Will all chlorinated camphene present in environmental samples be identified and quantified?

Environmental sampling and analysis data is used to protect human health and the environment, and the same data will be used by several different scientific disciplines. Toxicologist produce health and risk assessments, biologists evaluate environmental risk to micro to macro biota, and remedial plans are developed to protect human health and natural resources. At a minimum, all chlorinated camphene MUST be reported in environmental samples. Neither the OIG nor the EPA Region 4 Response evaluated their recommendations and conclusions against the scientific disciplines that will be utilizing the data set from sites contaminated by chlorinated camphene or toxaphene manufacturing wastes.

2. The EPA Region 4, Final Response to the Recommendations and Final Report for the Hercules 009 Landfill OIG/Ombudsman Report (Response) Appropriate Testing and Timely Reporting Are Needed at the Hercules 009 Landfill Superfund Site Brunswick, Georgia (OIG Audit) constitutes a refusal to implement the recommendations in the OIG Audit, and misrepresents the finding of the OIG.

In the OIG Audit, specific recommendations were made for the quantification of chlorinated camphene.

"The OIG believes that spiked sample recoveries of the individual toxaphene congeners of interest, such as Hx-Sed, Hp-Sed, p26, p50, and p62, should be incorporated into any NIMS method considered by the EPA for developing and validating."

"EPA needs to use a congener-specific analytical method (e.g., GC/NIMS) to positively identify and quantify toxaphene degradation products in the environment. The OIG highly recommends standardizing and validating the GC/NIMS method and inserting a EPA GC/NIMS method into SW-846."

Contrary to the OIG Audit recommendations, EPA Region 4 has proposed chlorinated camphene quantification and risk assessments be based solely on p-26, p-50 and p-62 congeners and that all other compounds be excluded from the quantification and risk assessment process. As the OIG noted, Hx-Sep and Hp-Sed congeners account for the majority of chlorinated camphene found in Glynn County, Georgia. Even though the OIG identified the need for more toxicological data on the Hx-Sep and Hp-Sed congeners, EPA Region 4 has proposed elimination of these from the quantification and risk assessment process without presenting data in support of this conclusion. To the contrary, Hx-Sep and Hp-Sed congeners are the most prominent and represent a significant risk to citizens of Glynn County due to the chronic exposure via seafood, soil, and air.

The OIG noted that there are deficiencies in the studies used to determine the toxicity of chlorinated camphene, in that the exposure periods were short and did not represent the extended period of exposure (1948 to 2006) of those living in Glynn County. Further complicating the reaching of any conclusions is the lack of data about the chronic exposure to metabolites produced during human elimination of chlorinated camphene over the duration of exposure experienced in Glynn County,

which is where chlorinated camphene was manufactured from 1948 to 1980. In addition, the majority of the data relied upon by the OIG and EPA Region 4 was from populations and food stuffs that derived chlorinated camphene levels from atmospherically distilled chlorinated camphene, which does not contain the same ratio of congeners as in Glynn County. Atmospherically distilled chlorinated camphene is very different than Glynn County where manufacturing wastes, off-grade product, and product were dumped into Glynn County estuaries, landfills, dumps, and fugitive emissions from the Hercules Plant into surrounding neighborhoods.

3. EPA Region 4 has structured their entire Response to the OIG Audit around the Simon and Manning article to the exclusion of the many studies about chlorinated camphene and its toxicological effects. EPA Region 4 contends: "The OIG introduced the Region to the MATT report as the sole information on the toxicity of weathered toxaphene."
For EPA-Region 4 to represent that the OIG did an exhaustive search of the scientific articles published concerning the toxicological properties of chlorinated camphene is a gross misrepresentation. Even more egregious is for EPA Region 4 to represent that the OIG stated there is only one scientific article concerning weathered toxaphene. Still, EPA Region 4 has claimed that the MATT study is the toxicology model, and used it as their rationale for their Response and the Simon and Manning study.

4. The proposed toxaphene quantification method using only p-26, p-50 and p-62 congeners that is proposed by EPA Region 4 is a re-packaging of the Toxaphene Task Force (TTF) method and will result in a larger under quantification of chlorinated camphene than the TTF method.
The OIG identified the TTF as an inappropriate analytical method since it failed to identify and quantify chlorinated camphene. The OIG found the TTF method was estimated to report as little as 10% of the actual levels of chlorinated camphene present, failed to identify or report Hx-Sed and Hp-Sed chlorinated camphene, and relied only on the latter peaks for quantification, which resulted in a gross underreporting of the actual levels of chlorinated camphene present. The toxicologist with the Agency for Toxic Substance and Disease Registry (ATSDR) noted that use of the "back half" peak method (TTF method) is likely to result in significant underestimation of PCC concentration, and the estimated dose could be 10 times higher if historical data are taken into account for dose estimation. [1] The OIG interview with Dr. Keith Maruya for the Hercules 009 Landfill Superfund Site Five-Year Review resulted in an estimation of toxaphene levels up to 10 times higher than reported by the TTF analytical method. The three congeners proposed for quantification use - p-26, p-50 and p-62 - are located in the latter area, or back-half, of the chromatogram and will exclude Hx-Sep and Hp-Sed chlorinated camphene, which the OIG identified as being important to quantify.

5. Neither the OIG or EPA Region 4 provide toxicological data in support of excluding all chlorinated camphene congeners, other than p-26, p-50 and p-62, from consideration in risk assessments. Sites in Glynn County contain chlorinated camphene manufacturing wastes, off-grade product, and decades of releases into the estuary, landfills, dumps, in addition to fugitive emissions from the Hercules Plant into nearby neighborhoods. The arguments presented by the OIG and EPA Region 4, that are based upon seafood data, are not relevant when the underlying data is examined and compared to actual conditions present in Brunswick, Glynn County, Georgia. The following comments explore the inconsistencies in the OIG and EPA Region 4 reasoning that led to the conclusion that only p-26, p-50 and p-62 congeners are relevant to the protection of human health and environmental resources in Glynn County.

6. EPA Region 4 stated in their Response, "At this time, the Region considers Simon/Manning as the authoritative article on the toxicity of the degradation products. It focuses on p26, 50, and 62." Since EPA Region 4 has declared the "…Simon/Manning as the authoritative piece on the toxicity of the degradation products," the article should be closely examined for its adherence to the principals of scientific investigation and reporting. The GEC also asked for other recognized authorities on chlorinated camphene to review and comment on the arguments presented, data and studies used to construct arguments and conclusions, and the quality of the scientific investigation conducted by the authors. The GEC submits the following comments concerning the Simon and Manning article as additional comments to those solicited from experts in their field.

7. The quantification method proposed by EPA Region 4 will report between 1.56% and 8.69% of the chlorinated camphene present, according to the Simon and Manning article.
Failing to quantify between 91% and 99% of the chlorinated camphene present in environmental samples results in a significant and unacceptable degree of uncertainty for any risk assessments produced with the data. Simon and Manning quantified chlorinated camphene congeners p-26, p-50 and p-62 in fish that were exposed by two very different routes, which resulted in very different ratios of congeners, and therefore, very different risk potentials.

8. Dumped Chlorinated Camphene Exposure Route (Simon and Manning, Table 7)
In the seafood samples from the Terry Creek Dredge Spoil Areas/Hercules Outfall Site in Brunswick, Georgia, exposure was from chlorinated camphene manufacturing wastes and chlorinated camphene that was dumped directly to Terry Creek from 1948 to 1970, and additional discharges from residual chlorinated camphene in the Hercules Plant soils, in excess of 8%, continue in 2006. When p-26, p-50 and p-62 congeners were measured in seafood, they ranged from 1.56% to 8.69%, and the average was 4.80%. The p-26, p-50 and p-62 congeners are not the most prevalent in Brunswick, Georgia, and are inappropriate for use as chlorinated camphene indicators.

9. Atmospherically Distilled Chlorinated Camphene Exposure Route (Simon and Manning, Table 6)
Both the OIG and EPA Region 4 relied heavily on the MATT Report[2] for their reasoning and conclusions regarding toxicity. The MATT study investigated levels of chlorinated camphene congeners in seafood exposed by chlorinated camphene that had been atmospherically distilled and transported, which resulted in a very different ratio of chlorinated camphene congeners with very different risk potentials than the ratio of congeners found in Glynn County, Georgia. Individual chlorinated camphene congeners will volatilize and precipitate differently, depending upon the congener's specific chemical properties and atmospheric variables. The result of this atmospheric distillation is selective transport and selective precipitation of individual congeners. The range of p-26, p-50 and p-62 congeners found in fish exposed via atmospherically distilled chlorinated camphene ranged from 8.02% to 58.05%, and averaged 22.45%.

The MATT study selected the -26, p-50 and p-62 congeners for analysis because it had previously been determined that they were the most prominent in the seafood from the area being studied. The prominent chlorinated camphene congeners in manufacturing wastes in Glynn County are very different, with Hx-Sed and Hp-Sed being the most prominent. Simon and Manning fails to conduct any analysis of what congeners are appropriate for areas contaminated by manufacturing wastes.

10. Dioxin is a component of chlorinated camphene manufacturing wastes and must be taken into consideration when planning sampling, analysis, and risk assessments. Simon and Manning ignores the known additional toxicological properties of chlorinated camphene manufacturing

wastes. Chlorinated camphene manufacturing wastes contain their own unique composition of congeners, compounds, and contaminants that must be considered when evaluating risk to human health and the environment. The simplistic approach to chlorinated camphene identification, quantification, and risk assessment presented by Simon and Manning will pose a significant threat to human health and the environment.

11. The use of p-26, p-50 and p-62 congeners is used as an indicator of chlorinated camphene in areas where they are the primary congeners. The primary analytical use of p-26, p-50 and p-62 congeners is as an indicator of chlorinated camphene and not as an quantification or risk assessment tool. [3] The MATT study found relevance in the p-26, p-50 and p-62 congeners only because exposure is exclusively from seafood exposed to atmospheric distilled chlorinated camphene, which results in higher percentages and ratios of the three congeners in northern climates.

12. The range of p-26, p-50 and p-62 congeners vary widely in seafood so total chlorinated camphene is measured for toxicological evaluations. The range of chlorinated camphene congeners can range widely, but as a rule, the higher in the northern latitudes the seafood was obtained, the greater the percentage of p-26, p-50 and p-62 congeners. The use of p-26, p-50 and p-62 congeners is less useful as an indicator for seafood from southern latitudes. [4] Total toxaphene is measured when a risk assessment is being conducted. [5] Tables 6 and 7 in the Simon and Manning paper demonstrate the significant decrease in p-26, p-50 and p-62 congeners in Glynn County, which has been noted in other studies.

13. The comparison of seafood exposed to dumped versus atmospherically distilled chlorinated camphene is inappropriate. Simon and Manning violate the basic principles of scientific investigation by drawing conclusions between dissimilar data sets, and failed to report that the route of exposure of the seafood in the data sets were vastly different. This omission invalidates all conclusions derived. The injection of so many variables, and the failure to report these variables, draws into questions the conclusions reached by Simon and Manning. A review of literature would have revealed that use of p-26, p-50 and p-62 congeners is inappropriate for southern latitudes.

14. Failure of Simon and Manning to report variables such as mode of exposure in the data sets that were compared, and failure to report the ratio of all chlorinated camphene congeners present in seafood Tables 6 and 7 undermines the article to the point that no conclusions can be reached, nor should the premise presented for risk assessments be utilized. The failure to follow basic scientific investigative techniques and report variables in the data set renders the conclusions and recommendations unusable. If the Simon and Manning method of chlorinated camphene quantification and risk assessment is implemented, it would present significant risks to human health and the environment.

15. As manufactured, chlorinated camphene contains over 800 different chemicals that are found in different ratios depending on the source, latitude, and other environmental factors. Reducing toxaphene quantification and risk assessment to only p-26, p-50 and p-62 congeners ignore these environmental factors and the variables that need to be taken into consideration when conducting human and environmental risks assessments, and remedial decision-making. Environmental sampling should, at a minimum, report all chemical compounds present in the environment. There is no scientifically sound reason for not reporting chemicals present in the environment.

16. Simon and Manning appears to be written as an advocacy of limited testing at the other Sites in County that received chlorinated camphene manufacturing wastes, off-grade product, and other

residues of the manufacturing process. These Sites represent significant exposure routes via air, soil, and different congener ratios that are not normally encountered outside of communities where chlorinated camphene was manufactured.
All major exposure pathways and sources need to be identified, but the OIG failed to do so in the Audit, and incorrectly speculates that air and soil exposure are practically negligible when stating:

"In general, a major factor needed to evaluate the level of risk to human health is to determine the major exposure pathways to toxaphene's degradation products and to determine all potential sources. The Hercules 009 Landfill site is just one off the potential exposure routes. …The remaining exposure routes (i.e. air and soil are practically negligible)."

While local fish consumption is a very significant risk factor, chlorinated camphene levels higher than at the 009 Site are spread throughout the community. The following sources of chlorinated camphene should be considered by the OIG before discounting other significant chronic exposure routes and considering the implication presented in the EPA Region 4 Response:

- Hercules Plant: chlorinated camphene levels in the plant site soils exceed 8% and are a significant air and soil exposure risk, via wind-blown dust and erosion.
- Areas surrounding the Hercules Plant: chlorinated camphene was found above 64 ppm on an elementary school playground. Significant source areas are suspected to be present in neighborhoods surrounding the Hercules plant site.
- Terry Creek Site: Between 2 and 3 million pounds of chlorinated camphene manufacturing wastes are estimated to have been released into the estuary, some of which is in dredge spoil areas that are a potential air exposure source.
- Chlorinated camphene was reported to be disposed of in the T Street Dump that is located in the estuary, 4th Street Landfill next to the Glynn Schools Stadium, and Old Sterling Landfill.
- Hercules has taken depositions from workers concerning distribution of toxaphene to employees, purchase by Glynn County Parks and Recreation, and Glynn County Schools for use throughout the community.

17. The GEC agrees that compounds that bioaccumulate need to be identified, but applying chlorinated camphene congeners relevant in Europe and northern latitudes to Glynn County that is located in a southern latitude is inappropriate. The OIG and EPA Region 4 erred by focusing on congeners in fish from northern latitudes that are not relevant to the chemicals of concern at chlorinated camphene contaminated Sites in Glynn County. The OIG took an inappropriate leap of logic when writing:

"However, five toxaphene congeners (i.e. p26, p50, p40, p41, and p44) are not readily metabolized and excreted and, thus, can accumulate in the human body. … To evaluate the level of risk to human health, EPA needs to know the concentration of these five congeners and their metabolite precursors in the environment."

"Since these five toxaphene congeners represent the long-term chronic toxaphene exposure problem to humans, the toxicity of these five individual congeners and/or mixture of these five congeners needs to be determined in more detail than is currently available in the scientific literature"

Even though the conclusion of the OIG might be appropriate in another situation, the basis of the logic and underlying data from a dissimilar area that formed the rationale is not appropriate for chlorinated camphene manufacturing sites and areas that received the wastes.

The GEC agrees that there should be concern about these five congeners and more information would be desirable, but the entire chlorinated camphene manufacturing waste mixture is of concern for long-term chronic exposure in Glynn County. As the OIG noted, the toxicology of chlorinated camphene is not well understood, and even less so for manufacturing wastes . The OIG presents no data in support of ignoring the other 800-plus compounds in the chlorinated camphene mixture manufactured by Hercules, or the manufacturing wastes.

The inherent weakness of considering only persistent congeners found in fish from northern latitudes, as borne out in the discussion of Dr. Olson's study, is that short term exposures can have profound effects on offspring. The exposure duration during the study was not long enough to produce effects attributable to bioaccumulation. Potential endocrine disruption by chlorinated camphene compounds or metabolites must remain under consideration as toxic components, as well as other potential adverse health effects noted in the ATSDR Toxicological Profile for Toxaphene. Synergistic effects of the chlorinated camphene compound in Glynn County could be much different than those noted in studies since both chlorinated camphene and manufacturing wastes are the chemicals of concern. Dioxin produced during chlorinated camphene production could significantly increase the cancer potential of the chemicals present in Glynn County toxic sites.

18. Dr. Gill's and Dr. Barr's studies discussed by the OIG are interesting, but the OIG failed to note that the source was airborne chlorinated camphene transported to Canada in Dr. Gill's study and the general population in Dr. Barr's study, and not exposure to PCC and manufacturing waste products. The same mistake was repeated in the EPA Region 4 Response and by Simon and Manning. Sampling of the local Glynn County population will be needed to confirm any applicability between the results Dr. Gill and Dr. Barr presented and the very different situation that exists in Glynn County. By no means should the need for additional studies or information be used as an excuse not to take action to protect the citizenry of Glynn County from widely distributed chlorinated camphene and manufacturing wastes.

19. The OIG made specific recommendations about which chlorinated camphene congeners should be identified and quantified. The EPA Response limits the selection of congeners to only those in the back-half of the chromatogram window, which is a repackaged version of the Toxaphene Task Force method that will quantify even less of the chlorinated camphene present. Interestingly, and borne out in the OIG audit and the Simon and Manning paper, the p-26, p-50 and p-62 congeners are not prevalent in Glynn County. The OIG's report recommended the following, which includes the prominent congeners, in addition to identification of all chlorinated camphene in the environment.

"Since toxaphene is known to degrade in the environment and these degradation products are thought to be toxic, EPA must evaluate the groundwater at the Hercules 009 Landfill site for toxaphene's degradation products, specifically, the Hx-Sed and Hp Sed congeners, but also the p26, p50, p40, p41, and p44 congeners."

20. The OIG made sweeping conclusions about which compounds in the chlorinated camphene mixture manufactured by Hercules are of toxicological concern based upon data from fish from northern latitudes, and made inappropriate recommendations concerning chlorinated camphene analysis to a few selected compounds. The EPA Response seized upon the congeners and studies identified by the OIG to craft a more limited chlorinated camphene congener quantification and analysis presented in the Simon and Manning paper.

The OIG previously stated:

"Conducting a detailed and comprehensive risk assessment for the potential exposure to toxaphene from the Hercules 009 Landfill site is a complex task that is beyond the scope of this OIG review."

The sweeping recommendations for limited congener analysis do require a comprehensive health assessment and evaluation of literature far greater in scope than presented in the OIG Report or the Simon and Manning paper. At a minimum, ATSDR and natural resource trustees should review any proposed analysis, quantification, and risk assessment procedures for chlorinated camphene. The OIG should clearly recommend that all chlorinated camphene and degradation products will analyzed, identified, and reported in samples from Sites in Glynn County.

21. The OIG identified the need for further research into carcinogenicity and embryotoxicity, but the scope of the research should not be limited to congeners that are not relevant to the chlorinated camphene and manufacturing wastes present in Glynn County. The toxicology of chlorinated camphene is not well enough understood to limit the scope of research at this time, and the toxicology of chlorinated camphene degradation products is even less understood. Regardless of any recommendations for further research, measures should be taken to determine the current human health risks through appropriate testing and the precautionary principle applied until research results are produced, reviewed, and published in a recognized peer reviewed scientific journal that are relevant to the chlorinated camphene congeners and manufacturing wastes present in Glynn County.

22. Glynn County has been identified by the Georgia Department of Human Resources, Division of Public Health, as an area with an incidence of disease above the State of Georgia and National averages, which is noteworthy. Glynn County demographics indicate that the majority of African Americans live in the areas most contaminated by chlorinated camphene and subsistence fish in areas contaminated by chlorinated camphene. The following health facts should be considered when evaluating chlorinated camphene exposure in Glynn County:

- Childhood leukemia mortality rate in all black males is twice the Georgia average, 14.1769 in Glynn County, compared to 7.6755 in Georgia per 100,000. Childhood leukemia rates are higher in Glynn County for all demographic groups than the Georgia Average.
- Adult lymphoma rates in Glynn County are higher for all demographic groups, except white females.
- All cancers, chronic obstructive pulmonary disease, and liver disease in Glynn County are higher than the national averages. The liver is a known target organ of chlorinated camphene.
- Infant mortality and low birth weight rates are higher in Glynn County than national rates.
- The Georgia Department of Human Resources, Division of Public Health has identified Glynn County as having a significantly higher incidence of cancer than the state rate.

23. Children attending schools located next to chlorinated camphene contaminated areas show decreased IQ scores that increase with age. As noted in animal studies, chlorinated camphene has been demonstrated to cause developmental delays. School children attending schools near chlorinated camphene contaminated sites in Glynn County scored lower than children attending other schools. IQ should remain a constant, but as the children grew older the IQ scores rose, which indicates an environmental factor delaying learning potential. Further study is needed of the population that has been chronically exposed for several generations to chlorinated camphene and manufacturing wastes, including impacts to offspring and learning potential.

[1] Health Consultation - Terry Creek Dredge Spoils Areas/Hercules Outfall Brunswick, Glynn County, Georgia. Agency for Toxic Substance and Disease Registry. December 7, 1999.
[2] MATT, 2000. Final Report, Investigation into the Monitoring, Analysis and Toxicity of Toxaphene in Marine Foodstuffs FAIR CT PL.96.3131.
[3] Oetjen, K., H. Karl, Levels of toxaphene indicator compounds in fish meal, fish oil, and fish feed. Chemosphere. July, 1998.
[4] Oetjen, K., H. Karl, Levels of toxaphene indicator compounds in fish meal, fish oil, and fish feed. Chemosphere. July, 1998.
[5] Chan, H. M., F. Yeboah. Total toxaphene and specific congeners in fish from the Yukon, Canada. Chemosphere. August 2000