Technical Minutes of the
U.S. Environmental Protection Agency (EPA)
Science Advisory Board
Workgroup on Demolition and Disposal of Hurricane Debris

Panel Members:	Dr. Taylor Eighmy, Dr. Barry Dellinger, Dr. Philip Hopke, Dr. Paul J. Lioy, Dr. Morton Lippmann, Dr. Mark Rood
Date and Time:	2:00pm – 4:00pm, October 5, 2005
Location:	Teleconference
Purpose:	To respond to the Agency's request for advice on demolition and disposal of hurricane debris
SAB Staff:	Dr. Holly Stallworth, Designated Federal Officer (DFO)
Other EPA Staff:	Cloris Slokum, EPA/NRMRL Randy Hill, EPA/OECA Robert A. Olexsey, EPA/NRMRL Andy Miller, EPA/ORD Roger Wilmoth, EPA/ORD Fran Kremer, EPA/ORD Paul Lemieux, EPA/ORD Phyllis Flaherty, OECA Pam Mazakas, EPA/OECA Mark Hansen, EPA Region 6 Michele Burgess, EPA/OSWER Larry Cupitt, EPA/RTP
Other:	Colin Finan, *Inside EPA*
Attachments:	1. Submitted written comments by panelists prior to the teleconference 2. Agenda for the Oct. 5, 2005 teleconference 3. Charge Questions for SAB Workgroup 4. Panel Roster 5. EPA's Conditions for Granting a No Action Assurance (and Appendices A – D, plus letter from Louisiana Department of Environmental Quality)

Meeting Summary

Dr. Stallworth, the Designated Federal Officer, convened the meeting and explained that this Workgroup was responding to emergency conditions caused by recent hurricanes on the Gulf Coast and, as a result, the Science Advisory Board Staff Office was using the provision of the Federal Advisory Committee Act that allowed rapid consultative advice without 15 days advance notice provided the intent of such meetings was provided in a Federal Register Notice.

Background

In the aftermath of Hurricane Katrina and Hurricane Rita, and the subsequent flooding, EPA has been asked by the Louisiana Department of Environmental Quality (LDEQ) to review their approach for addressing demolition and disposal of specific structures in Jefferson Parish, Orleans Parish, Plaquemines Parish and St. Bernard Parish. EPA intends to exercise its enforcement discretion and grant a no action assurance for demolition and disposal of asbestos-containing waste material in these parishes provided those activities are carried out in accordance with the LDEQ guidelines and the conditions set forth in earlier guidance documents. The conditions and recommendations were developed for the purpose of minimizing any potential adverse public health and environmental effects from the demolition and disposal activities. The EPA is contemplating a no action assurance that will extend for a period of six months from the date of the transmittal letter. Prior to the expiration date, the situation will be reviewed to determine if either the guidance or the no action assurance needs to be modified or revoked.

In the Conditions and Recommendations document (see Attachment 5), the air curtain destructor (ACD) section provides a process for ACD operating parameters to be determined through an approach described in Appendix B to that document, entitled "Approach for Conducting Source Emission Characterization Tests of Open Burning of Vegetative and Demolition Debris."

The EPA is interested in learning whether this approach will allow the agency to verify the effectiveness of ACDs in reducing potential risks. Five charge questions were posed: open burning issues of concern, parameters to be monitored, pollutants to be measured, burn site monitoring (continuous or characterization) and monitoring methods (equipment and quality assurance). The five charge questions specifically pertain to Appendix B ("Approach for Conducting Source Emission Characterization Tests of Open Burning of Vegetative and Demolition Debris.") of the Conditions and Recommendations document located in Attachment 5.

Summary of Comments and Recommendations:

This synthesis reflects written and oral comments provided by the convened panel for its consultative teleconference of October 5, 2005. The synthesis for this consultation, though nor requiring panel consensus, reflects areas where the panel generally agreed about matters; both of a general nature and specifically for each of the five charge questions submitted by the EPA.

Recognizing the need for EPA to be able to identify how best to operate ACDs for management of debris (particularly volume reduction and converting the chrysotile asbestos and organic materials in the debris to less hazardous materials), the panel nonetheless desired to place into a larger scientific perspective the relative risks to human health and the environment of using open burning (including ACDs) when compared to those risks associated with: (i) doing nothing; (ii) temporary land filling at collection points in the parishes; (iii) significant processing, recycling and reuse at those points; (iv) transport and long term land filling of debris outside the affected areas after treatment for Formosan termites, and (v) other, as yet identified, methods of management and disposal. None of these alternatives may be more practical or tenable than open burning (in the near term or long term), but some general understanding of relative risk is needed to frame the first charge question that addresses open burning issues of concern. Clearly, there are immediate and dire health, ecological and economic risks to doing nothing--- but what are the alternative risks to implementation of open burning? Consequently, the panel recommends the EPA consider a comparative risk assessment to other possible debris management options. The panel feels that this is something the public and the risk management scientific community will care about now and in the future.

ACDs have reportedly been generally used for land clearing operations and specifically in prior hurricane recovery operations. However, little is known about the environmental performance of ACDs and their use in combusting salt-inundated vegetative debris, construction and demolition (C&D) debris of varying composition, and municipal solid waste. The panel noted that ACDs are not confined combustion processes, and that engineering controls to influence time/temperature/turbulence variables are generally absent when compared to more confined processes such as industrial and municipal waste combustors. While there may be opportunities to learn about how this technology may (or may not) perform, the panel expressed concerns about adverse health and environmental effects of potential air-borne emissions (organohalogens including polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans [PCDDs/PCDFs], PM_{10} and $PM_{2.5}$, total particulate matter, metals (Hg, Pb, Zn, Cd), wood smoke (including hydroquinones and catechols), and untransformed asbestos fibers during burning, and during the handling of ash residuals.

The panel also recognizes the six-month window with which this no action assurance may apply and that there are real opportunities for all parties to perhaps ‘learn as you go.’ This may allow the EPA to make changes and make improvements to its guidance of those addressing the debris crisis on the ground in and around New Orleans.

Though not explicitly described by EPA in its “Approach for Conducting Source Emission Characterization Tests of Open Burning of Vegetative and Demolition Debris” (see Attachment 5), the panel suggests that the situation may require an approach similar to that of carefully developed and designed test burn campaigns typically used in municipal waste combustors to generate emissions data as a function of fuel type, combustor type and operation and burn performance.

The generally described intent of the EPA to how best to discover the ‘preferred operational practices’ of ACDs is sound, given the extreme circumstances that the public faces in the New Orleans area and in the Gulf Coast. However, the use of these semi-engineered technologies might best be framed by: (i) combustion emission data useful for acute and chronic human health risk assessment; (ii) combustion emission data useful for ecological risk assessment; and (iii) detailed combustion performance data associated with ‘preferred operational practices’ that are translational to the emissions data. This would help to benchmark operations to emissions to risk. In this way, surrogate operational parameters can be developed and used to guide the combustion process so that emissions are at the lowest possible levels and may then be deemed temporarily acceptable. The panel recognizes that this is challenging, specifically given the unconfined nature of the ACD combustion process and the urgency of the situation on the ground in New Orleans and vicinity.

Given the vast amounts of debris that must be managed, the numbers of ACDs that might be used (12 to 36 were mentioned), the vast scale of operations related to waste collection, sorting, combustion, ash removal and ACD relocation within the parishes, the panel felt that some efforts should eventually be given to: (i) operator training; (ii) burning approvals tied to meteorological data--- there may be days when use of ACDs poses unacceptable acute health risks; (iii) use of easy to implement and interpret combustion sensors for ACD operation that provide feedback to the operators about when and how to feed and mix wastes in the combustion zones; (iv) development of a practicable and realistic debris processing and sorting strategy for each staging point that maximizes the opportunity to burn the right debris in the right type of combustor; and (v) further careful planning as to how data from detailed testing and routine monitoring will be managed and used to make improvements to the system.

The panel felt it might be useful for the final guidance documents to better describe ACDs, their uses, their prior performance, prior scientific study (note the Lutes and Kariher (1997) and the Fountainhead Engineering (2000) studies) and their typical operational practices (e.g., ramp up/ramp down, supplemental fuel use, bed layering, bed loading rates, air curtain breeching during loading, transient ash removal).

The panel felt it might also be useful, in subsequent documents that are generated, to clarify the federal/state/local jurisdiction about who is expected to be burning what type of debris in what type of burn system (piles, pit ACDs, firebox ACDs) and where the burns will take place.

The panel also offers one additional idea… if combustion is essential for debris management, then the EPA may wish to consider the idea of temporarily staging small modular MSW combustors with modest air pollution control (APC) systems. These could be trailer- or barge-based systems. However, processing the debris to readily fit into and combust well within modular combustors may pose a serious constraint that might be managed by debris processing. Debris processing may also help to improve volume reduction percentages and improve the chance for recycling.

Comments on Charge Question 1. *Open burning issues of concern: The approach identifies several issues of concern associated with open burning: Failure of asbestos to be transformed into benign forms, Emissions of metals, particularly lead and mercury; Formation of halogenated organic compounds; Increased emissions of PM, including $PM_{2.5}$-- Are these the situations that should most receive attention?*

The panel was in agreement that given the nature of the fuel (wet debris, vegetative debris, C&D debris), its variable BTU content, the unclear guidance on how supplemental fuel like kerosene would be used, that the bed temperatures will not be uniformly >800^{o}C in the ACDs. This has great influence on each of the specific issues raised by the EPA for this charge question. It also offers the opportunity to explore how supplemental fuel use requirements can be instituted for temperature maintenance.

Regarding asbestos transformation to forsterite, there is some literature on the dehydroxylation of chrysotile to forsterite at temperatures above 800^{o}C and at ambient pressure (e.g., MacKenzie and Meinhold (1994) <u>Amer. Mineral.</u> **79**:43-50, Jeyaratnam and West (1994) <u>Ann. Occupational Hygiene</u> **32**: 137-148). There is less know about the kinetics of the reaction, though one source reports the reaction is fast. The time/temperature/turbulence conditions in the ACDs are not well known and the ability to sample for flue gas particles that may contain chrysotile or its thermal degradation products is important (and not easy). Likewise, sampling the bottom ash would also be important. At this time, given the paucity of data, it is not clear how effective the ACDs will be at transforming the chrysotile asbestos. Thus, the panel feels that the assumption should be made that chrysotile will remain in the fly ash, bottom ash and in the fugitive ash emissions.

Regarding emissions of metals, the panel felt that ways to process and separate debris beforehand will be helpful (if feasible) in segregating those municipal solid wastes and C&D debris that may contain elevated metals (particularly Pb-based paints). Depending on what is burned, the use of water misters to reduce PM emissions may help to reduce fugitive emissions, but the efficacy of this system is not known. If debris that contains painted wood or pressure-treated wood is segregated and burned in select ACDs with additional (but as yet unidentified) APC control measures, then the dispersion of toxic metals may be minimized. There are also other elements of concern, including Hg species (see charge question 5), Cd, Zn, As species and Cr species. Depending on bed temperature and turbulence, some metals may be found primarily in the bottom ash, and thus are more readily managed when the ash is sampled, tested and disposed in approved disposal sites.

Regarding organohalogens, the panel strongly felt that ACDs will contain all the necessary prerequisites for PCDD/PCDF formation (organic carbon, metal catalysts, chlorine, exposure to the necessary temperature window around 300^oC), so PCDD/PCDF formation is expected. It is not clear how ‘preferred operational practices’ or flue gas misters will reduce these emissions.

Regarding PM, the nature of the waste and the way the ACD is operated (ramp up firing, kerosene use, debris water and salt contents, bed structure, bed loading, curtain breeching, ramp down cooling) may have the most significant impact on PM release (the total PM as well as the particle size, i.e. <2.5 um., <10 um and > 10um in diameter release).

One additional issue of concern was raised in the panel discussion---- handling of debris containing mold spores and its acute health impacts to workers collecting, processing, sorting and burning debris.

Comments on Charge Question 2. *Parameters to be monitored: Are the parameters that are described adequate for developing operating guidance to ensure that future open burning activities are conducted in such a way to minimize adverse impacts on human health and the environment?*

The panel generally felt that even though ACDs are not like modern mass burn or two-stage combustors, HCl and CO should be carefully monitored to characterize acid gas emissions and combustion efficiency.

The panel strongly felt that the ability to use remote sensing technologies that assess the burning zone, the air emissions above the curtain, or any area within a down-gradient plume would be helpful. Opacity, infrared camera, and integrative spectral sensors were identified as possible candidates (see charge question 4). The panel notes that these can provide useful feedback to operators attempting to operate in the ‘preferred operational window.’

There was also some consensus that local meteorological observations (wind direction/speed, existence of low lying inversion layers, and select atmospheric stability conditions) should be considered when scheduling burns, as it relates to near and far field potential OSHA concerns about the impacts of emissions on workers operating the ACDs or working within the debris processing areas adjacent to the ACDs, and on downwind populations.

Comments on Charge Question 3. *Pollutants to be measured: Given the broad range of compounds likely to be present in open burning of demolition debris, do the specific compounds* *listed describe an adequate range of pollutants to provide guidance on the performance of open burning systems?*

The panel felt that a number of additional pollutants should be added, specifically total PM, wood smoke (indexed by potassium), hexachlorobenzene, catechols, hydroquinones, vinyl chloride, NO_x , reactive gaseous mercury (RGM), As species (including organoarsenics), Cr species, Zn, and Cd. However, there was concern expressed by the committee that it would be difficult to measure all of the proposed pollutants and interpret the results in a reasonably short time so as to be able to better understand how to best operate the ACDs.

Hexachlorobenzene is a surrogate for other aromatic chlorinated hydrocarbons that will be formed during combustion. Catechols and hydroquinones (including semiquinones) are families of pollutants formed from biomass combustion that have been increasingly implicated in the health impacts of airborne $PM_{2.5}$.

Comments on Charge Question 4. *Burn site monitoring – continuous monitoring or characterization monitoring: Is it sufficient to monitor an initial burn(s) to develop a characterization of potential releases rather than continuously monitoring each burn? How many burns should be monitored to develop the initial characterization necessary to determine the appropriate parameters?*

The panel generally felt that what is first important to consider is a something akin to a detailed test burn campaign that relates fuel type, combustor type, and combustor operation to burn performance. This would help benchmark operations to emissions to risk and help to discover the 'preferred operational practices' of the ACDs. The use of surrogate parameters (e.g., opacity) and spectral sensors (infrared cameras, integrative spectral sensors for atmospheric emissions) could then be routinely used to monitor subsequent daily burn operations. The panel felt that the EPA might explore the development of some rapid risk assessment approach or application to link the routine operations measurements to appropriate acute health effects benchmarks, and, possibly longer term health outcomes

The panel felt that the specific testing would need the full suite of monitoring and analytical methods for traditional (municipal solid waste) MSW combustor testing campaigns. These are obviously expensive and time consuming, so the translation of burn performance to surrogate parameters and sensors would be designed to reduce costs and increase the use of more routine monitoring at ACD staging sites. The panel generally felt that it is prudent to monitor the burns and plumes of all ACD staging sites, if feasible.

Finally, the panel felt that some side studies may be needed later to look at the transient operations of the ACDs (especially when the curtain is breeched during charging), bed loading rates, bed layering, and mist scrubber efficacy.

Comments on Charge Question 5. *Monitoring methods, equipment, and quality assurance activities: To the extent that EPA has been able to describe or reference the monitoring methods, equipment, and quality assurance activities in the document, are they appropriate? What advice do you have for EPA as we further develop the methods and equipment plans?*

The panel felt that some clarification would be helpful about methods and equipment that might be used for air emission monitoring during controlled detailed campaign studies, versus those that may become more routine and performance monitoring-based in nature.

The panel felt, regardless of the type of source emission characterization, either detailed test burn campaigns or continuous monitoring, the ability to use remote sensing technologies that assess the burning zone, the air emissions above the curtain, or any area within a down-gradient plume would be helpful. Opacity may prove to be a useful surrogate of combustor performance and emissions level. Infrared cameras might be used to monitor bed temperatures. There are ways to monitor plumes with integrative spectral sensors (e.g., light detection and ranging [LIDAR], Fourier-transform infrared spectroscopy and differential optical absorption spectroscopy).

Regarding asbestos generally and chrysotile in particular—the panel recommends that the EPA consider bulk techniques as a screen first (especially x-ray diffraction) before using the transmission electron microscopy (TEM) or polarized light methods. X-ray diffraction can be automated. The other techniques can then be made easier to use, especially if the chrysotile/forsterite samples are concentrated through some technique (perhaps washing, density gradient separation, magnetic separation).

One concern was raised by the panel during the discussion about the asbestos analytical method. The protocol reportedly does not address the possible presence of the more hazardous amphibole fibers. Also, the analytical protocol indicates that AHERA counting rules would be used, which will ensure that the fiber counts are dominated by fibers shorter than 5 um, which pose negligible risks.

In addition to measuring particulate mercury, the panel encourages measuring RGM. RGM can more readily deposit and start to cycle in local ecosystems. Tekran continuous RGM units might be useful for monitoring RGM.

Although the EPA conditions and recommendations document (see Attachment 5) indicates monitoring for PCDDs and PCDFs, the Air Monitoring and Contingency Plan for Hurricane Katrina Debris Activities Louisiana (see Attachment 5) suggests mostly low volume sampling that is unlikely to provide a sufficient sized sample to permit accurate assessment of the PCDDs and PCDFs. The panel believes that there needs to be sampling specifically established for these contaminants.

The Air Monitoring and Contingency Plan for Hurricane Katrina Debris Activities (see Attachment 5) proposes using ICP for the metals determinations. However, the panel notes that the digestion and analysis is somewhat slow and it may make sense to do some screening with more rapid x-ray fluorescence analyses to find quickly if there are problems with high metal levels.

The panel observed that no apparent guidelines were offered as to acceptable levels of concentrations or lower limits of detection for the monitoring or analytical methods. Lacking these, it was not possible to comment as to whether the methods and equipment are appropriate. Therefore, at this time, the panel feels that it is difficult to fully assess the suitability of the quality assurance program.

On behalf of the panel,

Respectfully Submitted:

/s/

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Dr. Holly Stallworth
Designated Federal Official

Certified as True:

/s/

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Dr. Taylor Eighmy
Chair SAB Workgroup on Demolition and Disposal of Hurricane Debris

Attachment 1
Submitted Written Comments

Individual written comments related to the teleconference were received from Dr. Barry Dellinger, Dr. Taylor Eighmy, Dr. Philip K. Hopke, Dr. Morton Lippmann and Dr. Mark Rood. These are included here.

Dr. Barry Dellinger

1. Open burning issues of concern

The approach identifies several issues of concern associated with open burning:

Failure of asbestos to be transformed into benign forms
Emissions of metals, particularly lead and mercury
Formation of halogenated organic compounds
Increased emissions of PM, including PM2.5

Are these the situations that should most receive attention?

I am concerned with the use of open burning or air curtain destructors (ACD) for cleanup of hurricane-related debris. Poorly controlled burning does not effectively destroy existing toxic chemicals, and it forms new toxic chemicals. Combustible debris will be largely biomass and the emissions will not be that different from wood smoke or tobacco which are known to have and produce significant toxic components.

The volumes to be burned are enormous and the combustion control is poor. Emissions will likely be overwhelmingly larger than from existing municpal or hazardous waste incinerators in the US. Incinerators have been largely eliminated as a result of public concern, and they are much better controlled than open burning. Is there any emissions data to suggest that air curtain burning is any better than open burning?

There is a lot of support for coastal restoration in Louisiana. Can the debris be used for this purpose? If transport of Formosan termites is a concern, the debris could first be treated then transported.

Transporting the debris to “rural” areas brings up environmental justice concerns. The inhabitants of the rural areas did not generate the debris, so why should they be exposed? Even if the population density is lower in a rural area, exposed people are still exposed to the full dose of pollution. Either burn the debris in place while no one is still in New Orleans, burn it on the coast while the winds blow into the Gulf, or better yet, burn it in a controlled incinerator.

2. Parameters to be monitored

Are the parameters that are described adequate for developing operating guidance to ensure that future open burning activities are conducted in such a way to minimize adverse impacts on human health and the environment?

It appears that a test burn to determine safety is not being proposed, and instead only monitoring during the actual burns will be conducted. I strongly recommend that a well-documented and monitored test burn be conducted and evaluated before actual burns are conducted.

The proposed burning will be difficult to control. Temperature measurements will have little meaning, as the temperature will vary widely. Toxic chemicals will be vaporized ahead of an advancing flame front and may be released rather than burned. The burn guidelines state that a minimum temperature of 800 C must be maintained. This is very low and will not destroy most chemicals under substoichiometric combustion conditions. Normal temperature fluctuations will result in the temperature being too low to destroy most toxic chemicals even under oxidative conditions.

3. Pollutants to be measured

Given the broad range of compounds likely to be present in open burning of demolition debris, do the specific compounds listed describe an adequate range of pollutants to provide guidance on the performance of open burning systems?

The source monitoring and ambient air hit lists of pollutants are not in agreement. Hexachlorobenzene should be added as a surrogate for chlorinated hydrocarbons. Vinyl chloride should be added to the source test.

Dioxins will be formed and must be added to the source testing. Much of the debris will be contaminated with salt water. An organic fuel, chlorine from the salt, transition metals from construction and other sources, and poor combustion conditions are the recipe for forming dioxins. I doubt if open burning can satisfy any serious evaluation of its human health impacts.

Biomass combustion can produce significant quantities of catechols/hydroquinones/semiquinone radicals and phenols that are now strongly implicated in initiation of oxidative stress in individuals exposed to airborne fine particles. These are among the most toxic chemicals in cigarette smoke. These classes of compounds must be added along with analysis of associated free radicals.

4. Burn site monitoring – continuous monitoring or characterization monitoring.

As I previously stated, a test burn or characterization burn should be conducted before the actual debris disposal is conducted.

4. Monitoring methods, equipment, and quality assurance activities

To the extent that EPA has been able to describe or reference the monitoring methods, equipment, and quality assurance activities in the document, are they appropriate? What advice do you have for EPA as we further develop the methods and equipment plans?

The proposed monitoring methods are standard, generally complete, and appropriate. However, there is no stated plan as how to determine if a burn is safe, either during the actual burn or during a test burn. Burning rates and temperatures will vary widely making accurate plume dispersion and trajectory modeling exceedingly difficult.

Dr. Taylor Eighmy:

Documents Reviewed:

1. Charge Questions for SAB Workgroup Consultation on Approach for Conducting Source Emission Characterization Tests of Open Burning of Vegetative and Demolition Debris (10/3/05 version).
2. EPA's Conditions for Granting a No Action Assurance and Associated Recommendations for LDEQ Asbestos Demolition and Disposal Procedures for Jefferson Parish, Orleans Parish, Plaquemines Parish and St. Bernard Parish in the Aftermath of Hurricane Katrina and Hurricane Rita (10/3/05 draft).
3. Appendix A to Document 2: Hurricane Katrina Debris Management Plan, Louisiana Department of Environmental Quality, September 28, 2005, Revised September 30, 2005.
4. Appendix B to Document 2: Approach for Conducting Source Emission Characterization Tests of Open Burning of Vegetative and Demolition Debris.
5. Appendix C to Document 2: Air Monitoring Contingency Plan for Hurricane Katrina Debris Activities Louisiana (September 2005).
6. Appendix D to Document 2: Overview Plan for Ambient Air Monitoring after Hurricane Katrina.
7. Letter of September 22, 2005 from LDEQ to Region 6.

Background:

The Gulf Coast region (especially the City of New Orleans and surrounding parishes) is facing an immense debris management problem associated with Hurricanes Katrina and Rita. The debris has both imminent and longer term safety and health hazards and its presence prevents necessary reconstruction efforts.

In essence, the U.S. EPA is attempting to develop a quickly implemented research plan to assess the performance of open burning of various debris types (using open piles, pit air curtain destructors, firebox air curtain destructors) as the State of Louisiana and the Regional EPA offices wrestle with the very real issue of managing enormous quantities of vegetative and building debris.

One preferred management strategy, referred to as generally as open burning (but perhaps really variations of air curtain destructors) may be an excellent way to quickly reduce debris volume, destroy sources of the Formosan termite, and render the debris more inert. However, uncontrolled combustion can lead to another suite of environmental problems associated with uncontrolled combustion. While desiring to assist, the U.S. EPA does not want to exacerbate the situation by tacitly approving a well-intentioned management strategy that inadvertently leads to additional environmental problems.

Overview Comments:

1. I am a bit confused: I see in the September 22nd letter from LDEQ that the state intends to use combustion as one means of disposal, including air curtain destructors (ACDs). ACDs will apparently not be exclusively used. In the Conditions and Recommendations document, conditions for granting a no action assurance are limited to the use of ACDs (but not

differentiating between pit ACDs and firebox ACDs) for building debris waste. In Appendix B, differentiation is made about testing firebox ACDs, pit ACDs and open burn piles.

Recommendation: Clarify, where applicable, the use of firebox ACDs, pit ACDs and open pile burns.

2. Perhaps related to the first comment, it is not clear if open burn piles will be used for vegetative debris and ACDs for building debris. Clarity may be important here as this has bearing on how asbestos, Pb, Hg, PM, and organohalogens might be emitted from combustion processes, and how air emission and residuals sampling and testing programs are undertaken. From afar, my first reaction is that open pile burning, if done at all, should be limited to vegetative wastes only.

Recommendation: Clarify how open pile burning and ACDs will be generally used.

3. At this juncture, it seems to me that there is not a lot of scientific information on air emission monitoring and ash residuals testing from ACDs, though I note at least two perhaps useful studies that may help with air emission sampling problems/solutions and perhaps expected emission data:

- Lutes, C.C. and P.H. Kariher (1997) Evaluation of Emissions from the Open Burning of Land Clearing Debris, EPA/600/SR-96/128, U.S. EPA NRL, January, 1997.

- Fountainhead Engineering (2000) Final Report Describing Particulate and Carbon Monoxide Emissions from the Whitton S-127 Air Curtain Destructor.

Recommendation: If appropriate, EPA and LDEQ might make use of sampling methodologies and device configurations in these documents as sampling plans are finalized.

4. It seems to me, based on information in Appendix B; an outline to an approach is offered to develop the information needed to create effective and credible guidelines for open burning disposal of asbestos-contaminated demolition debris as well as for other materials that are likely to be disposed of via open burning. Once information is learned, the approach will be memorialized. The approach also will need flexibility as it is implemented and lessons are quickly learned.

What this approach is really trying to do is describe practical waste type and combustor conditions where air and residual emissions are acceptable with respect to human health and environmental risk.

The approach involves doing sampling runs in triplicate for three combustor types (open pile, pit ACD, fire box ACD) using four waste types (vegetative, vegetative plus demolition, demolition of composition A and demolition of composition B). I think this approach is very sound as the EPA and LDEQ seek to frame the relative risks and benefits for managing the various debris types by combustion process type.

However, this will produce 36 sampling campaigns, a rather extensive and expensive program. The documents, as provided, do not explicitly lay out a designed test burn/residuals sampling program for these 36 campaigns that will get to the over arching issues of balancing relative risks to human health and the environment. The type of burning technologies used will play a large role. The transient nature of the burner process will play a large role. Waste composition will play a large role. Ongoing ACD operations (and operators) will play a large role.

Recommendation: Simplify the program by restricting the burning of building debris to only pit ACDs and firebox ACDs.

Recommendation: Simplify the program by doing duplicates initially. You can always go back and add to the program later once more information is available. It is going to be tough to even make the duplicates truly duplicate in nature.

Recommendation: Simplify the program by doing using only one type of composite demolition waste initially. You can always go back and add to the program later once more information is available.

Recommendation: Give some thought to designing a subsequent side study that looks at ACD operation (bed layering, percent over fire air, transient emissions when debris is charged and the curtain is temporarily breeched) once initial information is obtained.

Charge Question 1. Open burning issues of concern: The approach identifies several issues of concern associated with open burning: Failure of asbestos to be transformed into benign forms, Emissions of metals, particularly lead and mercury; Formation of halogenated organic compounds, and Increased emissions of PM, including PM2.5 --- Are these the situations that should most receive attention?

Recommendation: This is a good list to start with and includes contaminants of concern. I wonder how easy it will be to relate burner type and waste type to something like standardized emissions or emission factors for these materials.

Recommendation: There is some literature on the dehydroxylation of chrysotile to forsterite at temperatures above 800^{o}C and at ambient pressure (e.g., MacKenzie and Meinhold (1994) Amer. Mineral. 79:43-50, Jeyaratnam and West (1994) Ann. Occupational Hygiene 32: 137-148). There is less know about the kinetics of the reaction, though one source reports the reaction is fast. The time/temperature/turbulence conditions in the ACDs are not well known and the ability to sample for flue gas particles that may contain chrysotile or its thermal degradation products is important. Likewise, sampling the bottom ash would also be important. Depending on the type of waste burned and the asbestos level, finding particles may be like finding needles in a haystack. Consider some additional bulk techniques as a screen first (especially x-ray diffraction). The TEM technique can then be made easier to use if you can concentrate the chrysotile/forsterite samples through some technique (perhaps washing, density gradient separation, magnetic separation).

Charge Question 2. Parameters to be monitored: Are the parameters that are described adequate for developing operating guidance to ensure that future open burning activities are conducted in such a way to minimize adverse impacts on human health and the environment?

Yes, it is a good place to start. However, when attempting to frame relative emissions, some efforts will have to put into emission factor determination as a function of waste burned or as a function of combustion conditions (% O_2, CO, CO_2) so that comparisons can be made. These observations are for only steady state situations. This does not include transient operations.

Recommendation: The air emission and residual sampling campaign must be made as uniform and standardized as possible across the range of waste combusted and combustor types. That will require some knowledge of the fuel, the combustor air provision (where possible) and combustor burn performance (% O_2, CO, CO_2). This is not simple given the notion of sampling an open burning pile, unconfined combustion generally even in an ACD, and the spatial-temporal nature of the combustion flame even in an ACD.

Recommendation: Most ACDs have somewhat steady state operations intermixed with transient loadings that can breech the air curtain. Some understanding of what is emitted during breech events may eventually be helpful.

Charge Question 3. Pollutants to be measured: Given the broad range of compounds likely to be present in open burning of demolition debris, do the specific compounds listed describe an adequate range of pollutants to provide guidance on the performance of open burning systems?

Recommendation: Maybe include opacity as a combustor efficiency indicator?

Charge Question 4. Burn site monitoring – continuous monitoring or characterization monitoring: Is it sufficient to monitor an initial burn(s) to develop a characterization of potential releases rather than continuously monitoring each burn? How many burns should be monitored to develop the initial characterization necessary to determine the appropriate parameters?

Recommendation: The idea of doing some initial studies and figuring out what is working and what is not might be a better approach than wide spread continuous emission monitoring of all burner type/waste combinations on a routine basis over time.

Recommendation: As noted above, the initial 36 trials may be unnecessarily extensive and expensive. Some initial framing of the approach (waste type and combustor type) is needed. Building in flexibility to the approach allows for subsequent testing programs to get additional needed information as lessons are learned.

Charge Question 5. Monitoring methods, equipment, and quality assurance activities: To the extent that EPA has been able to describe or reference the monitoring methods, equipment, and quality assurance activities in the document, are they appropriate? What advice do you have for EPA as we further develop the methods and equipment plans?

Recommendation: Perhaps the state-of-the-art has changed, but given the different ways that combustor gases were sampled in the Lutes and Kariher (1997) study and the Fountainhead Engineering Study (2000) and the problems posed about sampling hot gases over an ACD, the type of slip stream samplers/impactors used, and the difficulties in thermal measurements of the fuel beds, flexibility in how the air emission studies are crafted might be helpful. This may have to be a "learn as you go" exercise.

Dr. Philip K. Hopke:

My major concern is the potential differences between the operation of systems in test burns and demonstration combustion projects and mass production efforts. It is one thing to set up the air curtain combustor when you know you are being watched with a careful monitoring effort. It is quite possible to be less careful when you are combusting material day-after-day-after-day on different sites and with different mixes of input materials. It is not clear from the documents what the continuing level of oversight and monitoring. Given the staggering amount of material to be inspected and disposed of, there will need to be a large number of monitoring and oversight personnel assigned to ensure that the procedures are being followed each and every time and that the ACD is being properly used as it is moved on a frequent basis.

The procedures outlined seem very reasonable, but it is of great concern that in a mass production operation that will require the use of far more people than currently have experience in handling hazardous materials to be quickly trained and utilized, there will be a high potential for cutting corners resulting in additional risk to both the workers and the public. The "Air Monitoring and Contingency Plan for Hurricane Katrina Debris Activities Louisiana" calls for 3 sets of air monitoring systems with sampling at two burn sites per day and one "floater" system to be available as needed. The key is then to keep that floater system in action so any other non-monitored burn site could be monitored without notice and let all of the contractors doing the demolition and burning know that they could be monitored at any time with penalties if they fail to comply with the guidelines and procedures. There must be a rigorous QA process to ensure that everyone is doing the demolition and combustion in the best possible manner if public and worker health is to be protected while dealing with this large quantity of debris.

Are there really sufficient laboratory capabilities to handle the workload? For example, there is a requirement to handle sites containing PCBs differently. Is the capability for making those determinations in place?

Given the highly heterogeneous nature of the materials being burned, I would worry about the uniformity of temperature and thus, would not assume that all of the chrysolite will be converted into forsterite. Although the guidelines call for the mean temperature to remain above 800C, it is certainly possible to have areas that do not consistently meet that temperature while other regions are higher. Thus, the assumption should be made that there will remain chrysolite in the debris.

It is planned to measure particulate mercury, but the bigger problem will be the release of reactive gaseous mercury (RGM) that can more readily deposit and start to cycle in local ecosystems. It would be very useful to get some Tekran continuous RGM units into the mix of monitors to explore the potential for RGM release from the demolition/combustion activities.

Although the EPA conditions document indicates monitoring for polychlorinated dioxins and dibenzofurans, the Air Monitoring and Contingency Plan for Hurricane Katrina Debris Activities Louisiana suggests mostly low volume sampling that is unlikely to provide a sufficient sized sample to permit accurate assessment of the PCDDs and PCDFs. There needs to be sampling specifically established for these contaminants and it is not clear where that is in the material provided to us.

The Air Monitoring and Contingency Plan for Hurricane Katrina Debris Activities Louisiana proposes using ICP for the metals determinations. However, the digestion and analysis is somewhat slow and it may make sense to do some screening with more rapid XRF analyses to find quickly if there are problems with high metal levels.

Dr. Morton Lippmann:

1) Issues of Concern

Issues of concern that should receive as much, or more concern than the four ones listed are:
* how will mold spore dispersion and worker exposures in handling waste construction debris be addressed?

* are wastes sufficiently segregated prior to combustion to facilitate uniformity and completeness of combustion?
* how will burn temperature be maintained when burning construction debris in view of non-combustibles and varying moisture content?
* how will burn temperature be maintained when burning vegetative debris in view of varying moisture content?
* will supplemental fuel be used to facilitate uniformity and completeness of combustion?
* will the burn temperature needed to convert chrysotile to fosterite be optimal or nearly so for minimizing the formation and release of halogenated organic compounds and toxic metals?
* will air quality data from early burns be available in time to influence protocols for subsequent burns?
* has consideration been given to the likelihood that wood smoke and ash may cause respiratory irritation and aggravation of asthma and bronchitis in downwind populations

Another issue is that the extent of the characterization of asbestos handling is broader than the thermal conversion of chrysotile to fosterite. The protocols fail to address the possible presence of more the hazardous amphibole fibers. Also, the analytical protocols indicate that AHERA counting rules would be used, which will ensure that the fiber counts are dominated by fibers shorter than 5 um, which pose negligible risks.

2) Parameters to be Monitored

Most of the parameters described will be adequate, but there is no mention of others that might also be important. These are:
* Consideration of prevailing winds and atmospheric stability to ensure that effluents do not go toward populated areas.
* Control of resuspension of the very large quantities of burn ash during removal from burn pit, loading onto trucks, truck transport to disposal sites, and discharge into such disposal sites.

3) Pollutants to be Measured

The pollutants cited are adequate in terms of being of concern by themselves, and/or as surrogates of others, but consideration also should be given to less hazardous markers of the pollution mixture that can serve as surrogates of pollutant dispersion.

4) Burn site Monitoring

Long-path continuous monitoring of atmospheric opacity and specific chemical effluents along multiple air paths would enable LDEQ, combined with meteorological data, to designate specific days as suitable for burn bans, limited burning, or more generalized burning of debris. It would also provide data on the air quality impacts of specific burns.

5) Monitoring Methods, Equipment, and QA

No Guidelines were offered as to acceptable levels of concentrations or lower limits of detection. Lacking these, there it is not possible to judge whether the methods and equipment are appropriate. The analytical methods QA do seem to be appropriate.

Dr. Mark Rood:

1. Open burning issues of concern

The heterogeneity of the waste's heat content and composition and the heterogeneity of the burning conditions are more diverse in the air curtain pit burners than exists for municipal solid waste incinerators. Care needs to be taken by the operators to provide adequate mixing of the wastes to achieve a more uniform temperature and reasonable circulation of combustion air. A wide range of contaminants is proposed to be monitored, but it is unclear how well the results will characterize the bottom ash, fly ash, and gaseous emissions. It would be good to consider how the monitoring results will provide feedback to the community and to the personnel operating the burn site. The documentation should also provide guidelines about when to burn that are based on meteorological conditions (e.g. existence of low lying inversion layers, wind direction/speed, and select atmospheric stability conditions). Dispersion modeling scenarios should be considered to provide the operators the best conditions to complete the burns.

The documentation takes into special consideration: 1) asbestos, 2) metals, particularly lead and mercury, 3) halogenated organic compounds, and 4) PM, including PM2.5. However inorganic gases such as HCl and CO should be carefully monitored to characterize acid gas emissions and incomplete combustion. Production of these contaminants during stable atmospheric conditions could prove problematic for nearby burn pit operators and communities.

2. Parameters to be monitored

There is a wide range of parameters that will be used to monitor the emissions of contaminants to the atmosphere and to the bottom ash. However, it is unclear how representative the samples will be and how the results will be included in a contingency plan in case there are conditions that are a danger to human health and the environment. It is not clear how the results will be used to assess if the air curtain pit burns are burning the wastes safely.

Remote sensing of the plumes that integrate results across the entire plume should be carefully considered for the initial test burns. The plumes will most likely be very heterogeneous temporally and spatially, which will make it difficult for extractive point samplers to provide representative samples that describe the composition and concentration of contaminants in the plume.

3. Pollutants to be measured

The lists of specific compounds provided in the appendices are relevant to characterizing the emissions from open curtain pit burning of the wastes. However, the documentation could be strengthened if it describes how the information will be interpreted, and used to decide how best to operate the air curtain pit burns.

4. Burn site monitoring – continuous monitoring or characterization monitoring

It is prudent to monitor the plumes of all operating pit burns because of the heterogeneity of the wastes to be burned and the degree of control that exists with the open curtain pit burns. Parameters should include at least CO, temperature, and particulate mass concentration/opacity. Results from the measurements need to be interpreted and then provided to the certified/trained (?) open pit burn operators.

5. Monitoring methods, equipment, and quality assurance activities

Sorting of the wastes for the test burns needs to be completed carefully to best represent the wastes as they will be burned at other test sites. Select continuous monitors should be used at all burn sites to provide feedback to the operators about when and how to feed and mix wastes in the combustion zones.

Attachment 2

Preliminary Agenda
U.S. Environmental Protection Agency
Science Advisory Board
Workgroup on Demolition and Disposal of Hurricane Debris
Teleconference
October 5, 2005
2:00 – 4:00 PM, Eastern time

2:00pm	Welcome, Roll Call, Opening Remarks	Dr. Holly Stallworth, Designated Federal Officer
2:05pm	Introductions and Review of Agenda and Purpose of Meeting	Dr. Taylor Eighmy Chair
2:15pm	Overview of Agency Request	Office of Enforcement and Compliance Assurance (OECA) representative
2:30pm	Discussion of Charge Questions - question 1 - question 2 - question 3 - question 4	Dr. Eighmy and Panel
3:30pm	Other Comments and Questions	Dr. Eighmy and Panel
3:40pm	Summary and Identification of Important Points, Discussion, Next Steps	Dr. Eighmy
4:00pm	Adjourn	Dr. Stallworth

Attachment 3:

Charge Questions for SAB Workgroup Consultation on

Approach for Conducting Source Emission Characterization Tests of Open Burning of Vegetative and Demolition Debris

Introduction:

In the aftermath of Hurricane Katrina and Hurricane Rita, and the subsequent flooding, EPA has been asked by the Louisiana Department of Environmental Quality (LDEQ) to review their approach for addressing demolition and disposal of specific structures in Jefferson Parish, Orleans Parish, Plaquemines Parish and St. Bernard Parish. EPA intends to exercise its enforcement discretion and grant a no action assurance for demolition and disposal of asbestos-containing waste material in these parishes provided those activities are carried out in accordance with the LDEQ guidelines and the conditions set forth in a guidance document entitled "EPA's Conditions for Granting a No Action Assurance and Associated Recommendations for LDEQ Asbestos Demolition and Disposal Procedures for Jefferson Parish, Orleans Parish, Plaquemines Parish and St. Bernard Parish in the Aftermath of Hurricane Katrina and Hurricane Rita" (Conditions and Recommendations Document) The conditions and recommendations were developed for the purpose of minimizing any potential adverse public health and environmental effects from the demolition and disposal activities. This no action assurance will extend for a period of six months from the date of the transmittal letter. Prior to the expiration date, the situation will be reviewed to determine if either the guidance or the no action assurance need to be modified or revoked.

Note that within the Conditions and Recommendations Document, the Air Curtain Destructor (ACD) section provides a process for ACD operating parameters to be determined through an approach described in Appendix A, entitled "Approach for Conducting Source Emission Characterization Tests of Open Burning of Vegetative and Demolition Debris." We are interested in learning whether this approach will allow us to verify the effectiveness of this process in reducing potential risks from use of ACD technology. To this end, we are asking the Science Advisory Board to answer the following questions:

1. Open burning issues of concern

The approach identifies several issues of concern associated with open burning:

Failure of asbestos to be transformed into benign forms
Emissions of metals, particularly lead and mercury
Formation of halogenated organic compounds
Increased emissions of PM, including $PM_{2.5}$

Are these the situations that should most receive attention?

2. Parameters to be monitored

Are the parameters that are described adequate for developing operating guidance to ensure that future open burning activities are conducted in such a way to minimize adverse impacts on human health and the environment?

3. Pollutants to be measured

Given the broad range of compounds likely to be present in open burning of demolition debris, do the specific compounds listed describe an adequate range of pollutants to provide guidance on the performance of open burning systems?

4. Burn site monitoring – continuous monitoring or characterization monitoring

Is it sufficient to monitor an initial burn(s) to develop a characterization of potential releases rather than continuously monitoring each burn? How many burns should be monitored to develop the initial characterization necessary to determine the appropriate parameters?

5. Monitoring methods, equipment, and quality assurance activities

To the extent that EPA has been able to describe or reference the monitoring methods, equipment, and quality assurance activities in the document, are they appropriate? What advice do you have for EPA as we further develop the methods and equipment plans?

Attachment 4:

Roster

U.S. Environmental Protection Agency
Science Advisory Board
Workgroup on Demolition and Disposal of Hurricane Debris

CHAIR

Dr. Taylor Eighmy, Research Professor of Civil Engineering and Director of Recycled Materials Resource Center, University of New Hampshire, Durham, New Hampshire

MEMBERS

Dr. Barry H. Dellinger, Patrick F. Taylor Chair of Environmental Chemistry, Department of Chemistry, Louisiana State University, Baton Rouge, Louisiana

Dr. Philip Hopke, Bayard D. Clarkson Distinguished Professor
Department of Chemical Engineering, Clarkson University, Potsdam, New York

Dr. Paul J. Lioy, Professor of Environmental and Community Medicine, Environmental and Occupational Health Division, University of Medicine and Dentistry of New Jersey, Piscataway, New Jersey

Dr. Morton Lippman, Professor, Nelson Institute of Environmental Medicine, New York University, Tuxedo, New York

Dr. Mark Rood, Professor, Department of Environmental Engineering, University of Illinois, Urbana, Illinois

SCIENCE ADVISORY BOARD STAFF

Dr. Holly Stallworth, Designated Federal Officer, Environmental Protection Agency, Washington, D.C.

Attachment 5

EPA'S CONDITIONS FOR GRANTING A NO ACTION ASSURANCE AND ASSOCIATED RECOMMENDATIONS FOR LDEQ ASBESTOS DEMOLITION AND DISPOSAL PROCEDURES FOR JEFFERSON PARISH, ORLEANS PARISH, PLAQUEMINES PARISH AND ST. BERNARD PARISH IN THE AFTERMATH OF HURRICANE KATRINA AND HURRICANE RITA (followed by Appendices A – E)

I. INTRODUCTION

In the wake of Hurricane Katrina and Hurricane Rita, EPA has been called upon to provide guidance on proper practices for the demolition and disposal of buildings rendered structurally unsound or otherwise uninhabitable by the hurricanes and any subsequent flooding. Various federal regulations apply to building demolition activities and to disposal of certain types of wastes or debris. Areas of primary federal concern include asbestos demolition requirements, the proper disposal of electrical equipment containing PCBs (e.g., distribution transformers, lighting ballast, and capacitors) and storage tanks. EPA has already provided guidance on the appropriate practices for demolition and disposal of structurally unsound buildings damaged by Hurricane Katrina and for the burning of vegetative, structural, or mixed debris associated with the hurricane. These two guidance documents, "Demolition Guidance for Structurally Unsound Buildings Damaged by Hurricane Katrina" and the "Emergency Hurricane Debris Burning Guidance," are attached for your information (Informational Attachments 1 and 2). The two guidance documents recognize that the extraordinary circumstances caused by Hurricane Katrina may make full compliance with certain federal regulations difficult, and specify actions that should be taken nonetheless to the extent feasible to minimize the health, safety, and environmental risks associated with demolition and disposal practices.

The flooding of the City of New Orleans and nearby communities following Hurricanes Katrina and Rita poses particularly difficult challenges for recovery and reconstruction efforts. It is estimated that the hurricanes and floods left as many as 260,000 buildings structurally unsound or otherwise uninhabitable. As many as 170,000 of these structures, a significant fraction of which are residences, may contain asbestos, lead paint, or other hazardous materials. The volume of debris from the demolition of these structures plus other debris from the hurricanes and floods is overwhelming. In addition, the New Orleans area has one of the largest and most destructive Formosan termite infestations which makes disposal of debris from the demolition of homes in that area problematic. To prevent further spread of this termite, the Louisiana Department of Agriculture and Forestry is expected to issue a quarantine on the movement of cellulose products. Yet, it is recognized that landfill capacity in the immediate area is insufficient to handle the volume of debris.

The Louisiana Department of Environmental Quality (LDEQ), in a letter sent to EPA on September 22, 2005, outlined a set of demolition and disposal practices for the New Orleans area that are designed to implement EPA's two guidance documents and federal and state requirements to the extent practical without impacting timely cleanup and removal. LDEQ believes that if it strictly followed the two guidance documents, it would take years to complete the inspection and removal process and may result in moving debris that may contain the Formosan termite to less-infested areas. By adopting the practices outlined in its letter, LDEQ believes that the New Orleans area would be free of debris within six months and that reconstruction could begin. LDEQ has asked for EPA's concurrence that, given the circumstances, the approach outlined in the LDEQ letter represents a reasonable approach for timely removal and disposition of the debris.

EPA acknowledges the extraordinary circumstances facing the State and local communities and the truly daunting tasks associated with clean up and disposal of so much debris. EPA is committed to providing assistance to deal with this massive effort. The Agency shares the State's desire to strike the right balance between implementing an expeditious and efficient clean up plan and protecting public health and the environment. EPA appreciates the State's efforts to properly remove and dispose of asbestos containing material in accordance with previous disaster-related guidance and state and federal requirements, specifically the federal asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 61, Subpart M.

To help facilitate the rebuilding of the New Orleans area, EPA recognizes under these extraordinary circumstances, it needs to consider all available options including granting enforcement discretion when reasonable measures can be taken to address and reduce the environmental concerns.

II. SUMMARY OF LDEQ'S PROPOSAL

LDEQ proposes to demolish certain residences without inspections for asbestos and to dispose of the debris by using air curtain combustion as one means of disposal. LDEQ intends to require an amended water misting system on the exhaust side of the air curtain destructors to further reduce particulate emissions. LDEQ also intends to provide air monitoring for asbestos and lead on the downwind side of the air curtain destructors. All of the air curtain destructors will be operated in uninhabitable areas. The LDEQ will conduct periodic representative sampling of ash prior to disposal or reuse. A more complete description of the approach is included in LDEQ's "Hurricane Katrina Debris Management Plan, Louisiana Department of Environmental Quality, September 28, 2005, Revised September 30, 2005" which is included by reference herein (Appendix A).

III. SUMMARY OF CONDITIONS AND RECOMMENDATIONS

This document and accompanying letter provide a no action assurance for persons demolishing a large number of residences (single family residences or residential buildings with 4 or less units) in a limited area that are 1) subject to a government-ordered demolition and 2) structurally unsound (in imminent danger of collapse) or structurally sound but uninhabitable. Under this no action assurance, such demolitions can be done without prior inspection by an asbestos trained person or removal of asbestos-containing materials for proper disposal prior to the demolition. This document further addresses the disposal of the debris from these residences using air curtain destructors.

While the asbestos NESHAP allows structurally unsound buildings which are in imminent danger of collapse to be demolished without prior inspection, it nonetheless requires the debris to be treated as though it contains asbestos and disposed of in accordance with NESHAP requirements (e.g., approved landfill, 6 inches of soil, posting, recordkeeping, and a management plan to ensure the asbestos is not disturbed and made airborne.)

Wetting the structure before and during demolition and the resulting debris until final disposal will minimize the risk of releasing asbestos fibers during demolition and movement of the debris. The EPA has data to indicate that the burning of the chrysotile form of asbestos (the type of asbestos commonly found in residences) at the temperatures expected with the air curtain destructor may result in the transformation of these chrysotile fibers into forsterite, which does not present the same hazards of chrysotile fibers. The EPA believes monitoring is necessary to ensure that burning of these structures does not pose unacceptable risks. LDEQ must ensure that appropriate monitoring is conducted. EPA plans to review the data from the monitoring and make adjustments to this document if necessary or even rescind it, if appropriate. In addition to asbestos, these structures may contain lead paint. Thus, EPA is requiring monitoring of asbestos, lead, and any other pollutants of concern to ensure that this activity does not present environmental problems greater than the one that Louisiana is trying to solve (i.e., the debris arising from uninhabitable houses).

IV. CONDITIONS

A. PURPOSE OF THIS SECTION

This section lays out the conditions under which EPA will exercise its enforcement discretion and grant a no action assurance as outlined in the cover letter.

B. APPLICABILITY AND SCOPE

This document applies only to residences with four or less units that are located in the following parishes in the New Orleans area: Jefferson, Orleans, Plaquemines, and St. Bernard, and which are being demolished under an order of a State or local government because the facility is structurally unsound and in danger of imminent collapse or because it is uninhabitable as a result of Hurricane Katrina or Hurricane Rita. This document does not apply to other types of buildings, renovations, or debris from renovations.

C. TIMEFRAME

This document is effective for 6 months from the date of signature of the no action assurance letter. If at any time during this six month period EPA receives data/information that raises public health or environmental concerns, EPA may modify or withdraw this document and its companion no action assurance. The Assistant Administrator for the Office of Enforcement and Compliance Assurance may extend the effective date if deemed appropriate.

D. NESHAP REQUIREMENTS

If a trained asbestos inspector/licensed asbestos contractor is on site to help identify asbestos material, regulated asbestos-containing material must be adequately wetted, segregated, kept wet, labeled, and disposed of in a landfill in accordance with the NESHAP requirements to the extent feasible.

E. ASBESTOS TRAINED PERSONNEL

1. EPA will work with LDEQ to identify available asbestos trained personnel (as specified under 40 CFR §61.145(c)(8)) from other Regions and states that could be deployed to the New Orleans area to assist. EPA recognizes that buildings that are non-residential or residential with more than 4 units, are more likely to contain forms of asbestos other than chrysotile. As a result, the Agency concurs with LDEQ's proposal to focus the available trained asbestos personnel on inspecting those types of buildings, and to demolish residential buildings with 4 or less units without having trained asbestos personnel on site to help segregate the waste or to inspect and sample.

2. In those circumstances where the residence is not inspected for asbestos, asbestos is not removed, and the resulting waste is not segregated with oversight by trained personnel, LDEQ will dispose

of the material either in accordance with this document or in an appropriate landfill and in compliance with NESHAPs requirements.

F. DEMOLITION

1. Public access to the demolition sites must be restricted. Persons within the demolition site must wear appropriate personal protective equipment (PPE) to prevent potential exposure from the inhalation of asbestos fibers and other hazardous materials.

2. Persons operating demolition equipment must not run over the debris to break it up into small pieces.

3. Wet structures before and during demolition to reduce the potential for air migration of asbestos. If water is not available, delay demolition until it is available. Keep debris wet until final disposal. If moved offsite, label debris as asbestos.

G. NOTIFICATION

Notification of demolition must be provided to LDEQ as early as possible, but no later than one working day after such activity begins.

H. AIR CURTAIN DESTRUCTOR (ACD)

4. Disposal of debris described in Section A may occur by combustion using the air curtain type of destructors with overfire air. The ACD must be operated in such a manner as to produce the least amount of particulate and gaseous emissions.

5. LDEQ must follow its own guidelines for ACD procedures as outlined in its "Hurricane Katrina Debris Management Plan, Louisiana Department of Environmental Quality, September 28, 2005, Revised September 30, 2005," incorporated by reference herein.

6. ACDs must be constructed in such a way to eliminate the potential for soil and groundwater contamination.

7. Based on air modeling predictions, no burns may be conducted within 1000 feet of occupied areas.

8. The mean burn temperature must remain above 800 degrees C unless modified by the operating conditions defined through process outlined in number 6 to this section.

9. The conditions for operating the ACD unit will be determined through execution of the approach described in Appendix B, entitled: "Approach for Conducting Source Emission Characterization Tests of Open Burning of Vegetative and Demolition Debris." Within fourteen (14) days of completing the characterizations tests, LDEQ and EPA will memorialize, in a separate document, the appropriate operational parameters for the ACD to minimize the environmental and public health impacts. This document must include monitoring requirements, including location and frequency, to ensure compliance with defined operating conditions.

10. Access to burn sites must be restricted to workers only within the 1000 foot zone.

11. Workers in the 1000 foot zone must wear appropriate PPE to prevent potential exposure from the inhalation of asbestos fibers and other hazardous materials.

I. MONITORING

Prior to and during demolition of residences under this document, LDEQ shall ensure adequate monitoring is conducted to address the ACD/burn sites as well as the demolition sites. Such monitoring must provide information sufficient to ensure adequate protection of public health and the environment. Where EPA is monitoring to address some or all of these monitoring requirements, LDEQ may use such data to satisfy its requirements under this section. EPA acknowledges that LDEQ is currently working with EPA and other agencies to develop an Air Monitoring and Contingency Plan for debris activities (Appendix C), consistent with the Overview Plan for Ambient Monitoring after Hurricane Katrina (Appendix D). LDEQ must ensure compliance with such plans once they are finalized. LDEQ and Region 6 must coordinate and memorialize responsibilities under each plan.

The LDEQ must also coordinate worker protection monitoring to meet OSHA requirements with air sampling currently being conducted by LDEQ and EPA. Since Louisiana does not currently have an OSHA-approved state plan, the local and state workers are protected under the EPA Asbestos Worker Protection Rule (WPR), 40 CFR Part 763, Subpart G. LDEQ must make data available on a website for First Responders so that they can make decisions on the appropriate worker protection decisions.

J. REPORTING

1. Monitoring and sampling data must be submitted monthly to EPA Region 6, with a copy sent to EPA Headquarters, at the following addresses:

   John Blevins, Director
   Compliance Assurance and Enforcement Division
   EPA Region 6
   Fountain Place 12th Floor, Suite 1200
   1445 Ross Avenue
   Dallas, Texas 75202-2733

   Randy Hill, Deputy Director
   Office of Civil Enforcement
   U.S. EPA (2241A)
   1200 Pennsylvania Ave., NW
   Washington, DC 20460

2. Data from air sampling and worker protection monitoring must be posted on the LDEQ website as soon as possible, but no later than two (2) days of receipt of test results, so that emergency responders can make worker protection decisions for area workers.

K. ANALYSIS AND DISPOSAL OF ASH WITH ASBESTOS

Ash from the ACD activities noted above must be analyzed for asbestos. Alternatively, such ash can be presumed to have asbestos. Where ash is known or presumed to contain asbestos from the ACD activities noted above, it must be disposed of pursuant to the NESHAP requirements.

V. RECOMMENDATIONS

A. PURPOSE OF THIS SECTION

This section includes demolition and disposal practices that, while not conditions of the no action assurance, EPA recommends that LDEQ follow to the extent feasible.

B. STATE GUIDANCE

EPA supports and defers to existing State regulations, guidance, and policies for managing solid and RCRA hazardous waste for disaster debris.

C. DEMOLITION

To the extent practicable, EPA recommends knocking down each structure wall by wall, folding it in on itself to minimize excess breakage of asbestos containing material. Debris should be moved in a way to minimize breakage.

D. SEGREGATION OF OTHER WASTES

LDEQ should continue efforts to follow the previous guidances on segregating and disposing of wastes such as white goods, electrical equipment (e.g., transformers/capacitors/lighting ballasts) which may contain PCBs, etc.

E. ACD PROCEDURES

1. Combustion of debris is more effective when combustion air can flow through the burning debris. Where possible, maintain the burning debris bed to allow air to flow from the bottom through the bed, and to have the bed burn from top to bottom. This will increase the potential for unburned materials carried by the combustion air to pass through the hotter combustion zones, resulting in improved combustion performance. Methods of increasing the air flow through the debris bed include layering of less dense debris (those with greater air spaces) below and above more dense debris or providing means for air flow under the debris bed by use of pallets under the debris pile.

2. The operator should ensure that the level of debris in the unit remains below the curtain.

F. DISPOSAL OF ASH FROM BURNED DEBRIS

1. Requirements for disposal of ash generated from open burning of mixed debris are generally governed by the State's regulations, guidance, and policies. If ash contains regulated PCBs, federal requirements apply.

2. The criteria for defining and closing out a burn site will be the responsibility of the State. If the burn site contains regulated PCBs, federal requirements apply.

3. Where practicable and feasible, recommendations for disposal of burned mixed debris include the following:

-Areas that are only used to stage vegetative debris, or ash from burning solely vegetative debris, would not ordinarily require any environmental sampling after the debris or ash is removed unless there is reason to believe that the area may have become contaminated (e.g., significant visible staining or known contaminant releases in the area).

-Materials that could be potentially hazardous and easily moved (e.g., large electrical equipment and propane tanks) should be removed when practical prior to demolition of the residence.

-If ash is left at the site, prudent measures should be taken to protect human health and the environment. If ash is removed from the site, it should be taken to a permitted landfill as approved by the State. If ash contains regulated PCBs, federal requirements apply.

-If ash from open burning is disposed at the site, documentation of closure activities and any restrictions should be performed by the State to inform future owners or developers.

III. APPENDICES

APPENDIX A: "Hurricane Katrina Debris Management Plan, Louisiana Department of Environmental Quality, September 28, 2005, Revised September 30, 2005"

APPENDIX B: "Approach for Conducting Source Emission Characterization Tests of Open Burning of Vegetative and Demolition Debris."

APPENDIX C: "Air Monitoring and Contingency Plan for Debris Activities"

APPENDIX D: "Overview Plan for Ambient Monitoring after Hurricane Katrina"

IV. INFORMATIONAL ATTACHMENTS

ATTACHMENT 1: "Demolition Guidance for Structurally Unsound Buildings Damaged by Hurricane Katrina"

ATTACHMENT 2: "Emergency Hurricane Debris Burning Guidance"

HURRICANE KATRINA

DEBRIS MANAGEMENT PLAN

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

SEPTEMBER 28, 2005

Revised September 30, 2005

Debris Management Plan Purpose

On August 28, 2005, Governor Kathleen Babineaux Blanco declared a state of emergency for the state of Louisiana as Hurricane Katrina approached Louisiana. On August 29, 2005, Hurricane Katrina struck Louisiana causing widespread damage, flooding and destruction. The Department of Environmental Quality has subsequently issued a number of declarations, administrative orders and waivers for local governments handling Katrina debris. On August 30, 2005 the Secretary of the Louisiana Department of Environmental Quality (LDEQ) issued a Declaration of Emergency and Administrative Order. This Declaration and Order was subsequently amended by the Secretary on September 3, 2005. Both documents are included as Attachments 1 and 2.

The purpose of this guidance is to furnish local governments with basic information on hurricane debris management within the scope of effective environmental management. While LDEQ is willing to be flexible and innovative on various approaches to handling debris issues as a result of Hurricane Katrina, it must still adhere to its mission of protecting the state's environment to the fullest extent possible under the circumstances. The Department will consider reasonable waiver requests in order to effect rapid and environmentally safe disposal, composting and waste diversion goals.

Requests for waivers and approvals for debris management sites should be routed to Dr. Chuck Carr Brown at (225) 219-3180 or Lou Buatt at (225) 219-3980.

This guide is an ongoing project. Revisions will be posted on the Department's web site.

Table of Contents

Debris Management Site Selection
General Guidelines

Types of Debris Management Sites

In general, local governments will need to determine appropriate sites for the following temporary activities: staging and transfer of construction and demolition (C&D) debris; staging of vehicles and boats; staging of household hazardous waste; chipping, grinding and/or burning of vegetative debris; and staging of white goods, electronics and other consumer items. Use of a site as a permanent disposal site may also be considered.

Finding the Right Location

When selecting a debris management site, the local government will need to keep the following in mind:

1. What is the proposed use for this site?
2. Is it easily accessible?
3. Is it removed from obstructions such as power lines and pipelines?
4. Is the site considered to be a wetland area, as defined by the U.S. Army Corps of Engineers?
5. Is the general site topography conducive to the activity that will be conducted there?
6. Are there nearby residences and/or businesses that will be inconvenienced or adversely affected by use of this site?
7. Is the size sufficient for its intended use?
8. Is the soil type suitable for its intended use?
9. Can a site that has been used in the past be reactivated for this use?

In addition to the criteria listed above, LDEQ will evaluate proposed burn sites based on their location near water bodies such as rivers, lakes or streams and their proximity to occupied dwellings.

Site Approval

Upon request by the local government, LDEQ or its agent will inspect the proposed site to determine the appropriateness of its use as a debris management site. If the site is approved, LDEQ will inform the local government and will document the approval, usually by letter. The letter will contain any restrictions and operational conditions that must be adhered to. Examples of these restrictions are hours of operation and types of wastes to be allowed. Operational conditions will be outlined in an Interim Operational Plan. For examples of these documents, see Attachments 3-7.

Site Closure

Each debris management site will eventually be emptied of all material and be restored to its previous condition and use.[1] Closure must be in accordance with approved department practices and/or the interim operational plan.

Sampling of soil and/or ash that is left at the site might be required by the department. If required, the contractor will take necessary steps to ensure no environmental contamination is left on-site. Monitoring and/or remediation of a site must be coordinated through the department's Office of Environmental Assessment.

Closure should be accomplished within the time limits established by the department.

[1] If the site is used for C&D disposal and on-site closure is approved, specific tasks such as deed recordation must be accomplished.

Construction and Demolition (C&D) Debris

C&D debris may be handled in accordance with the provisions of the Department's Declaration of Emergency and Administrative Order, as amended. LDEQ expects, to the greatest extent possible, for C&D debris to either be staged at temporary sites and transported to permitted Type III facilities or to be placed into emergency disposal sites. Materials approved for receipt at these sites include roof shingles, roofing materials, carpet, insulation, wallboard, treated and painted lumber, etc.

LDEQ recognizes that decisions on the disposition of wastes and debris need to be made at the collection point. Use of best professional judgment will be necessary to determine the ultimate disposition of collected material. Contractors chosen by the local governing authority or by state or federal agencies should possess knowledge of applicable regulations and of the Declaration of Emergency and Administrative Order in order to correctly route waste streams to appropriate sites and/or facilities.

Site operations will comply with the Interim Operational Plan provided by LDEQ. It is the responsibility of the local government to provide this document to any entity that may be charged with operation of the site.

Staging/Transfer sites

Arrangements should be made to screen out, to the greatest extent practicable, unsuitable materials such as household garbage, white goods, asbestos containing materials (ACM's), and household hazardous waste. These materials should be placed in containers and transported to facilities that are approved for their receipt.

On-Site Disposal Sites

During extreme emergencies, it is necessary to allow accumulation and disposal of C&D debris at sites that are deemed appropriate but have not had time to go through the regular permitting process. LDEQ will evaluate requests by local governments and, if it is determined that a need exists, will allow disposal in this manner. If approved, operations must comply with the Interim Operational Plan provided by LDEQ.

Burning of C&D Debris

As dictated by circumstances, occasions may arise where LDEQ will allow C&D debris to be burned. While not an ordinary occurrence, it is a possibility.

LDEQ will endeavor to ensure that the location chosen for this activity is thoroughly evaluated to make any impacts as minimal as possible. Local, state and federal partners will be advised of locations that have been approved for this purpose.

Ash generated as a result of burning of C&D debris must be analyzed to determine if contaminants are present that would render the material unsuitable for use as a soil amendment, or would render the material a hazardous waste. Disposal or use of this ash must occur ONLY AFTER review of analysis results by LDEQ.

Materials approved for receipt at these sites include vegetative storm debris such as yard waste, trees, limbs, stumps, branches and untreated or unpainted wood. Sites should be identified as chipping/grinding sites and/or burn sites. All sites must be operated in accordance with the LDEQ-provided Interim Operational Plan or other department correspondence. It is the responsibility of local government to provide this document to any entity that may be charged with operation of the site. All equipment (grinders, chippers, air curtain pit burners) shall be operated in accordance with manufacturers' instructions and any applicable LDEQ permit. For an example of instructions provided for these sites, see Attachments 3-7.

Chipping/Grinding Sites

Chipping and grinding provide material for use in landscape mulch, compost preparation, and industrial boiler fuel. If preparing compost and/or mulch piles, care should be taken to reduce the potential for spontaneous combustion.

Placing ground organic debris into piles can result in rapid microbial decomposition that generates heat and volatile gases. Temperatures in large piles containing readily degradable debris can rise to greater than 160° F, increasing the chance of spontaneous combustion.

Spontaneous combustion is more likely in large, dense piles of debris under dry, windy conditions. Maintaining windrows with a height of less than 6 feet and base width of less than 10 feet provides greater surface area for dissipation of heat and volatile gases, thereby minimizing the risks of spontaneous combustion.

Turning piles when temperatures reach 160 degrees can also reduce the potential for spontaneous combustion by allowing accumulated heat and gases to escape. Turning piles when temperatures decline can restore microbial activity and composting temperatures. Optimal moisture should be maintained to reduce combustibility. As a rule, optimal moisture is obtained when squeezing a handful of material yields a drop or two of water. Shredded leafy debris will decompose more rapidly and retain more heat than wood chips. Sufficient wood chips or other bulky materials should be mixed with leafy material to ensure rapid diffusion of heat and gases during the early stages of decomposition.

Large piles or windrows should be located away from wooded areas, power lines and structures. They should be accessible to fire fighting equipment, if a fire were to occur.

Burn Sites

Proximity to roads and dwellings is of particular importance in the selection of sites for this activity.

Open Burning. LDEQ may approve open burning of vegetative debris on a case by case basis. As with all proposed debris management sites, open burning locations must be approved by LDEQ in advance of their use.

Air Curtain Pit Burners (Air Curtains or Pit Burners). Air Curtains should be operated in accordance with manufacturers' instructions and with any applicable LDEQ permits or directives. For examples of Air Curtains, see page 5.

Disposal of Ash from Vegetative Debris Burn Sites. Ash may be land applied on site or off site. Whenever possible, soil test data and analysis of the ash should be available to determine appropriate application rates. Ash should not be applied during periods of high winds. Ash should not be applied within 25 feet of surface waters or ditches or drains on vegetated sites. These distances should be doubled on sites that are not vegetated, and the ash should be promptly incorporated into the soil.

As an alternative to land application, ash may be managed at a permitted solid waste landfill.

Assistance in obtaining soil test data and waste analysis of ash should be available through parish offices of the Extension Service.

Overview of an Air Curtain Operation

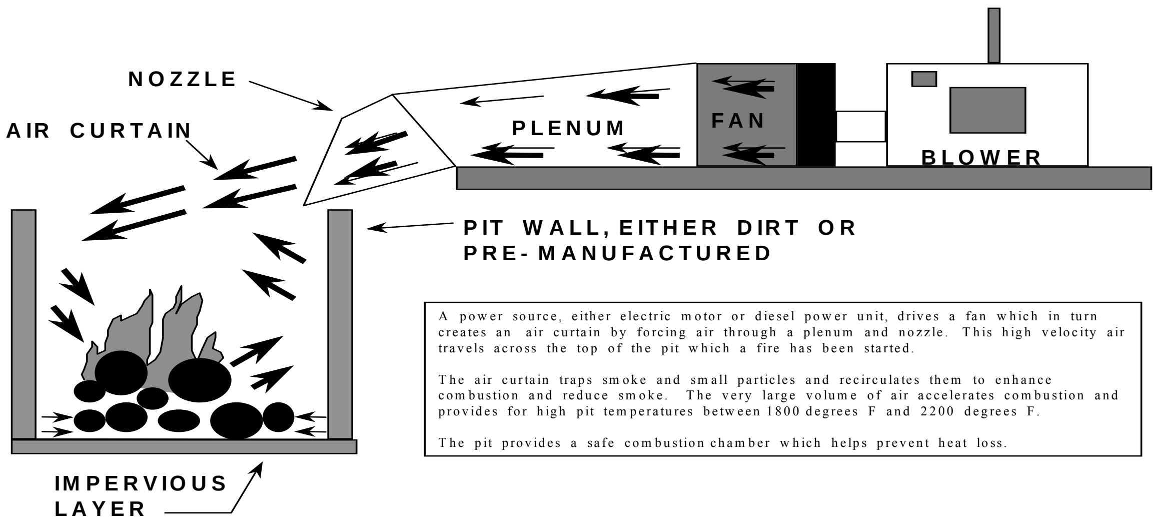


FIGURE 2

Air Curtain Pit Burner

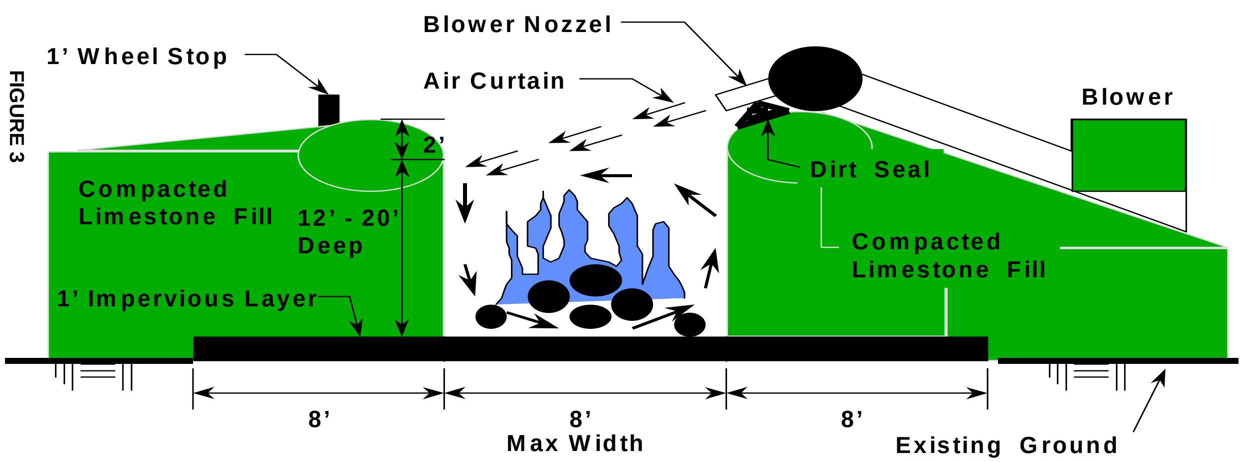


FIGURE 3

Abandoned Vehicles

1. Local governments shall designate an aggregation point for the temporary storage of abandoned vehicles. Contact DEQ for site approval.

2. Storage areas should be secure, fenced and lighted.

3. Vehicles brought to the storage areas should be site tagged, inventoried in by license plate, make, model, color and VIN.

4. Vehicles shall be staged and site tagged for easy retrieval.

5. Site operators shall forward vehicle data to the Department of Insurance for dissemination to insurers.

6. Local governments shall be responsible for the proper notification of vehicle owners.

7. Louisiana State Police will be sending Inspectors. Vehicles shall remain at the staging areas until inspected by the State Police and the National Insurance Crime Bureau.

8. Local government may request that direct federal assistance handle the disposition of unclaimed abandoned vehicles as required by state and local laws.

9. Scrap vehicles should be dismantled and properly recycled. The following materials must be recovered: gasoline and diesel fuel, refrigerants, lubricating oils, mercury ABS switches, mercury convenience switches, lead acid batteries, brake and transmission fluid, antifreeze and tires. Propane tanks and large appliances in recreational vehicles should be removed.

10. Vehicles may need to be decontaminated before leaving the aggregation site.

Abandoned Boats

1. Local governments shall designate an aggregation point for the temporary storage of abandoned boats. Contact DEQ for site approval.

2. Storage areas should be secure, fenced and lighted.

3. Boats brought to the storage areas should be site tagged, inventoried in by Department of Wildlife and Fisheries registration, make, model, color and serial number.

4. Boats shall be staged and site tagged for easy retrieval.

5. Site operators shall compare boat data with FEMA database registered boats.

6. Site operators shall forward boat data to the Department of Insurance for dissemination to insurers.

7. Local governments shall be responsible for the proper notification of boat owners.

8. Louisiana State Police will be sending Inspectors. Boats shall remain at the staging areas until inspected by the State Police and the National Insurance Crime Bureau.

9. Local government may request that FEMA handle the disposition of unclaimed abandoned boats as required by state and local laws.

10. Boats deemed for scrap should be crushed to reduce volume for easier handling and management, shredded and properly recycled when possible. The following materials must be recovered: gasoline and diesel fuel, refrigerants, lubricating oils, mercury bilge switches, propane tanks, large appliances, lead acid batteries, transmission fluid and electronics, such as, radar sets, radios, GPS units, and depth finders.

Large Appliances (White Goods)

1. Local governments should request or set up drop off collection sites for citizens for large appliances (white goods).

2. Local governments should require contractors demolishing condemned structures, to the greatest extent practicable, to remove and properly handle household appliances, televisions and computers, including refrigeration and freezing units at commercial locations.

3. Refrigerant containing appliances (RCAs) such as: refrigerators, freezers and air conditioning window units shall be handled in a manner which will prevent a release of refrigerants.

4. RCAs will be delivered to approved collection sites for refrigerant removal. EPA certified refrigeration technicians will remove refrigerants and handle in accordance with EPA standards.

5. Refrigerants shall be removed from condemned structures with split system air conditioning units prior to demolition. Only EPA certified refrigeration technicians will remove and handle refrigerants in accordance with EPA standards. Condensing units will then be removed from site and sent to an appropriate collection site. When possible, evaporator and air handling units should be removed and sent to an appropriate collection site.

6. White goods (e.g., unsalvageable air conditioners, stoves, range tops, and refrigerators or freezers from which food has been removed) shall be stored in an area separate from other wastes and shall be stored in a manner that prevents vector and odor problems and shall be removed from the facility or staging area within ninety (90) days.

7. Putrescible waste (e.g. rotting food has been removed from unsalvageable refrigerators and freezers) shall be disposed in a permitted Type II landfill.

1. Local governments should request or set up drop off collection sites for citizens.

2. Precautions must be taken at these sites to prevent the release of materials into the environment. Such precautions include providing lined temporary storage areas for accumulation of the material.

3. Local governments should require that contractors demolishing condemned housing units, to the greatest extent practicable, remove and properly handle household hazardous materials such as: paints and varnishes, solvent, acids, pesticides, cleaning fluids, pool chemicals, used motor oil, propane tanks, mercury thermostats, liquid mercury, mercury containing devices, smoke detectors, and refrigerants.

Liquefied Petroleum Gas Tanks

Liquefied Petroleum Gas (LPG) tanks typically contain propane gas. Propane is a flammable gas that is sometimes generically referred to as LP-Gas, LPG, or Liquefied Petroleum Gas. LPG is typically a propane-butane mixture. Propane might also contain small amounts of other flammable gasses, such as, ethane, ethylene, propylene, ouisiana, or butylenes. LPG tanks may be found in a number of urban and rural environments such as motor homes, travel trailers, grills, camp stoves, lanterns, etc. Liquefied petroleum gas is stored under pressure. The gas will leak from any joint or connection which is not sealed properly.

Liquefied petroleum gas is heavier than air. Any significant leak will move down and stay on the ground. LPG will accumulate in any low-lying area such as depressions in the ground, drains or pits.

Since LPG is stored in two phases, liquid and gaseous, there is potential for either a liquid leak or a gas leak. If the Liquefied petroleum gas leak is a gas leak it may not be seen (because LPG is colorless), except where the leak is of sufficient size to be seen shimmering in the air. When a liquid Liquefied petroleum gas leak occurs, the gas release will be seen as a patch of ice around the area of the leak, or as a jet of white liquid. This white appearance is due to the cooling effect created by the rapid expansion of the LPG liquid into a gas. The condensing atmospheric moisture makes the leak visible.

In concentrated amounts and in uncontrolled conditions, Liquefied petroleum gas has the potential to create a fire or an explosion.

Debris workers must be observant for LPG tanks. Basically, there are two types of tanks you will find, portable and bulk. Portable, consumer type tanks will be sized from 4 to 40 pounds, though the most common tank is the 20 pound tank. Bulk tanks are often 100 to several hundred thousand pounds.

It is vital that LPG tanks be located. Portable tanks can be re-located to a “staging area for recertification, refurbishment or dismantling. Bulk tanks should not be moved except by properly train personnel. Tanks measuring 25 gallons and larger, are supposed to be in the LPG Commission database. The data base should list where these tanks were supposed to be installed. Orphan tanks can be identified and the owners tracked down by their serial numbers.

Development comment: Liquefied Petroleum Gas Commission will coordinate this once we have them staged at a particular place. LA State Police Haz Mat Section is working to log found tanks locations and those that are still floating in the flood waters and locations of tanks after the waters recede. Once the tanks are able to be retrieved, they need to be taken to a staging area or areas and get serial numbers. Then they can then start the process of getting them properly placed with their owners Most of these tanks will be reusable and will not cause an additional problem of disposal.

Floodwater Sediment Handling Guidelines

1. Sediment samples collected by the Environmental Protection Agency (EPA) and Louisiana Department of Environmental Quality (LDEQ) in the New Orleans area have been analyzed for bacteria and chemicals. Preliminary results indicate that some sediments may be contaminated with bacteria and fuel oils. Human health risks may therefore exist from contact with sediment deposited from receding flood waters.

2. Health agencies and/or occupational health agencies may be consulted to determine appropriate exposure precautions to be taken. Workers collecting sediments from flooded areas should take necessary precautions to avoid skin contact with sediments or breathing sediment materials. Assume all sediments are contaminated.

3. Vehicles transporting sediments to aggregation points must be covered to prevent sediments from escaping.

4. Sediments need to be characterized to determine the appropriate disposal option. If warranted, some sediments may need to be disposed in a permitted hazardous waste landfill. Some slightly contaminated sediments may be disposed in a permitted industrial solid waste landfill. Uncontaminated sediments may be used as fill material.

5. Sediments arriving from sites where no sampling has taken place must be separately piled, sampled and tested before disposal. Untested sediments will be treated as hydrocarbon or heavy metal contaminated until proven otherwise.

Asbestos Debris

Licenses Required by the Louisiana State Licensing Board for Contractors (LSLBC)

Contractors performing asbestos abatement must be licensed by the Louisiana State Licensing Board for Contractors. Licensing for asbestos abatement is under the Commercial license with a specialty in Asbestos. Additional information for licensing can be found at http://www.lslbc.louisiana.gov/index.asp or by calling (225) 765-2301.

One of the licensing requirements is that one Supervisor/Contractor acting as the responsible individual for the company be accredited with LDEQ in order to get a license. The Licensing Board has expedited testing and Board approval. Time frame is approximately 2 weeks.
Following approval from the Louisiana State Licensing Board for Contractors, all abatement workers/supervisors performing work in Louisiana are required to be accredited by LDEQ. The Asbestos Accreditation Form (AAC-1) can be found at www.deq.louisiana.gov/permits/asbestos/aac-1.doc. Note that there is a fee for emergency processing (3 days or less).

Accreditations and Notifications Required by La. Dept. of Environmental Quality

The Louisiana Air Quality regulations, Chapters 27 and 5151 regarding Asbestos Demolition and Renovation abatement activities as well as accreditation of Workers, Supervisor/Contractors (including air monitoring personnel), Inspectors, Management Planners, and Project Designers are located at http://www.deq.louisiana.gov/planning/regs/title33/index.htm.

All personnel working as Asbestos Workers, Supervisor/Contractors (including air monitoring personnel), Inspectors, Management Planners, or Project Designers must be accredited by Louisiana Department of Environmental Quality. Initial and subsequent AHERA training by an EPA recognized training provider or training provider recognized by a state program with EPA authorization is required for accreditation as well as a picture for an I.D. card and fees. An Asbestos Accreditation Application can be found at http://www.deq.louisiana.gov/permits/asbestos/aac-1.doc . Also, a list of Louisiana recognized training providers can be found at http://www.deq.louisiana.gov/permits/asbestos/asbestos_training.pdf

The LDEQ has expedited the accreditation process for the Hurricane affected areas, including Hurricane related abatement, and is able to give almost immediate accreditation by letter, if necessary. Follow up certificates will be generated as soon as possible for all approved applicants. During the review process, if an applicant does not have the necessary credentials, additional paperwork will be requested. If the paperwork is not submitted, the accreditation for that person will be pulled. See Amended Declaration of Emergency and Administrative Order, number 6. **Asbestos Clean-up** on our website for abatement and training notification allowances with a 24-hour notification after commencement, and waiver of the Louisiana 2-hour regulations class at http://www.deq.louisiana.gov/news/pdf/Declarationofemergency.pdf.

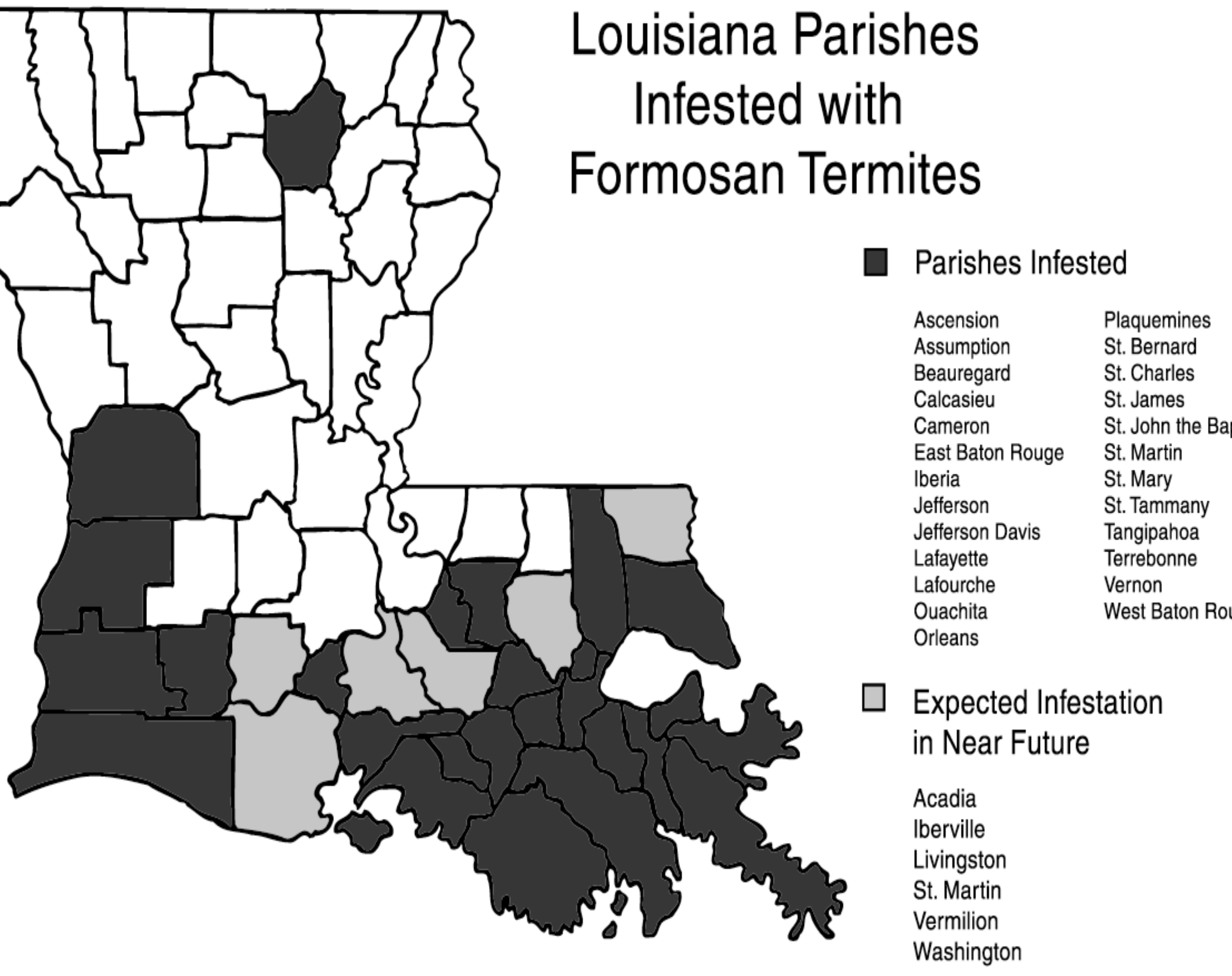
The Asbestos Notification form for Demolition or Renovation can be found at http://www.deq.louisiana.gov/permits/asbestos/aac-2.pdf. Note: 10-day notification is waved for the affected Hurricane area; however, notification is required within 24 hours of abatement commencement.

Formosan Termite Control

Formosan subterranean termites, *Coptotermes formosanus*, were introduced into the greater New Orleans area, as well as several other coastal cities, after World War II. By the time they were identified in 1966, they had become well established in areas throughout New Orleans and Lake Charles. The termites have had 30 years to grow and spread.

New Orleans has one of the largest and most destructive Formosan termite infestations. A humid, near-tropical climate contributes to the problem. The architectural character of the city's French Quarter or *Vieux Carre*, contributes to the problem. Many of the buildings there are historic landmarks with foundations supported by woodwork dating back to the 1700s in some cases. Row-style homes with their shared walls give foraging termite's easy access from one building to the next. This construction style hampers pest control efforts to treat or fumigate a single client's home or building.

Landfills are an ideal environment for these subterranean termites, especially in humid Louisiana. For this reason, restrictions are in place from the Louisiana Department of Agriculture and Forestry as to where in Louisiana potential Formosan termite contaminated debris might be disposed. Landfill operators, contractors and waste generators should consult with the Department of Agriculture and Forestry about proper disposal of Formosan termite debris. Contact Mr. Bobby Simoneaux at (225) 925-3763 or bobby_s@ldaf.state.la.us


Louisiana Parishes Infested with Formosan Termites
Parishes Infested
Ascension
Assumption
Beauregard
Calcasieu
Cameron
East Baton Rouge
Iberia
Jefferson
Jefferson Davis
Lafayette
Lafourche
Ouachita
Orleans
Plaquemines
St. Bernard
St. Charles
St. James
St. John the Bap
St. Martin
St. Mary
St. Tammany
Tangipahoa
Terrebonne
Vernon
West Baton Rou
Expected Infestation in Near Future
Acadia
Iberville
Livingston
St. Martin
Vermilion
Washington

Hurricane Katrina Response

Approach for Conducting Source Emission Characterization Tests of Open Burning of Vegetative and Demolition Debris

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Background

Given the enormous amount of vegetative, building, and demolition debris created by Hurricane Katrina, and the limited solid fuel capacity of industrial and commercial incineration facilities, open burning will be a key means of reducing the volume of waste to be disposed of. One of the more serious problems associated with Katrina is the huge number of homes, many of them older homes, that will have to be demolished and disposed of. Many of these homes likely contain asbestos, and safely demolishing the structures and disposing of the debris presents a significant challenge, particularly when using open burning as a means of disposal.

Unfortunately, there is relatively little reliable and quantitative information that can be used as a guide for ensuring that open burning processes are conducted so as to minimize the risk to health and the environment. Although there are reliable data on temperature requirements for thermal transformation of asbestos from chrysotile to the less harmful forsterite, there are no data that provide guidance on ensuring such temperatures in an open burning environment. There are also other pollutants that will be emitted from open burning sources that need to be characterized. In addition to criteria pollutants such as CO and PM (including PM_{10} and $PM_{2.5}$), it is likely that both vegetative and demolition debris will emit chlorinated organic compounds, including PCBs and polychlorinated dioxins, metals such as lead or mercury, and other gaseous pollutants such as HCl, SO2, and possibly H2S.

The purpose of this document is to outline an approach to developing the information needed to create effective and credible guidelines for open burning disposal of asbestos-contaminated demolition debris as well as for other materials that are likely to be disposed of via open burning. Such information must be developed with both the immediate needs in mind as well as future information needs, to ensure that EPA and other disaster response agencies are not in the same position of having inadequate information in the future. This information must also be developed within the context of minimizing interfering with ongoing restoration activities.

Required Measurements

Air Emissions Concentrations of the compounds below will be measured in the plume of the open burn pile, pit, or firebox:

Carbon monoxide (CO)	Carbon dioxide (CO_2)	Polychlorinated dioxins (PCDDs) and furans (PCDFs)
Particulate Matter mass (PM_{10}, $PM_{2.5}$)	Total hydrocarbons (THC)	
Lead (Pb)	Polycyclic aromatic hydrocarbons (PAHs)	Polychlorinated biphenyls (PCBs)
Mercury (Hg)	Benzene, toluene, ethylene, xylenes (BTEX)	Styrene
Asbestos (chrysotile and forsterite)	HCl, H2S, SO2	Phenol

Burning Debris Bed Temperature Temperature of the burning debris bed is a critical parameter in the transformation of asbestos to forms that are much less toxic than those in building materials. Mean temperatures (defined below) will be recorded during open burning operations, and are particularly important during emissions sampling activities.

Bottom Ash Analyses Materials that remain in the bottom ash will determine the appropriate solid waste disposal requirements. Samples of bottom ash remaining after (1) ash is removed from a pit or firebox; or (2) after a one-time burn at a pile or pit will be collected and analyzed for lead (Pb), mercury (Hg), and copper (Cu), and subjected to the Toxicity Characteristics Leaching Procedure (TCLP).

In addition, bottom ash will be analyzed for asbestos concentration and speciation (chrysotile and forsterite) through a modification to EPA bulk Method for Determination of asbestos in Bulk Building Material (EPA/600/R-93/116, July 1993). Under this modification, first examine the ash by PLM (Polarized Light Microscopy) for identification of any unburned chunks, followed by a washing step. Then filter the wash and examine that by Transmisssion Electron Microscopy (TEM) using ISO 10312:1995 Ambient Air-Determinations of Asbestos Fibres-Direct Transfer Transmission Electron Microscopy Method.

Debris Analysis It is expected that emissions will vary significantly as the composition of the debris varies. It is therefore critical to gain additional understanding of the debris composition. Given the physical size of the debris, standard solid grab sampling approaches are not likely to be appropriate. The debris must be characterized, in qualitative terms at a minimum, in terms of an estimated fraction of vegetative vs. building and demolition debris, estimates of wallboard, insulation, roofing, aggregate, blocks and bricks, and other major building components. Presence of electrical wiring, plumbing, furniture, and other debris should also be determined.
The weight, volume, and degree of wetness of the debris will need to be measured or estimated.

Measurement Methods and Approaches

General Approaches Source sampling should be coordinated with ambient sampling to allow correlation between source and ambient concentrations to the extent possible. Testing will need to be coordinated with cleanup and recovery activities to ensure that source sampling does not interfere with proper disposal of debris.

Measurements should be collected for several different debris compositions (vegetative only, vegetative and demolition, and at least two demolition only) and for different open burning approaches (pit air curtain, firebox air curtain, and open pile). Given the heterogeneous nature of the debris, the transient nature of the ACD operation, and the inherent variability in open burning operations, it will be necessary to perform at least triplicate experiments on each individual run condition so that experimental precision can be assessed.

Air Emissions Direct sampling of the open burn plume is the desired approach. This can be achieved by use of a boom that holds the sampling system in the plume. The boom should have the capability to be moved to maintain the sampling probe as close to the center of the plume as possible. It is not anticipated that a "traverse" approach will be taken, given the high variability that is expected to be seen even in a single location as the plume moves. The boom shall include both the sampling probe as well as temperature instrumentation.

Standard EPA sampling methods will be used to the extent possible, and will be modified or adapted as needed, in consultation with OAQPS Emissions Measurement Center . These methods were primarily designed for use in stack sampling situations and may need to be modified to operate as desired.

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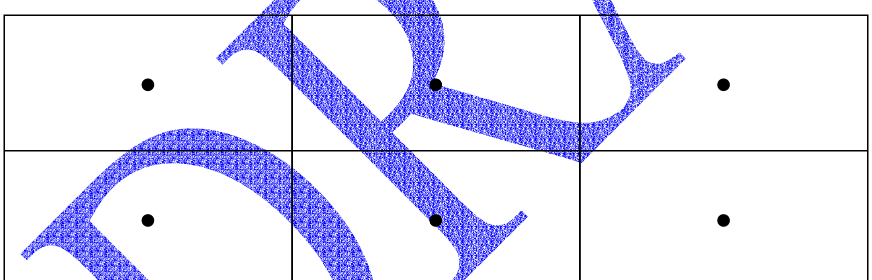
Continuous CO and CO_2 monitors can be used, as well as continuous monitors for total hydrocarbons (THCs).

PM will include both filterable and condensable fractions. PM size distribution measurements will be made using cascade impactors. If adequate power is available, mobility and aerodynamic particle sizers can provide valuable information, but are not as field-ready as impactors. PM samples will also be analyzed to determine the split between elemental and organic carbon.. It may be possible to perform additional physical/chemical analysis on the impactor stages, including assessment of airborne asbestos emissions.

Open-path remote sensing such as FTIR or DOAS can also be used to measure IR- and UV-absorbing VOC species, some two-ring PAHs, as well as HCl, CO, CO_2, nitrogen species, H_2S, and SO_2. These open-path methods can be installed across the top of the ACD, giving real-time measurements of the distribution of the pollutants in the plume.

Sampling of the ACD plume for asbestos is a challenge. An alternative approach to be considered is use of a long stainless steel tube to reach into the plume and continuously withdraw air. At ground level, the tube would be coiled a number of times and immersed in an ice bath to serve to cool the air before it entered the filter. Analysis would be by TEM using ISO 10312:1995 Ambient Air-Determinations of Asbestos Fibres-Direct Transfer Transmission Electron Microscopy Method.

Burning Debris Bed Temperature Measurements of temperatures in the burning debris bed will reflect the mean temperature across the bed. Remote IR thermometers will be used to take bed measurements at a minimum of six locations, equally spaced across the bed (see below). During plume sampling, temperature measurements will be taken every 15 minutes. The aiming locations of the measurements should remain the same for each 15 minute interval.



● – point at which temperature measurement will be taken

Bottom Ash Analyses Samples of the ash that accumulated during the burn from which emissions were sampled should be collected after completion of the burn. Samples should be collected from the center and each end of the firebox or burn pit, and from the top and bottom of the accumulated ash, and well mixed together. Equal amounts of ash should be collected from each point. Ash will be analyzed for asbestos, mercury, and lead, as well as for leachable toxic metals by TCLP. Ash samples will be archived for future analyses needs that may arise.

Debris Analysis At a minimum, mass/volume and visual analysis of the debris is necessary. Photographs of the debris piles from which the open burn is being fed would be very helpful in allowing more detailed visual evaluation of the debris composition. Where possible, samples of the debris should be pulled from the storage pile, choosing samples that appear to represent the composition of the larger pile. In the current situation, this may include sections of walls or other samples of similar size. While it is desirable to collect portions of the debris for detailed

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compositional analysis, care must be taken to follow adequate safety measures associated with handling and disposal of asbestos-containing materials. A qualitative assessment of the moisture content of the debris will be made.

Quality Assurance Requirements

In general, QA Level III requirements established by EPA/ORD/NRMRL will be used for field sampling activities. Although it is desired to perform these tests at a higher QA level, such as Level II, given the visibility and compliance implications of the tests, the fact is that the test methodologies will be largely based on adaptations and modifications of standard EPA test methods, so it will not be possible to satisfy all of the requirements of a Level II QA project. Close consultation with QA personnel will be ongoing throughout the process, and where possible, audits and test documentation will be performed similar to those done at Level II QA. A complete Quality Assurance Project Plan will be developed and approved prior to conducting actual testing.

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Appendix C

AIR MONITORING AND CONTINGENCY PLAN
for Hurricane Katrina Debris Activities
Louisiana

September 2005

DRAFT

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1.0 INTRODUCTION

1.1 Background

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, and tasking by the Federal Emergency Management Agency (FEMA) under Emergency Support Function (ESF) 10, *Hazardous Materials* of the National Response Plan, the U.S. Environmental Protection Agency (EPA) has prepared this Air Monitoring and Contingency Plan (AMCP) for Hurricane Katrina Debris Activities to assess decontamination and demolition activities in areas where floodwaters from Hurricane Katrina have receded.

The proposed disposal plans call for hurricane debris to be segregated by removing household hazardous waste, white goods. The remaining construction debris identified during cleanup following Hurricane Katrina will be burned in open pits and incinerators. Proposed debris burn sites are in the process of being identified at this time; however, it is anticipated they will be in the New Orleans metropolitan area and surrounding parishes in southern Louisiana. This plan summarizes the technical scope of work proposed to conduct ambient air sampling.

Controlled burns of segregated debris using air curtains technology has been approved as the disposal method for some Hurricane Katrina debris. By-products of combustion at these burn sites have a potential migrate off-site and may pose a risk to both Human Health and the Environment. A thorough investigation of the health risks requires integrated 24-hour air sampling downstream from burn sites. Due to time constraints, equipment and laboratory availability, budget, and potentially large number of burn sites, it is proposed that the evaluation be limited initially to a small number of separate burn sites that will process specific fuel types (i.e., brush, mixed brush & household, sorted construction/demolition debris, etc.). If downwind emissions from a particular fuel mix do not pose a hazard, the data may be used to determine whether or not similar fuels can be burned without intensive monitoring.

This AMCP describes the technical scope of work to be completed as part of this Emergency Response. The objective of this sampling and monitoring is to determine the nature and type of contaminants that may 1) have impacted disaster areas due to migration of hazardous materials by flood, 2) be present as a direct result of decontamination, demolition, excavation, and waste handling activities, 3) be present as a direct result of the burning of the debris. Further assessment may be warranted based on the results of this sampling and monitoring and/or if the particular area is located near an area of potential concern (such as an area of known chemical storage), and will be addressed in site specific Project Plans.

In addition, the information collected during this phase may be used to develop a plan for further detailed sampling of residential/industrial areas in the affected parishes. Specific sample locations will be determined on a site-specific basis prior to commencing decontamination/demolition activities.

1.2 Project Objectives

The purpose of this plan is to evaluate the effect of building decontamination, demolition, removal, excavation, and waste handling activities, as well as, the effect of debris burns on the surrounding community through the use of real-time air monitoring, and air sampling.

Air monitoring will be performed to measure the presence of volatile organic compounds (VOCs) and particulates in real time. Air sampling will be performed to identify airborne concentrations of asbestos, metals, particulates with an aerodynamic diameter less than or equal to a nominal 10 microns(PM_{10}) and particulates with an aerodynamic diameter less than or equal to a nominal 2.5 microns ($PM_{2.5}$),semi-volatile organics (SVOCs)/polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and particulate mercury, and to quantify potential emissions during the handling of all aspects of the hurricane debris. Airborne concentrations of contaminants will be monitored and sampled at upwind background location and at the Site perimeter. This AMCP shall remain in effect during all decontamination, demolition, excavation and waste handling activities.

Ambient air sampling will be conducted for the following constituents:

- PAH/SVOCs by NIOSH 5515 (analyte list may be extended)
- Volatile Organic Compounds (VOCs) by NIOSH 1500, 1501, 1003
- PM10
- PM-2.5 for particulate and metals (same filter)
- Mercury, particulate
- Asbestos fibers and mineral fragments that are the same size and shape by a modified AHERA method
- Other fixed gases as indicated by the waste stream and analytical data

Principal objective of the program is to provide information to the appropriate officials who are responsible for determining if the debris handling and burns may affect public health.

This plan is in addition to and in support of the Regional Air Sampling Plan for Hurricane Katrina (RASP) and the Concept Plan for Ambient Air Monitoring after (CPAAM)

1.3 Scope

The AMCP specifies air monitoring requirements (i.e., locations, frequencies, and parameters) for the Hurricane Katrina Decontamination/Demolition, Removal/Remedial Action. The AMCP provides for the protection of off-site areas. This AMCP will specify the minimum requirements for real-time and residential monitoring. The AMCP contains sufficient details to address sample collection, management, and analysis. However, specific sampling locations will be based on site-specific characteristics (topography, buildings, access to power, predominant wind directions, etc.).

Agencies and contractors performing various aspects of demolition work will be responsible for developing their own exposure monitoring plans and for conducting their own personal monitoring for appropriate work activities. Personal monitoring will be conducted to estimate potential exposure and quantify airborne concentrations of contaminants likely generated by their work per Occupational Safety and Health Administration (OSHA) requirements. OSHA will likely be available to partner with contractors and agencies to fulfill these requirements.

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This sampling is for protection of off-site areas. Off-site or perimeter sampling will be performed by the US EPA or its contractors in cooperation with Louisiana Department of Environmental Quality and local jurisdictions. Ambient air monitoring and sampling will be conducted at the site perimeter, as well as up and down wind of site activities, including waste load out, decontamination stations and other locations of interest (potential emissions).

2.0 OVERVIEW OF DECONTAMINATION/DEMOLITION ACTION

This portion of the Hurricane Katrina project involves the decontamination, demolition, excavation, containerization, transportation and disposal, including air curtain incineration of materials potentially contaminated with asbestos (and other minerals), metals, VOCs, SVOCs/PAHs, PM_{10}, $PM_{2.5}$ and particulate mercury.

3.0 APPROACH

The AMCP portion of the project will be organized as follows:

- Real-time air monitoring on-site (as needed for emergency purposes)
- Perimeter real-time air monitoring to determine potential off-site migration
- Perimeter/rural/residential air sampling to determine potential off-site impacts

4.0 SAMPLING NETWORK

Air sampling locations will be contingent upon site specific conditions, and may vary from day to day, based on meteorological conditions and forecasts. Short term (1 to 2 months) monitoring events cannot rely on climatological data for location placement. These events will require the use of an on-site meteorological tower and/or a daily local weather forecast. Long term (>6 months) monitoring events may be able to utilize monthly, seasonal, or annual climatological data for monitor placement. Due to varying meteorological conditions, sample locations may be upwind one day and downwind the next.

The distribution of the sampling locations is dependent upon the locations of the burn sites Particular attention will be paid to the refineries and other industries that are operating under emergency conditions. Attention will also be given to rural residential burn sites that may be occurring. One or two locations may be identified to provide a reliable background characterization for several of the target burn sites. Additionally, air monitoring data from the RAMP and information from the CPAAM after Hurricane Katrina will be employed in the decision- making process and interpretation of data.

General considerations that should be taken into account include: vertical placement above the ground, horizontal spacing from nearby obstructions, unrestricted air flow, and distance from roads. (USEPA 1990). Sampling locations should also take into account the effects of local topography on day/night wind shifts (i.e. sea/land breeze, valley/mountain breeze). Also the potential impact from upwind or background sources should be considered. (USEPA 1995).

4.1 Air Monitoring

Air monitoring for particulates near a site may be performed for comparison with established action levels to determine the need for additional suppression measures or work stoppage. This

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real-time particulate monitoring may be conducted at sampling locations, which will be determined on a site-specific basis.

4.2 Air Sampling

4.2.1 Perimeter/Fence Line Sampling

Perimeter/fence line sampling will be performed to gauge the effectiveness of the on-site dust control program and to estimate off-site migration of contaminants of concern. Considerations to take into account include predominant wind direction, areas near suspected high contamination, accessibility, security,representativeness, and access to electrical power.

4.2.2 Residential Sampling

As an added measure of safety, a residential sampling program may be instituted. Locations to be considered shall include the nearest resident/habitable building, and sensitive receptors. Sensitive receptors should include daycare centers, schools, parks, hospitals, as well as areas proximal to suspected elevated contamination. Site perimeter reconnaissance may reveal additional local concerns. The requirements for residential sampling will be determined once sites have been identified.

4.3.3 Air Sampling Locations

Sampling locations shall be identified for each site. It is anticipated that locations will include up to two upwind or reference sampling locations, up to four downwind decontamination/demolition/excavation perimeter samples and up to three residential locations (including sensitive receptors).

The Environmental Unit Leader or designee shall determine the number of downwind perimeter and residential sampling locations based on , operable unit dimensions, topography and best professional judgment.

5.0 FREQUENCY OF MONITORING AND SAMPLING

5.1 Frequency of Air Monitoring

Perimeter/fence line and debris burn particulate monitoring may be conducted when decontamination, demolition, and excavation activities are occurring, to determine the effectiveness of the on-site dust suppression program and effectiveness of the air curtain incinerators.

5.2 Frequency of Air Sampling

Air sampling for potential contaminants (excavation, perimeter, fence line, and residential) will be conducted at two burn sites daily during debris operations. A third set of "floater" sampling equipment will be available for deployment, as needed, in areas that may require immediate attention.

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6.0 METHODOLOGIES

6.1 Air Monitoring for Particulates Methodology

Particulates will be monitored either utilizing the Thermo MIE DataRAM Real-time Aerosol Monitor or an instrument with an equivalent range and sensitivity. The DataRAM is a high sensitivity nephelometric monitor whose light-scattering sensing configuration is optimized for the measurement of the concentration of airborne dust, smoke, fumes, and mists in ambient environments. The instrument samples the air at a constant flow rate by means of a diaphragm pump and passes the sampled air through the optical sensing stage. The DataRAM covers a range of measurement from 0.1 Fg/m^3 to 400 milligrams per cubic meter (mg/m^3) with monitoring information being logged internally. The PM_{10} attachment will be used with these instruments.

6.2 Air Sampling

Ideally, all air sampling will be performed over a maximum operational period of 24 hours. However, if the site-specific activity, that is being monitored, operates for less than 24 hours, sampling may cease when on site activity ceases. Asbestos by a modified Asbestos Hazard Emergency Response Act (AHERA) and ISO 10312Air sampling for asbestos and mineral fragments (that are the same size and shape) will be conducted using ERT standard operating procedure (SOP) #2015, *Asbestos Sampling.* For all asbestos sampling locations, an asbestos sampling train consisting of 0.8 micron (Fm), 25-millimeter (mm) mixed cellulose ester (MCE) filter connected to a sampling pump will be used. The top cover from the cowl extension on the sampling cassette shall be removed ("open-face") and the cassette oriented face. An SKC or equivalent sampling pump will be calibrated to collect approximately 1 liter per minute (L/min) of air through the filter. Over a 24 hour period, this flow rate will allow a target volume of 1440 liters (L) and provide a sensitivity limit of less than or equal to 0.01f/cc. One 24-hour sample will be collected per day. Samples will be archived for International Organization for Standardization (ISO) Method 10312, *Ambient Air- Determination of Asbestos Fibers: Direct Transfer Transmission Electron Microscopy Method* should additional information be required. It is anticipated that air samples will be analyzed by ISO 10312 at a rate of 2 percent (%) of the phase contrast microscopy (PCM) analysis.

PAH/SVOC Air Sampling. Ambient air samples for PAHs/SVOCs analysis will be collected using SKC (or equivalent) personal air sampling pumps and either 150-milligram (mg) or 600-mg washed XAD-2 solid sorbent tubes fitted with a 2- µm, 37-mm Teflon (PTFE) filter cassette. Sampling flow rate will be set at 1 L/min. Sampling procedures will follow guidelines established in modified NIOSH Method 5515, *Polynuclear Aromatic Hydrocarbons by GC.*

VOCs by NIOSH Methods 1500, 1501 and 1003. Ambient air samples for VOC analysis will be collected using SKC (or equivalent) personal air sampling pumps and either 150-mg or 600- mg charcoal tubes. Sampling flow rate will be set at 1 liter per minute (L/min). Sampling procedures will follow guidelines in REAC SOP #2103, Charcoal Tube Sampling in Ambient Air and in modified NIOSH Methods 1501, *Aromatic Hydrocarbons*; 1500, *Hydrocarbons BP 36°-126°C*; and 1003, *Halogenated Hydrocarbons.*

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Metals by NIOSH Method 7300. Ambient air samples for metals analysis will be collected using SKC (or equivalent) personal air sampling pumps and a 0.8-µm pore size 37-mm MCE filter cassette. Sampling flow rate will be set at 1 L/min. Sampling procedures will follow the guidelines established in NIOSH Method 7300, *Elements, ICP*.

Particulate Mercury by NIOSH Method 7300. Ambient air samples for particulate Hg analysis will be collected using SKC (or equivalent) personal sampling pumps and a 0.8-µm pore size 37-mm MCE filter cassette. Sampling flow rate will be set at 1 L/min. Sampling procedures will follow the guidelines established in modified NIOSH Method 7300, *Elements.*

PM2.5 Sampling. On-site PM2.5 sampling will be conducted over a 23- to 25-hour period using a polytetrafluoroethylene (PTFE) pre-conditioned and pre-weighed filter. The mass concentration of PM2.5 in the ambient air will be computed as the total mass of collected particles in the PM2.5 size range divided by the actual volume of air sampled expressed in micrograms per cubic meter (µg/m3). This is contingent upon the availability of AC power.

PM10 Sampling. On-site PM10 sampling will be conducted over a 23- to 25-hour period using a PTFE pre-conditioned and pre-weighed filter. The mass concentration of PM10 in the ambient air will be computed as the total mass of collected particles in the PM10 size range divided by the actual volume of air sampled expressed in micrograms per cubic meter (µg/m3). This is contingent upon the availability of AC power.

7.0 METEOROLOGICAL MONITORING

To document local area wind flow (upwind, downwind, and background) conditions meteorological monitoring must be performed. A meteorological monitoring station will be set up in a location representative of the area where on-site activities will be performed. A tower will be erected to monitor wind speed, wind direction, barometric pressure, temperature, solar radiation, and rainfall. All meteorological parameters will be situated and measured in accordance with the "Quality Assurance Handbook for Air Pollution Measurement Systems" Volume IV: Meteorological Measurements (March, 1995).

For short-term duration projects, such as these (assuming each individual site takes less than 6 months), a portable 3-meter meteorological tower will be deemed acceptable. In order to maintain valid measurement data, meteorological sensors are required to be field calibrated periodically and factory calibrated annually, with the exception of the solar radiation sensor that must be calibrated every two years.

7.1 HISTORICAL METEROLOGICAL DATA

The proper selection of upwind background sampling locations is essential to the evaluation of burn site impacts separate from other emission sources. At a minimum, it is anticipated that wind rose information will be of value in defining the predominant upwind location to be used as a background location. Figure 1 depicts the annual wind rose from 1985 through 1995 for the airport in New Orleans, LA. Figure 2 displays the seasonal wind rose for the months of September through December from 1985 through 1995

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for the airport in New Orleans, LA. Due to the variability of the historical meteorological data for New Orleans, the wind directions, and hence the suitability of the background locations, will be assessed on a regular basis to ensure that the background location is still appropriate. Where appropriate, short term or long term adjustments to the location of the background sample locations will be made to address wind direction variability.

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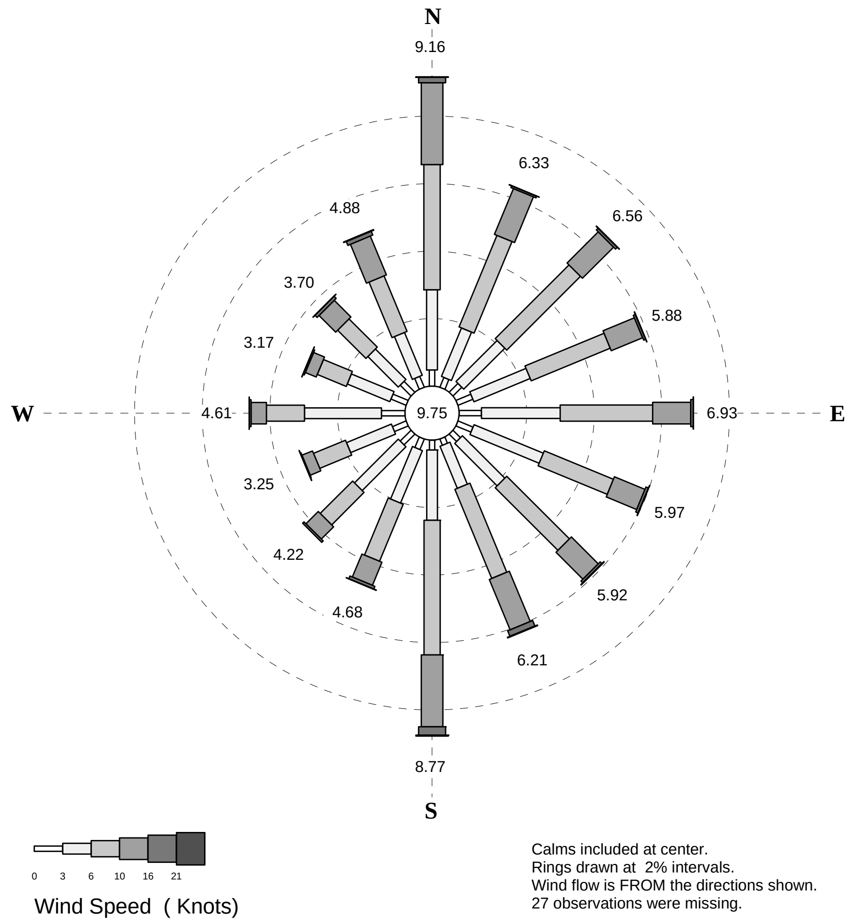
Figure 1
Annual Wind Rose

Wind Rose
New Orleans International
1985-1995
All Months



Calms included at center.
Rings drawn at 2% intervals.
Wind flow is FROM the directions shown.
27 observations were missing.

PERCENT OCCURRENCE: Wind Speed (Knots)
LOWER BOUND OF CATEGORY

DIR	0	3	6	10	16	21
N	0.48	2.37	3.71	2.42	0.16	0.01
NNE	0.31	1.55	2.94	1.47	0.05	0.01
NE	0.37	1.72	3.09	1.30	0.07	0.01
ENE	0.48	1.80	2.53	1.01	0.06	0.01
E	0.66	2.33	2.73	1.12	0.08	0.01
ESE	0.48	2.22	2.21	0.98	0.08	0.01
SE	0.31	1.78	2.62	1.12	0.07	0.02
SSE	0.20	1.34	2.86	1.62	0.18	0.02

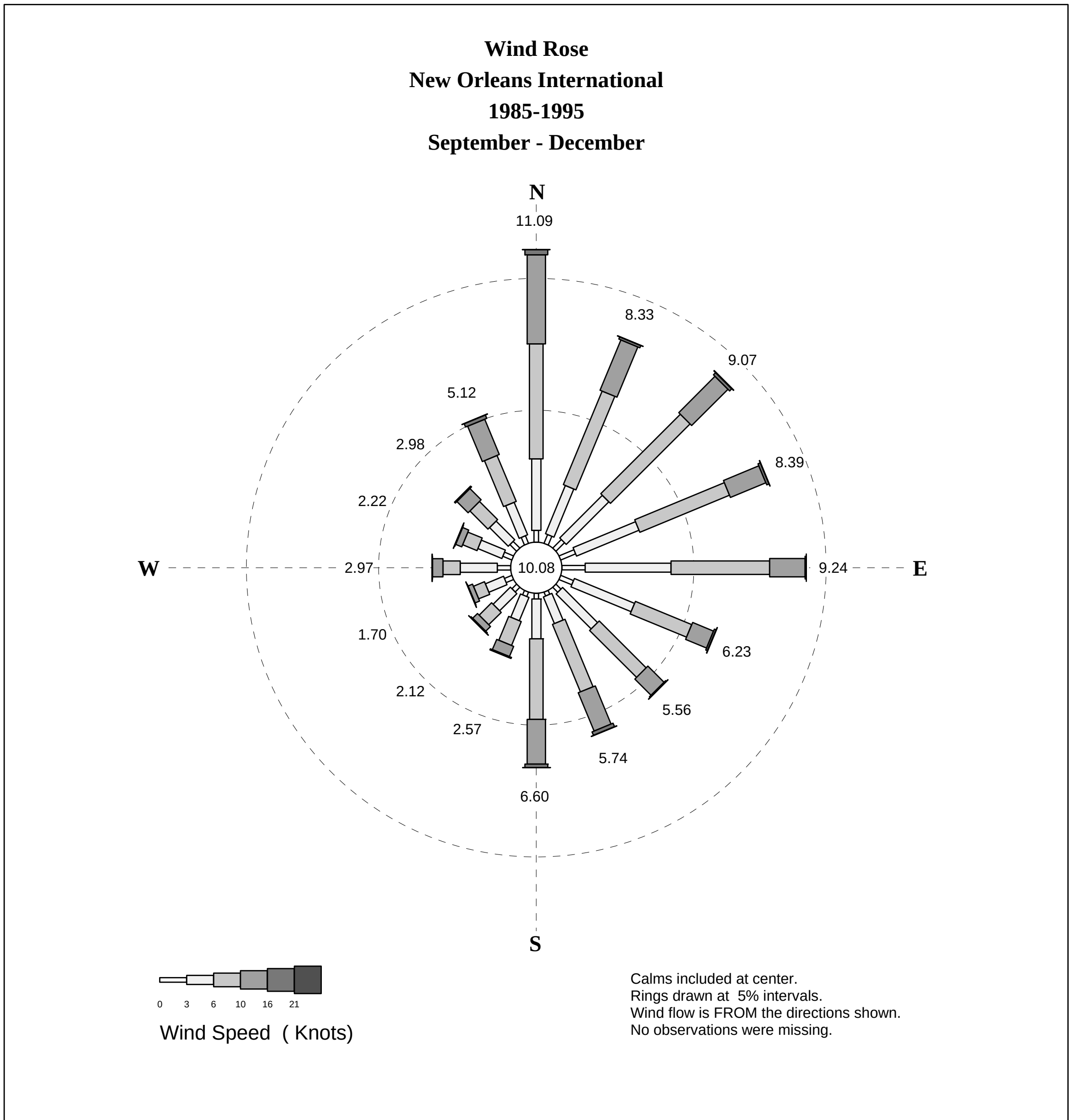
TOTAL OBS = 96380 MISSING OBS = 27

PERCENT OCCURRENCE: Wind Speed (Knots)
LOWER BOUND OF CATEGORY

DIR	0	3	6	10	16	21
S	0.29	2.08	3.99	2.13	0.25	0.03
SSW	0.34	1.68	1.83	0.74	0.09	0.01
SW	0.45	1.83	1.36	0.51	0.06	0.00
WSW	0.44	1.43	1.03	0.34	0.02	0.00
W	0.70	2.27	1.13	0.46	0.05	0.00
WNW	0.48	1.37	0.93	0.35	0.04	0.00
NW	0.45	1.28	1.19	0.70	0.09	0.00
NNW	0.35	1.37	1.78	1.24	0.12	0.02

CALM OBS = 9400 PERCENT CALM = 9.75

Figure 2
Seasonal Wind Rose



PERCENT OCCURRENCE: Wind Speed (Knots)
LOWER BOUND OF CATEGORY

DIR	0	3	6	10	16	21
N	0.45	2.71	4.35	3.37	0.20	0.01
NNE	0.36	1.97	3.84	2.06	0.09	0.01
NE	0.46	2.28	4.26	1.94	0.11	0.02
ENE	0.61	2.56	3.67	1.45	0.09	0.01
E	0.88	3.24	3.73	1.34	0.04	0.00
ESE	0.52	2.46	2.31	0.86	0.07	0.02
SE	0.27	1.87	2.51	0.87	0.03	0.01
SSE	0.16	1.09	2.77	1.57	0.14	0.01

TOTAL OBS = 32208 MISSING OBS = 0

PERCENT OCCURRENCE: Wind Speed (Knots)
LOWER BOUND OF CATEGORY

DIR	0	3	6	10	16	21
S	0.21	1.51	3.05	1.70	0.13	0.00
SSW	0.18	0.95	0.98	0.42	0.04	0.00
SW	0.25	0.92	0.67	0.25	0.03	0.00
WSW	0.30	0.75	0.45	0.18	0.02	0.00
W	0.50	1.40	0.66	0.39	0.01	0.00
WNW	0.37	0.99	0.59	0.25	0.02	0.00
NW	0.36	1.00	0.97	0.60	0.05	0.00
NNW	0.31	1.33	1.88	1.45	0.14	0.01

CALM OBS = 3245 PERCENT CALM = 10.08

8.0 DATA QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT OF DATA

The purpose of the air sampling for contaminants is to produce data that are, as reasonably possible, an accurate representation of the current levels of airborne contaminants which may be released during site decontamination/demolition activities. These data may be used for a variety of purposes, including the development of human health risk assessment and the evaluation of the adequacy of current measures that have been implemented to protect the public from excessive exposures.

Contaminated material may have been dispersed throughout the Southern Louisiana area. Additionally, numerous properties are anticipated to contain hazardous materials ranging from asbestos to metals. Therefore, there is a need to determine whether these sites could result in an inhalation exposure that poses a health hazard for individuals in the vicinity of the site.

The detection limits (DLs) for air sampling for asbestos will be 0.005 structures per cubic centimeter (s/cc) by AHERA. Lower DLs may be achieved by adjusting the flow rates to obtain maximum loading or by increasing the number of grid openings read. In the event of less than 1400 liters of sample being collected analytical sensitivity can still be met by consulting the following table:

Volume (Liters)	Number of Grid openings to be analyzed
560	24
600	23
700	19
800	17
900	15
1000	14
1100	12
1200	11
1300	10
1400	10

Two of the three data categories (DCs) based on the two Superfund Data Categories described in the 1993 Office of Solid Waste and Emergency Response (OSWER) Office of Emergency and Remedial Response (OERR) Directive will be used for this WA.

Screening data (SD) is typically used to evaluate the ambient air within the breathing zone for particulates. Screening data without definitive confirmation is not considered to be "data of known quality." The following requirements for "SD" are applicable:

- Sample documentation in the form of field logbooks and appropriate field data sheets. Chain of custody (COC) records are optional for field screening locations.

- All instrument calibration and/or performance check procedures/methods will be summarized and documented in the field/personal or instrument log notebook. The manufacturer's instructions or SOPs should specify the procedure and frequency for calibration during use.

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- Detection limit(s) will be determined and documented, along with the data, where appropriate.

Definitive data is used for all data collection activities that require a high level of accuracy using EPA, NIOSH, American Society for Testing and Materials (ASTM), and other industry-recognized methods. For the data to be definitive, either total measurement error or analytical error must be determined. The following requirements for "Definitive Data" are applicable:

- Sample documentation in the form of field logbooks, the appropriate field data sheets, and chain of custody forms will be provided.

- All instrument calibration and/or performance check procedures/methods will be summarized and documented in the field/personal or instrument log notebook.

- Detection limit(s) will be determined and documented, along with the data, where appropriate.

- Sample holding times will be documented; this includes documentation of sample collection and analysis dates.

- Initial and continuing instrument calibration data will be provided.

- For air samples, field blanks will be included for each day sampling is performed for each analysis. Lot blanks will be included for each lot of sample media used for each analysis.

- Performance Evaluation (PE) samples are optional.

- Analyte identification will be confirmed on 100% of the samples by analytical methods associated with definitive data.

- Quantitation results for all samples will be provided.

- Analytical or total measurement error must be determined on 100% of the samples.

- Analytical error determination measures the precision of the analytical method.

- At a minimum, two media blanks, prepared and analyzed in accordance with the method, calculated and compared to method-specific performance criteria, as applicable.

- Total measurement error is determined from independently collected samples from the same location and analyzed by analytical methods associated with definitive data. Quality control parameters such as the mean, variance, and coefficient of variation is calculated and compared to established measurement criteria.

The number of samples to be collected for this project is presented in Table 1 site , *Field Sampling Summary - Air*, and Table 2, *Analysis and Data Categories Summary - Air*. These tables identify analytical parameters desired; type, volume and number of containers needed; preservation requirements; number of samples to be collected; and associated number and type of QC samples based on the data category.

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9.0 DOCUMENTATION

Documents and records that may be generated during this project include:

- HASP
- QAPP
- Laboratory, site log books
- Site map
- Sample labels
- Chain of Custody (COC) forms
- Custody Seals
- Air Sampling Work Sheets
- Instrument printouts
- Data reduction records
- Data assessment forms
- Laboratory analytical reports
- Data Validation Records

All documentation will be recorded in accordance with standard operating procedures.

10.0 SAMPLE PACKING, SHIPPING, AND DOCUMENTATION

The samples will be sent under (COC) to the laboratory for analysis. Scribe will be used for sample management. COC records will be used to document the collection of all air samples. All COC records will receive a peer review in the field prior to shipment of the samples in accordance SOPs. At least two custody seals will be placed across the canister shipping containers to ensure sample integrity.

~~10.1 Cooler Preparation~~

In preparation for sample shipment

- Plastic coolers, or similar, will be used for each sample shipment;
- Coolers shall be inspected prior to shipment for cleanliness;
- All cooler drain plugs will be sealed with tape;
- All previous shipping labels will be removed.

10.2 Packing Samples in Coolers

Each sample will be placed in an individual container

10.3 Closing and Shipping of Coolers

Sample documentation will be enclosed in sealed plastic bags taped to the underside of the cooler lid. Coolers will be secured with packing tape and custody seals as described below:

- Cooler lids will be taped shut with strapping tape, encircling the cooler several times;
- Chain of custody seals will be placed on two sides of the lid after closing the lid (one in front and one on the side);
- “This Side Up” arrows will be placed on the sides of the cooler; and
- Coolers will then be shipped to the laboratory by overnight courier as soon as possible. Daily shipments are required to obtain 24-hour turn around required for the Hurricane Katrina site.

11.0 REFERENCES

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TABLE 1. Field Sampling Summary - Air
Hurricane Katrina Site
Southern Louisiana

Analytical Parameter	Sampling Media	Suggested Holding Times	Flow Rate	Volume Min - Max	Subtotal Number Samples
AHERA Asbestos	0.8 µm 25 mm MCE Filter	30 Days	1 L/min	1440 L	~25-35/day
$PM_{2.5}$	PTFE filter	NA	16.7 L/min	24000 L	~8/day
PM_{10}	PTFE filter	NA	16.7 L/min	24000 L	~8/day
VOCS	Charcoal Tubes	14 days	1 L/min	1440L	~25-35/day
PAHs/SVOCs	XAD-2 Tubes	14 days	1 L/min	1440 L	~25-35/day
Metals	MCE filter cassette	6 months	1 L/min	1440 L	~25-35/day
Particulate Hg	MCE filter cassette	21 days	1 L/min	1440L	~25-35/day

Fm = micrometer
L = liter
L/min = liters per minute
N/A = not applicable
ISO = International Organization of Standardization
TEM = Transmission Electron Microscopy
NIOSH = National Institute of Occupational Safety and Health
mm = millimeter
MCE = mixed cellulose ester

TABLE 2. Analysis and Data Categories Summary - Air
Hurricane Katrina Response
September 2005

Analytical Parameter	Analytical Method	Estimated Limit of Detection[1]	Lot Blanks[2]	Field Blanks[3]	Collocated Samples[4]	Trip Blanks[5]	Breakthrough[6]	PE Samples[7]	Data Category[8]
Particulates	Vendor Operating Instructions	0.1 μg/m^3	NA	NA	NA	NA	NA	NA	SD
Total VOCs	Vendor Operating Instructions	~0.1 ppmv	NA	NA	NA	NA	NA	NA	SD
VOCs (Carbon Tubes)	Modified NIOSH Methods 1500, 1501, 1003	~2 - 8 μg/tube	1 per day	1 per 20 samples or per day	1 per 20 samples or per day	1 per 20 samples or per day	NA	NA	DD
PAHs/SVOCs (XAD Tubes)	Modified NIOSH Method 5515	~20 μg/tube	1 per day	1 per 20 samples or per	1 per 20 samples or per day	NA	NA	NA	DD
Metals (MCE Filter Cassettes)	Modified NIOSH Method 7300	~0.5 - 5.0 μg/filter	1 per day	1 per 20 samples or per day	1 per 20 samples or per day	NA	NA	NA	DD
Mercury (MCE filter cassette)	Modified NIOSH 6009	~0.01 μg/filter	1 per day	1 per 20 samples or per day	1 per 20 samples or per day	NA	NA	NA	DD
$PM_{2.5}$	40 CFR Part 50 Appendix L	TBD	1 per day	NA	TBD	NA	NA	NA	DD
PM_{10}	40 CFR Part 50 Appendix J and K	TBD	1 per day	NA	TBD	NA	NA	NA	DD

TABLE 2. Analysis and Data Categories Summary – Air (Cont'd)
Hurricane Katrina Response
September 2005

Analytical Parameter	Analytical Method	Estimated Limit of Detection[1]	Lot Blanks[2]	Field Blanks[3]	Collocated Samples[4]	Trip Blanks[5]	Breakthrough[6]	PE Samples[7]	Data Category[8]
Mercury (MCE filter cassette)	Modified NIOSH 6009	~0.01 μg/filter	1 per day	1 per 20 samples or per day	1 per 20 samples or per day	NA	NA	NA	DD

Asbestos (TEM)	40 CFR 763 SubPart E AHERA and ISO 10312	0.005 s/cc	1 per day	1 per 20 samples or per day	1 per 20 samples or per day	NA	NA	TBD	DD
$PM_{2.5}$	40 CFR Part 50 Appendix L	TBD	1 per day	NA	TBD	NA	NA	NA	DD
PM_{10}	40 CFR Part 50 Appendix J and K	TBD	1 per day	NA	TBD	NA	NA	NA	DD

SD = Screening data, SD/DC = Screening Data with Definitive Confirmation, DD = Definitive Data, ppbv = parts per billion by volume, NA = not applicable,
TAGA = trace atmospheric gas analyzer

1. To be determined by the person arranging the analysis. Should be equal to or less than the action level.
2. Required for all data categories at a minimum rate of 10 percent of the total sample or one per sampling event per lot.
3. Mandatory for Definitive Data at a minimum rate of 5 percent of the total sample or one per sampling event. Certain methods may require a greater frequency.
4. Required for all data categories at a minimum rate of 5 percent of the total sample or one per sampling event.
5. Optional for SD/DC and mandatory for DD at a minimum rate of 5 percent of the total sample or one per sampling event.
6. Recommended for SD/DC and DD. Rate is method dependent. Requirement for use is based on deviations from accepted protocol and atmospheric conditions.
7. Performance evaluation samples are optional for SD/DC and DD at one per parameter per matrix. For SD, enter "NA."
8. QA objective desired: SD, SD/DC, DD

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Overview Plan for Ambient Air Monitoring After Hurricane Katrina

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I. Introduction and Purpose

This document provides an overview of ongoing and planned ambient air monitoring in the areas affected by Hurricane Katrina, describing the various elements of the monitoring effort and how they relate to each in terms of objectives, timing, and methods. The monitoring effort is aimed at providing air quality data in situations in which air quality may be adversely affected by the direct storm effects (flooding, destruction of buildings and their contents, damage to industrial facilities, etc.) or by activities aimed at clean up, start-up of industrial facilities, infrastructure restoration, rebuilding, and reoccupation. This document identifies certain situations which appear to be priority candidates for ambient air monitoring, types of monitoring that will obtain appropriate data about air quality in these situations, and planned uses of the ambient data collected.

This document has been coordinated with more detailed technical documents that will be used by the Incident Management Team's Environmental Unit and other personnel who will actually implement and operate the monitoring systems described herein. These other documents include:

- Quality Assurance Sampling Plan for Operational Air Evaluations at the Hurricane Katrina Response in Louisiana, September 21, 2005.
- Air Monitoring and Contingency Plan forHurricane Katrina Debris Activities - Louisiana, September 2005.
- Putative Inhalation Risk Air Monitoring Plan – Hurricane Katrina Louisiana/Mississippi, September 2005.

The titles of these documents may change with their next revision.

It is reasonable to expect that as recovery operations progress, local air monitoring situations will change requiring flexibility and additional plan modification. Therefore, needs for specific situations which are not addressed by this document or those listed above (the ERT plans) will be developed by an appropriate organization with EPA guidance and amended to this Overall Plan. In particular, EPA may establish additional monitoring requirements to more specifically address asbestos demolition and disposal operations. EPA will coordinate the implementation of all monitoring to avoid duplication or interference of efforts.

Knowledge of the situation on the ground and of the post-storm plans of various units and levels of government is evolving, and will continue to shape the details of implementation such as specific monitoring sites, funding and staffing, sources of needed monitoring hardware, etc.[2] EPA Offices and the affected states will work together to address these dynamic concerns. The need to determine and address heath concerns will be addressed first with available equipment taking into consideration site conditions. The air pollutants identified in this plan for sampling and analysis shall be reviewed from time to time in light of the area conditions, availability of sampling and monitoring equipment, and site specific contaminates to be assessed.

An earlier draft of this document was the subject of a consultation with a workgroup of EPA's Science Advisory Board (SAB) held on September 14, 2005. The document has been revised in light of the comments received, and may continue to evolve. Information on the SAB review is posted at **http://www.epa.gov/sab/hurricane_katrina_wg_activities.htm.**

II. Air Quality and Public Health Situations Addressed

On August 29, 2005, Hurricane Katrina made landfall near New Orleans, Louisiana (LA) breaching the levees that protect the city from Lake Pontchartain. The hurricane also damaged the coastal regions of southern Louisiana, southern Mississippi, and southern Alabama. The storm and efforts to deal with its aftermath have or may create the following situations which are special interest from an air quality perspective.

Flooded Areas

The air quality in New Orleans and other areas in the three-state region that experienced flooding may be adversely affected by a mix of fuels and chemicals spilled as a result of storm damage. This situation is likely to be relatively short term as flood waters drain, volatile material evaporates away, and industrial facilities stabilize their operation. It has been noted that since flood waters in New Orleans are being transferred to Lake Pontchartrain, the lake may be a longer term source of both gas phase and particle phase pollution deriving from material that was mixed into the flood waters.

After flood waters are gone, the air quality may be affected by flood-contaminated dust that is re-entrained by vehicle traffic, construction/demolition equipment, etc. This situation may develop according to the number of people and equipment active in these areas, and may continue until contaminated dust is washed away naturally, removed, or otherwise stabilized. This dust may contain biological organisms, metals, and low volatility organic compounds

[2] Information on debris management plans for Louisiana is provided in *DEBRIS MANAGEMENT PLAN HURRICANNE KATRINA DR-FEMA-1603-LA,* September 2005. Information on debris management plans for Mississippi is provided in DEBRIS MANAGEMENT PLAN HURRICANNE KATRINA REGION4-EPA-MS. EPA has also issued guidance documents on demolitions and debris burning for Katrina-affected areas: *EMERGENCY HURRICANE DEBRIS BURNING GUIDANCE* and *DEMOLITION GUIDANCE FOR STRUCTURALLY UNSOUND BUILDINGS DAMAGED BY HURRICANE KATRINA.*

from spills. It was noted during the SAB workgroup consultation that the multiple spills and releases from Katrina may have produced mixtures of chemicals that have not been studied before, which may yield unexpected emission products when dust is resuspended.

Areas Damaged by Flood or Winds – Other Considerations

As chemical plants and refineries resume operation there may be high start-up emissions. While initial emergency response efforts will address known spills and continuing leaks, there is a possibility of less obvious fugitive leaks in pipes and tanks taking longer to identify and repair.

Air quality may also be affected by other pollutants created by recovery activity and natural processes such as decay of biomass. Pollutants may include SO2, H2S, VOCs, NOx, and particulate matter from portable generators and mobile sources used in the recovery.

It seems likely that the destruction of buildings by the storm itself did not release large quantities of asbestos, in that buildings were damaged by wind or water without pulverization. However, building demolition and debris loading may release lead from paint, asbestos from building materials, and other pollutants. Transportation of building and other non-biomass debris to disposal sites may also release contaminated dust from the transported loads. In areas that flooded, even "clean" biomass may be contaminated and release pollutants during handling and transport.

Open Burning of Biomass, Building Debris, and Other Debris

The volume of debris from the storm is so large that it interferes with recovery and rebuilding efforts. The responsible federal, state, and local agencies will be trying to dispose of debris quickly, but the effort is likely to take many months in some areas. As of this time, plans for clean up and disposal of debris from Hurricane Katrina are in the final stages of development of staging and burn site details in each affected state and are not well settled. The situation in New Orleans is particularly complex, given the large number of buildings damaged and the local interest in allowing business operators and residents to return in the near future.

In light of the uncertain and fluid situation, this draft plan contemplates that a variety of waste burning situations may occur. There may be some fixed-site open burning facilities established for disposal of wastes that will not be recycled or landfilled, with these wastes being transported to these sites by truck. These facilities are assumed to be operated or closely supervised by federal, state, and/or local government agencies. It is assumed that these facilities will remove from the burn stream any designated hazardous wastes where feasible, but that this exclusion will not be entirely effective. The burn stream may therefore contain some amount of such hazardous wastes as well as biomass from downed trees, dead animals, and various other anthropogenic wastes such as building demolition debris, commercial and household materials and products, etc. The degree of emissions control using equipment such as forced air curtains, if any, may vary from site-to-site and day-to-day. It is plausible that the number of these burning facilities may increase as debris removal efforts increase, and that such facilities may be in operation for as long as a year.

It is also likely that there will be open burning operations that will be active only long enough to deal with material in the immediate vicinity. Some of these may be permitted and supervised by a unit of government, but others may be conducted by individuals without formal approvals or permits. These may also involve a range of burned materials.

The complex mix of material that may be burned in all these situations means that emissions from the fixed-site facilities may contain various hazardous air pollutants. EPA anticipates that the organic compounds in smoke from open burning after Katrina will at least include all those observed in previous open burning studies but the relative amounts may be different. It was noted during the SAB workgroup consultation that the multiple spills and releases from Katrina may have produced mixtures of chemicals that have not been studied before, which may yield unexpected emission products when burned. Because of the possible presence of metals and asbestos in building debris, these may also be present in smoke from open burning after Katrina.

There may also be situations in which large quantities of a single type of material are burned, for example to dispose of wholesale quantities spoiled foodstuff and other ruined merchandise and materials. This may happen early during the recovery and be of short term duration.

Incineration of Dead Livestock

Dead livestock needs to be disposed of through burial and/or incineration. The US Department of Agriculture is working with its state counterparts on this issue. Where conditions allow it, carcasses may be buried. In some places, a high water table may prevent this, and carcasses may need to burned or transported out of the area.

III. Ambient Air Monitoring Program Objectives

The primary and most immediate objective of the monitoring program is to provide information for managing risks, in other words, to give people in the area – government officials, contractors, and private parties –information to guide their actions in ways that will reduce air concentrations and/or exposures whenever feasible to avoid unreasonable risks.

Information on air quality has already been used to identify chemical spills for the Incident Response Team to clean up. It will also be used, in conjunction with information on many other relevant factors such as drinking water supply, to guide government and private decisions about re-occupation. Air quality measurements near and downwind of specific clean up operations such as demolitions, debris handling, and open burning can provide valuable feedback to the management of those activities. Data might, for example, indicate that greater efforts are needed to separate material before burning. Air quality measurements may also suggest the existence of unexpected emission sources that need to be identified and addressed. The decision framework(s) and responsibilities for using air quality data in this way is beyond the scope of this document.

One risk management action that can be taken based on air quality is for individuals to change their activities, for example to avoid unusual physical exertion during periods or locations of higher air pollution. Also, individuals can seek medical advice if symptoms related to air pollution are experienced.

Given this primary objective, air monitoring should focus on pollutants and situations that have a reasonable likelihood of presenting risks significant enough to require feasible actions that would not otherwise be taken as a matter of standard practice in emergency response situations of the types that exist in the affected area. In addition, there is merit in some amount of precautionary monitoring for unexpected or low probability problems, particularly if marginal costs would be relatively low.

Also, air monitoring data sufficient to support the above objective likely will be useful for simply informing the public of the air quality, which is itself of value. It may also be useful in retrospective studies of the health and ecosystem effects of the storm and recovery activities. Finally, air quality data collected during the Katrina recovery may be useful in developing plans for responding to future disasters.[3]

The monitoring activities described here are not specifically designed to provide all appropriate information on the exposure of workers while they are actually occupied in clean up and recovery tasks. There are independent requirements related to characterizing and managing worker exposure. There is some crossover of information between the two arenas. The measurement of chemical constituents in ambient air at population-oriented sites will provide some information on constituents to which workers may be exposed while on the job. Also, data from monitoring equipment used by workers to ensure safety on the job may give some indication of air quality data where power and conventional monitoring equipment are not yet available.

This monitoring plan is not aimed at estimating ambient concentrations except at the specific times and places monitored, or at providing data sufficient for such estimation by others. Absolute concentrations will vary widely with distance, burn volume, wind conditions, etc.

This program is not intended to provide data on local concentrations of criteria or hazardous air pollutants for SIP or conventional regulatory purposes, comparable to the data previously reported by state-operated ambient monitoring sites that were destroyed or disrupted by the storm or flooding. To obtain that data, the EPA and the affected states are working to restore those conventional sites. While this restoration is in general not considered to have as high a priority as providing information for guiding actions related to clean up and re-occupation, some types of monitoring equipment in this category can be useful for that purpose and will be given appropriate priority. Also, there may be opportunities to make progress on restoring the pre-storm monitors without detracting from the higher priority monitoring efforts.

This program also is not specifically designed to provide data to assess the impact of open burning activity and other disaster recovery activities have had on monitored concentrations of criteria pollutants (ozone, PM2.5, etc.) in the affected states or in downwind states. Similarly, it is not designed to evaluate whether displaced emissions generating activity has affected areas outside the recovery area itself. Nevertheless, the data collected under this program may be useful in future assessments of whether the monitoring data for criteria

[3] Any emissions data collected during the Katrina recovery may also be useful in planning response efforts for future emergencies. This document does not address collection of emissions data.

pollutants should be excluded or adjusted for nonattainment findings or other regulatory purposes.

The Center for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (CDC/ATSDR) is working closely with EPA and is providing technical support for the chemical and biological aspects of the post-Katrina situation. EPA has and will continue to make measurements for chemicals and pathogens in flood waters in New Orleans, other water bodies, and drinking water systems. As outlined in this plan, EPA will make measurements for chemicals and physical airborne contaminants. EPA will continue to provide CDC/ATSDR with the results of all the environmental monitoring. CDC/ATSDR will provide EPA with its technical review of the sampling results (e.g., what are the public health implications) and will assist in the development of joint public information/public health messages concerning the sampling results.

Although infectious diseases are a frightening prospect, widespread outbreaks of infectious disease after hurricanes are not common in the United States. Rare and deadly exotic diseases, such as cholera or typhoid, do not suddenly break out after hurricanes and floods in areas where such diseases do not naturally occur, such as the United States. In general, the biological pathogens found in flood waters from the recent hurricanes are related to sewage and are mostly a health concern if people ingest the pathogens (e.g., eat or drink contaminated food and water). It should be noted that there are not any conventional methods for monitoring sewage related pathogens in ambient air. Therefore, it is the opinion of CDC/ATSDR that ambient air monitoring for the pathogens that maybe related to the flood waters is not necessary. Information regarding hurricanes and infectious diseases can be found on CDC/ATSDR's web site at:
http://www.bt.cdc.gov/disasters/hurricanes/keyfactsinfectiousdisease.asp .

IV. Description of the Phased Monitoring Program

EPA began monitoring air concentrations soon after Katrina moved out of Louisiana, Mississippi, and Alabama. This monitoring followed established incident response procedures and was aimed at determining locations that needed Incident Management Team action to stop or clean up spills along with identifying potential safety issues for on-site personnel.

This comprehensive monitoring program will be implemented in phases, determined by the immediacy of the problem to be addressed, the availability of equipment, staff, and infrastructure for monitoring, and the evolving picture regarding plans for the clean up efforts and how and where they will generate emissions. The phases are not sharply separated even in a single location, but the phasing framework is useful for understanding the ongoing and planned activities even so.

Practical considerations are an important influence on this plan. For the most part, each phase is based on monitoring and data management approaches currently in routine use by EPA's Incident Management Team, EPA's headquarters and regional air program offices, or by state/local air management agencies in similar situations. This will allow rapid start up and will provide data types that are familiar to emergency managers, state and local officials, and the communities affected.

A. Phase 1 – Screening Data to Guide Emergency Response Efforts

Emergency Response to Spills

EPA's Incident Management Team has been and remains active in the affected areas. The earliest efforts used equipment mounted in a small aircraft that can obtain detailed information on chemicals in the air from a safe distance. The equipment - Airborne Spectral Photometric Environmental Collection Technology (ASPECT) - is an emergency response sensor package operated by EPA. It provides first responders - emergency workers on scene with information on possible chemical releases. ASPECT is also capable of collecting high-resolution digital photography and video and can take thermal and night images by using instruments that track differences in heat below the airplane.

The Department of Energy has made available an aircraft with additional monitoring capabilities compared to ASPECT, and some flights with this aircraft have also taken place. More may be planned as needed.

More information on the capabilities of this system is available at http://www.epa.gov/naturalevents/flyinglab.htm

This system provides data to direct emergency responders to locations where spills need to be stopped or cleaned up. It is not designed to monitor ambient air quality over long periods or areas, and is mentioned and described here primarily to avoid misunderstanding of its purpose.

In addition, as in any emergency response incident, EPA's on-site coordinators (OSCs) and contractors have been doing source specific air sampling on the ground using portable sensors where safe access by ground is possible and there is reason to suspect a spill or release.

Monitoring of Air Quality Above and Near Contaminated Flood Waters

The concern with respect to flood waters in New Orleans has been to locate any preventable continuing releases into the waters or air above them, and to provide information on any health risks to those assisting in evacuation and other efforts above or near the flood waters.

Two of EPA's Trace Atmospheric Gas Analyzer (TAGA) units have been deployed to New Orleans. The TAGA buses are self-contained mobile laboratories capable of real-time sampling and analysis in the low parts per billion level of outdoor air or emissions from various environmental sources and concerns. This is providing information on how contaminated flood waters and other pollutant releases are affecting air quality in New Orleans at present. TAGA's initial deployment will last two weeks. More information is available at http://www.epa.gov/earth1r6/6lab/taga.htm.

Data from the ASPECT and TAGA operations are being posted on EPA's Katrina response webpage; see http://www.epa.gov/katrina/testresults/air/index.html.

Other Relevant Information

The above monitoring is using methods that are the best available for the conditions under which they must be used. Portability, real time or at least rapid data reporting, and self-contained power supply are key considerations. The methods give screening level data, and in general the reported concentrations cannot be directly compared to established health benchmarks for various reasons including sampling period, data quality, or differences in exactly what is measured versus the compounds for which health benchmarks exist.

The Louisiana Department of Environmental Quality (LDEQ) has conducted sampling for volatile organic compounds in New Orleans using Summa canisters, mostly in response to specific reports of possible problems requiring response action. EPA will work with Louisiana DEQ to ensure these data are available to EPA and the public, for data that is of continuing relevance. This data should be of a quality that will allow comparison to health benchmarks, aside from the issue of sampling/exposure period differences.

While not specifically described here, similar monitoring to direct emergency response efforts has also been underway in Mississippi and Alabama. The situations to be investigated have involved spills and leaks, rather than standing flood waters.

Because the purpose of this monitoring is to direct immediate response efforts, it evolves quickly. The above descriptions are not necessarily complete or up-to-date.

B. Phase 2 – Data to Guide Initial Re-Occupation Decisions for New Orleans

As of this date, re-occupation of sections of New Orleans is under active consideration by city, state, and federal authorities. The Mayor has asked EPA to provide an assessment of the situation, of which air quality is one of several factors. While the monitoring in New Orleans to date generally have not found air pollutant concentrations that gave any obvious reasons for concern with respect to short term health effects from the pollutants measured, EPA is undertaking additional measurements.

Re-occupation also is an issue in the affected areas outside of New Orleans.

At times and places in which power was not available in New Orleans, equipment for assessing ambient air quality remained limited to the same types of self-sufficient monitors as used in guiding responses to spills and measurements acquired during Phase 1. These measurements included TAGA-based measurements at additional locations. Also, PM measurements have been made using DataRAM nephelometers, which provide an approximate measure of inhalable particulate matter. Some toxic gas measurements have been made using a hand-held gas analyzer (AreaRAE). However, battery powered PEP and EBAM systems are currently being deployed that will provide increased accuracy in PM measurements.

At this time, monitoring operations have resumed at the state-operated Kenner monitoring site, on the western edge of the city near Lake Pontchartrain. These include real-time PM2.5, some criteria pollutant gases, and VOCs by Summa canister. The data that is available can be considered in the re-occupation decisions, but its relevance is limited by the site's particular location.

The Environmental Unit of EPA's Incident Response Team is deploying a variety of monitors capable of giving more definitive data than can be obtained by the monitoring described above. These monitors will be placed in areas of current or potential general population exposure. The pace of deployment will be determined by the availability of equipment, personnel, trainers, and sites with appropriate security and power (where applicable).

The following types of monitors are planned. The attached "Timeline" provides more information on their operation and objectives. In New Orleans, all these monitors will be collocated at sites that will initially be considered fixed, but may be relocated as more is learned. About 19 population-oriented sites have been tentatively identified in New Orleans for these monitors. The Kenner site is one of the 19 sites, and will be operated every day. During the period in which equipment is not yet available to operate all 19 sites, other sites for sampling will be chosen daily based on which of the other 18 sites are in the vicinity of the most potentially problematic emissions-generating activities expected to occur that day. This may be open burning, debris handling, or ground and road activity that can resuspend contaminated dust. Another five fixed or movable sites may be established depending on equipment and lab services availability. On the advice of the SAB workgroup, EPA is not planning on "chasing plumes" with any of the PM samplers.

- Portable, battery powered continuous PM monitors based on beta attenuation with real time satellite data upload (EBAMs). These can be configured to measure either PM10 or PM2.5. These units also measure wind speed and wind direction. Initially, these monitors will be used mostly in the PM10 mode and will allow characterization of PM levels without having to rely on the much more uncertain DataRAMs. The first of these monitors to be deployed have been loaned by air agencies in other states. Those units may be supplemented by new purchases.

- Small battery-powered samplers normally used for personal exposure monitoring of workers, but in this case deployed as interim fixed-site monitors in areas where regular monitors for the same pollutants cannot yet be deployed because of lack of equipment, power, or laboratory services. Monitors in this category in New Orleans will collect samples for asbestos (NIOSH method 7402), VOCs (by carbon tubes), total PM for metals analysis, total PM for particulate mercury analysis, and semi-volatile organic compounds (by XAD). Sampling periods will be 24 hours, except where battery power limitations dictate a shorter sampling period. Filters and other media from this sampling will be analyzed by labs under contract to the Office of Emergency Management, which is most familiar with this type of monitoring.

- Passive badges for organic VOCs samplers normally used for personal exposure monitoring of workers, but in this case deployed as interim fixed-site monitors in areas where regular monitors for the same pollutants cannot yet be deployed because of lack of equipment, power, or laboratory services. 72-hour samples will be collected using 3M Organic Vapor Monitors (OVM) for long term integrated VOC concentrations, on a weekly basis. These have the advantage of being usable for longer sampling periods, since they are not limited by battery life. Because these badges have much the same objective as the pump-sampled carbon tubes for VOCs mentioned above, the use of both will be reconsidered after a period of using them in collocated fashion. The badges will be analyzed by a laboratory at the University of

Houston under the direction of EPA Region 6's Multimedia Planning and Permitting Division, which is most familiar with this type of monitoring.

- Battery powered, filter-based PM samplers (24-hour low flow rate Federal Reference Method samplers). These can be configured to measure either PM10 or PM2.5. Initially, samples will be taken daily and analyzed for both mass and toxic metals. Usually, PM2.5 and PM10 low flow FRM samplers will be collocated to allow better understanding of the size distribution and hence transportability of the PM. Collocation may also allow a rough attribution of the PM between resuspended dust (which will mostly be in the 2.5 to 10 size range) and PM from open burning (which will mostly be in the 2.5 and smaller size range, depending on the quality of the burning). The first of these monitors to be deployed have been diverted from their normal use performing audits of state-operated monitoring sites in EPA Regions 4 and 6 not affected by the storm. A number of new units will be procured to allow additional sites to be monitored and/or to allow the diverted units to be returned to their previous use. PM filters from these samplers will be analyzed by labs under contract to the Office of Air Quality Planning and Standards, which is most familiar with this type of monitoring and lab work.

- Filter-based PM10 high-volume samplers powered by portable generators. This is not a preferred approach to PM10 sampling for a number of data quality and practicality reasons, but is being pursued as an interim approach to get more of the planned PM monitoring sites operational sooner. These samplers were more quickly available to the monitoring effort than the new purchases of low flow FRM samplers mentioned above. Initially, samples will be taken daily and analyzed for both mass and toxic metals. When sufficient low flow PM samplers are available, the high volume PM10 samplers will be removed from this service, but may be applied in other ways depending on conditions.

- Full air toxics sites, identical to those that comprise the National Air Toxics Trends Sites. Equipment and lab services are being arranged to establish two such sites in New Orleans. These will be located at the pre-storm Kenner site and at a new "Chalmette" site, which can provide the AC power and other necessary logistics. NATTS sampling equipment will collect volatile and semi volatile organic compounds, aldehydes, and high vol PM10 samples for 24-hour periods. These samples will be sent to a laboratory for analysis of multiple air toxics constituents. The laboratory will post the results to the Air Quality System (AQS), the EPA data base for ambient air monitoring data, from which it can be obtained by any interested organization or individual. The following website provides information on the type, capabilities, and operation of this equipment: http://www.epa.gov/ttn/amtic/airtoxqa.html. Filters and other media from these four air toxics sites will be analyzed by a laboratory under contract to the Office of Air Quality Planning and Standards. An EBAM unit with a meteorology monitoring package (wind speed, wind direction, temperature, pressure, and relative humidity) will be collocated at each full air toxics site to provide real time data upload of PM10 concentrations and meteorology parameters to AIRNOW.

These monitors provide the first definitive data on a variety of air pollutants of concern from a re-occupation perspective. Except for the real-time PM2.5 data provided by the restored pre-storm state monitoring sites and by the battery-powered, portable EBAMs, there will be a time delay in the availability of results from the filters or other collection media for the remaining monitors, which must be sent to a laboratory for analysis.

The re-occupation issue will likely remain active over an extended period as the situations in each part of New Orleans and other affected areas change. This includes the effects that clean-up activities, which may result in new emission sources whose air quality impact may be important in considering whether more residents and businesses should return.

Information from the most recent testing in New Orleans will continue to be posted on the EPA Katrina response webpage.

C. Phase 3 – Air Quality Effects of Clean-Up Activities

For New Orleans and the nearby affected areas, the monitoring sites and samplers described for Phase 2 will also be the core monitoring network for characterizing ambient air quality in areas accessible to the public and off-duty response workers during the clean-up phase. The 19 planned sites are distributed throughout the areas where clean-up activities are expected to be most intense, yet are population oriented. In Phase 3, open burning/incinceration is likely to be the activity of most concern, and sampling sites will be selected from among these 19 sites based mostly on proximity to open burning/incineration operations, if not all can be operated at once. On the advice of the SAB workgroup, EPA is not planning on "chasing plumes" with any of the PM samplers.

For coastal Mississippi, fewer types of monitors will be deployed and fewer sites will be used, because of differences in conditions.

- In Mississippi, conditions allow the use of AC-powered TEOM-based real time PM2.5 and/or PM10 analyzers, so EBAM units may not need to be utilized there.

- VOCs, semi-volatile organic compounds, total PM metals, and mercury in total PM will not be sampled using the personal sampling pumps, but this may be reconsidered later.

- Passive badges will not be deployed in Mississippi because of the lack of standing flood waters contaminated by spills of organic liquids.

- Monitoring operations for AC-powered real-time and filter-based 24-hour PM2.5, PM10, and ozone have partially resumed at two pre-storm monitoring sites in coastal Mississippi: Gulfport and Pascagoula.. These will be supplemented by the addition of a new PM2.5/PM10 site at Stennis Space Center. Toxics metals will be measured on PM2.5 and PM10 filters collected with low flow FRM samplers at these three sites. These three sites will be equipped with asbestos samplers.

- Five additional sites measuring PM2.5 and PM10 (including toxics metals) may be established as more becomes known about demolition and open burning activities, and may be relocated from time to time as these activities evolve. These five sites will be equipped with asbestos samplers.

- Full air toxics monitoring will be added at the Gulfport and Stennis sites. An EBAM or TEOM unit with a meteorology monitoring package will be collocated at these sites. In addition, sampling frequency for air toxics will be increased at least temporarily at the Pascagoula site, which already sampled for air toxics prior to Katrina. Also, the air toxics site in Tupelo, in northern Mississippi, will be increased and used as a control site to help interpret concentrations observed in coastal Mississippi.

As more is learned about the nature and location of clean up activities, EPA will reconsider the number and location of monitoring sites. Information from ambient monitoring during the clean up periods in Louisiana and coastal Mississippi will continue to be posted on the EPA Katrina response webpage.

EPA will investigate how to link the ambient monitoring data to whatever information is available, if any, on nearby burning facility operations (burn volume, source and nature of material burned, control type, etc.).

EPA is consulting with other federal agencies on how the federal government can best assist federal, state, and local officials to have access to predictions or tools for predicting the land areas likely to be affected by smoke from open burning each day. This information can be used both to advise residents and to manage burning activities.

D. Phase 4 - Restoration and Enhancement of Pre-storm Ambient Monitoring Systems

Five conventional monitoring sites in New Orleans that were destroyed in the storm and flood will be re-established. This monitoring will include ozone, SO2, H2S, CO, PM2.5, PM10, NOx/NO2, and VOCs in various combinations at these five sites.[4] Priority will be given to restoring or adding PM2.5, PM10, SO2, and H2S capabilities, as these are deemed more relevant to the dust, combustion emissions, industrial start-up and lingering fugitive emissions, and other exposures that may face clean-up and recovery workers and others returning to the city. However, if other lost capabilities can be restored soon without sacrificing emergency-oriented monitoring work, they will be. None of these sites hosted a PM2.5 speciation sampler prior to Katrina. However, PM2.5 and PM10 filters from one or more of these sites can be analyzed for metals and other elements. This will be done at least some of the time. Most of these sites cannot resume operation until power is restored and new equipment obtained. As mentioned earlier, the Kenner site is at least partially operational now.

The SAB workgroup pointed out that depending on the pattern of re-occupation and emissions generating activity, the pre-storm sites may not meet logical siting objectives, both immediately and in the long run. EPA's practice is to have state and local officials make recommendation on this issue, and will await their long term recommendations.

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[4] The tentative plan is to establish the following combinations of monitoring capabilities in New Orleans:
Kenner site: PM2.5, NOx/NO2, SO2, H2S, CO, PMcoarse, VOCs, meteorology.
City Park: NOx/NO2, CO, PM2.5, PM10, SO2, VOCs, meteorology.
Arabi: SO2, CO, PMcoarse, VOCs, meteorology.
Meraux: PM2.5.
Chalmette: This is a new site that was in preparation prior to Katrina. VOC measurement at the site is relevant to Katrina monitoring objectives.

Conventional monitoring sites will also be restored in the coastal area of Mississippi. Some of the previous equipment survived, but some needs to be replaced.[5]

Conventional monitoring sites in Alabama were not significantly harmed by the storm.

E. Special Interest Pollutants and Other Monitoring Methods

Asbestos

Given the age of the architecture and the amount of demolition that may be needed in New Orleans, there is the possibility for release of asbestos. Some commercial and industrial facilities known to have special asbestos management issues before the storm will receive special attention by state and federal officials if they are demolished or subject to renovation. The asbestos NESHAP covers demolitions of buildings, both structurally sound and unsound buildings. It does not regulate the debris that is a direct result of the Hurricane completely demolishing a building. Releases may occur from demolition, sorting and piling, loading into trucks, transportation, and unloading. Open burning could also release asbestos if asbestos-containing materials are not well separated. These sources of asbestos may also exist in other affected areas to some degree.

Asbestos monitoring is frequently a part of emergency response activities. Asbestos monitoring can be used to check on the effectiveness of initial efforts to minimize asbestos emissions. As described under Phases 2 and 3 above, small personal-exposure samplers will be used in fixed-site mode, and a standard NIOSH filter analysis will be followed by a NIOSH-certified laboratory to obtain quantitative results.[6] Initially, these samplers will be placed at all monitoring sites described under Phases 2 and 3 as having low flow FRM PM2.5 and PM10 monitoring. This includes the 19 tentative fixed sites and five possible additional sites in New Orleans and vicinity, and the Gulfport, Pascagoula, Stennis and five additional sites in coastal Mississippi. This initial plan for asbestos sampling will be reviewed periodically to consider whether the sampling should be made more or less intense depending on the amount of demolition, its apparent degree of control for asbestos releases, whether open burning is occurring, and concentrations observed so far.

Mercury

Some total PM filter samples (taken using the personal monitoring pumps at the fixed sites) will be analyzed for particulate mercury. While most mercury emissions would be expected

[5] The following equipment needs to be obtained for sites in coastal Mississippi:
Pascagoula – FRM PM10 and PM2.5 (this site also monitors for air toxics)
Port Bienville - NO2, O3, PM2.5-FRM
Waveland - O3, PM2.5-FRM
Gulfport - O3, PM2.5-FRM+Continuous+Speciation
Pearlington - PM2.5-FRM

[6] All samples will be run for "modified AHERA." The modified AHERA is a TEM method that counts all asbestos fibers>0.5um length, with 5:1 aspect ratio but results are reported in terms of fibers/cc, with two different counts reported: (1) all asbestos fibers, PLUS (2) the subset of fibers >5um length. A subset of the samples (2%) will be run by the ISO method to get the detailed fiber dimension information.

to be in the gas rather than the particle phase, measurement of mercury from these total PM filters is an available screening approach. If measurable mercury is found, next steps will be considered.

Dioxins/Furans and PCBs

EPA has not yet finished coordinating internally regarding possible dioxin/furan and PCB monitoring objectives and approaches. PCBs have been spilled in the areas affected by the storm, and can enter the air by evaporation of by burning of PCB-contaminated debris. Open burning can produce dioxins and furans, but their production depends on the material burned and on burning conditions including the temperature and residency time during combustion. Some members of the SAB workgroup advised EPA not to rule out the possibility that inhalation exposures near open burning operations during the clean up period might be high enough to cause concern about health effects.

Other Pollutants, Monitoring Methods, and Systems

For Phases 1 and 2, EPA has deliberately not considered deployment of advanced monitoring systems that to date have been used more for special research purposes than for routine ambient air monitoring, including various open path methods other than those already part of the EPA and DOE aircraft systems described above. Such monitoring presents challenges in terms of coordination with those in control of such systems, logistical support, availability of and safety for qualified operators, contracting, interpretation of unfamiliar data streams, etc. Also, EPA presently believes that the large pollutant suite that can be monitored with the conventional methods planned for deployment as described is adequate for the objectives of the monitoring program. Once the planned sites with these conventional methods are well established, EPA may re-visit the issue of whether deployment of advanced systems is necessary and practicable.

EPA will also be assessing the possible role of satellite monitoring systems in helping to meet the objectives of this plan.

During interagency review of this plan, several suggestions were made for additional monitoring. These include measurement of the pH of re-suspended dust, phosgene, hydrochloric acid (HCl), and chlorine (or chloride), and mineral acids. These recent ideas will be considered and maybe added to this plan in a future revision. Toxic metals and pH cannot be measured on the same low flow FRM PM filter, but these analyses could be done on filters from alternate days or sites.

V. Responsibilities of Involved Offices and Agencies

EPA's Office of Emergency Management is planning and implementing the air monitoring for Phase 1. The Environmental Unit Air lead shall coordinate/implement/assist with operations. The Environmental Unit will also be responsible for implementing the remaining phases of the monitoring plan described in this document, with requested assistance from other parts of EPA. OEM will purchase most of the necessary sampling equipment. Data from direct-reading monitors (ASPECT, TAGA, DataRAMS, and AreaRAE units) operated by OEM personnel will be managed by OEM.

EPA's Office of Air Quality Planning and Standards has helped develop, review, and document the monitoring plan in consultation with the two affected Regional Offices and the Incident Management Team's Environmental Unit for New Orleans. OAQPS will facilitate resolution of roadblocks to implementation that cannot be resolved at the Regional Office level. OAQPS will also manage contracts for some or all needed laboratory analysis, especially for samples taken using equipment which OAQPS has arranged to provide. OAQPS is arranging the purchase of expendables and smaller equipment for some of the samplers. OAQPS has coordinated the loans of EBAM units from other states for use in New Orleans. OAQPS will also coordinate the collaboration with other federal agencies regarding smoke plume and cloud predictions, and regarding the possible role of data from satellite-based monitoring systems. OAQPS will operate the AQS and AIRNOW data systems. OAQPS, Regional Office staff, State, CDC/ATSDR and other EPA offices will collaborate on the development of public messages to explain data as it becomes available. OAQPS and the Office of Public Affairs collaborate on website design and operation.

EPA's Regional Offices 4 and 6 will be responsible for coordination with air monitoring auditing contractors (who will provide training and in some cases daily monitor operation services), state and local agencies, and EPA's on-site personnel to implement the plan. OAQPS and Regional Office staffs collaborate on the development of public messages to explain data as it becomes available.

EPA's Office of Research and Development (ORD) will continue to advise OAQPS and the Regional Offices on more detailed monitoring plans, and arrange for additional Science Advisory Board Review when appropriate. ORD is also considering possible projects to measure open burning source emissions as part of its research program on homeland security.

VI. Pollutants To Be Measured

Metals and other elements by ICPMS, as PM10 and as PM2.5:
Antimony
Arsenic
Beryllium
Cadmium
Chromium
Hexavalent Chromium (at full air toxics sites only, by separate high vol sampler)
Cobalt
Lead
Manganese
Mercury
Nickel
Selenium
Hexavalent Chromium
Potassium (on PM2.5 and PM10 filters from low flow FRM samplers, but not on air toxics PM10 filters from high vol samplers)
Calcium (on PM2.5 and PM10 filters from low flow FRM samplers, but not on air toxics PM10 filters from high vol samplers)

Toxic Gases at Full Air Toxics Sites:

Carbonyls
Formaldehyde
Acetaldehyde
Acetone
Propionaldehyde
Crotonaldehyde
Butyr/Isobutyraldehyde
Benzaldehyde
Isovaleraldehyde
Valeraldehyde
Tolualdehydes
Hexaldehyde
2,5-dimethylbenzaldehyde

Metals
Antimony
Arsenic
Beryllium
Cadmium
Chromium
Cobalt
Lead
Manganese
Mercuy
Nickel
Selenium
Hexavalent Chromium

SNMOCs
Ethylene
Acetylene
Ethane
Propylene
Propane
Propyne
Isobutane
Isobutene/1-Butene
1,3-Butadiene
n-Butane
trans-2-Butene
cis-2-Butene
3-Methyl-1-Butene
Isopentane
1-Pentene
2-Methyl-1-Butene
n-Pentane
Isoprene
trans-2-Pentene
cis-2-Pentene
2-Methyl-2-Butene
2,2-Dimethylbutane
Cyclopentene
4-Methyl-1-Pentene
Cyclopentane
2,3,-Dimethylbutane
2-Methylpentane
3-Methylpentane
2-Methyl-1-Pentene
1-Hexene
2-Ethyl-1-butene
n-Hexane

SNMOCs (cont.)
trans-2-Hexene
cis-2-Hexene
Methylcyclopentane
2,4-Dimethylpentane
Benzene
Cyclohexane
2-Methylhexane
2,3-Dimethylpentane
3-Methylhexane
1-Heptene
2,2,4-Trimethylpentane
n-Heptane
Methylcyclohexane
2,2,3-Trimethpentane
2,3,4-Trimethylpentane
Toluene
2-Methylheptane
3-Methylheptane
1-Octene
n-Octane
Ethylbenzene
m/p-Xylene
Styrene
o-Xylene
1-Nonene
n-Nonane
Isopropylbenzene
alpha-Pinene
n-Propylbenzene
m-Ethyltolune
p-Ethyltoluene
1,3,5-Trimethylbenzene
o-Ethyltoluene
beta-Pinene
1,2,4-Trimethylbenzene
1-Decene
n-Decane
1,2,3-Trimethylbenzene
m-Diethylbenzene
p-Diethylbenzene
1-Undecene
n-Undecane
1-Dodecene
n-Dodecane
1-Tridecene
n-Tridecane

VOCs
Acetylene
Propylene
Dichlorodifluoromethane
Chloromethane
Dichlorotetrafluoroethane
Vinyl Chloride
1,3-Butadiene
Acrolein
Bromomethane
Chloroethane
Acetonitrile
Trichlorofluoromethane

VOCs (cont.)
Acrylonitrile
1,1-Dichloroethene
Methylene Chloride
Trichlorotrifluoroethane
trans - 1,2 - Dichloroethylene
1,1 - Dichloroethane
Methyl tert-Butyl Ether
Methyl Ethyl Ketone
Chloroprene
cis-1,2-Dichloroethylene
Bromochloromethane
Chloroform
Ethyl tert-Butyl Ether
1,2 - Dichloroethane
1,1,1 - Trichloroethane
Benzene
Carbon Tetrachloride
tert-Amyl Methyl Ether
1,2 - Dichloropropane
Ethyl Acrylate
Bromodichloromethane
Trichloroethylene
Methyl Methacrylate
cis -1,3 - Dichloropropene
Methyl Isobutyl Ketone
trans - 1,3 - Dichloropropene
1,1,2 - Trichloroethane
Toluene
Dibromochloromethane
1,2-Dibromoethane
N-Octane
Tetrachloroethylene
Chlorobenzene
Ethylbenzene
m,p - Xylene
Bromoform
Styrene
1,1,2,2 - Tetrachloroethane
o - Xylene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
m - Dichlorobenzene
Chloromethylbenzene
p - Dichlorobenzene
o - Dichlorobenzene
1,2,4-Trichlorobenzene
Hexachloro-1,3-Butadiene

SVOCs / PAHs
N-Nitrosodimethylamine
Pyridine
Ethyl methanesulfonate
2-Picoline
N-Nitrosomethylethylamine
Methyl methanesulfonate
N-Nitrosodiethylamine
Phenol
Pentachloroethane
bis (2-Chloroethyl)ether
Aniline

SVOCs (cont.)
2-Chlorophenol
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Benzyl alcohol
o-Cresol (2-Methylphenol)
1,2-Dichlorobenzene
bis(2-Chloroisopropyl)ether
m,p-Cresol (3&4-Methylphenol)
N-Nitrosopyrrolidine
N-Nitrosodipropylamine
o-Toluidine
Hexachloroethane
Acetophenone
Nitrobenzene
N-Nitrosopiperidine
Isophorone
2-Nitrophenol
2,4-Dimethylphenol
bis(2-Chloroethoxy)methane
2,4-Dichlorophenol
4-Chloroaniline
1,2,4-Trichlorobenzene
Naphthalene
2,6-Dichlorophenol
Hexachloropropene
Hexachlorobutadiene
N-Nitrosodibutylamine
4-Chloro-3-methylphenol
Safrole
2-Methylnaphthalene
1,2,4,5-Tetrachlorobenzene
2,4,6-Trichlorophenol
Hexachlorocyclopentadiene
2,4,5-Trichlorphenol
2-Nitroaniline
Isosafrole
2-Chloronaphthalene
1,4-Naphthoquinone
Dimethyl phthalate
1,3-Dintrobenzene
2,6-Dinitrotoluene
3-Nitroaniline
Acenaphthylene
2,4-Dinitrophenol
4-Nitrophenol
Acenaphthene
2,4-Dinitrotoluene
2-Naphthylamine
Dibenzofuran
Pentachlorobenzene
1-Naphthylamine
Diethyl phthalate
2,3,4,6-Tetrachlorophenol
4-Nitroaniline
4-Chlorophenyl-phenyl ether
Fluorene
5-Nitro-o-toluidine
4,6-Dinitro-2-methylphenol
Diphenylamine
Azobenzene

SVOCs (cont.)
Phenacetin
Diallate
4-Bromophenyl phenyl ether
4-Aminobiphenyl
Hexachlorobenzene
Pronamide
Pentachlorophenol
Pentachloronitrobenzene
Phenanthrene
Dinoseb
Anthracene
Carbazole
Di-n-butyl phthalate
Benzidine
Isodrin
Fluoranthene
Pyrene
4-Dimethylaminoazobenzene
Chlorobenzilate
3,3'-Dimethylbenzidine
Butyl benzyl phthalate
2-Acetylaminofluorene
3-Methylcholanthrene
3,3'-Dichlorobenzidine
bis(2-Ethylhexyl)phthalate
Benzo(a)anthracene
Chrysene
Di-n-octyl phthalate
7,12-Dimethylbenz(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
Indeno(1,2,3-cd)pyrene
Dibenz(a,h)anthracene
Benzo(g,h,i)perylene

VII. Laboratory Analysis

Louisiana DEQ's PM filter weighing laboratory was destroyed in the storm. PM filters will be weighed and analyzed for metals and other elements by laboratories under contract to OAQPS.

All pollutants from the full air toxics sites will be analyzed by laboratories under contract to OAQPS.

Samples taken using personal samplers operating in fixed-site mode will be analyzed by a laboratory under contract to OEM Asbestos analysis will be conducted by an American Industrial Hygiene Association (AHIA) asbestos-accredited lab under contract to OEM.

Passive badges for organic VOCs will be operated by a laboratory under contract to EPA's Office of Research and Development (ORD)..

VIII. Quality Assurance Activities

All field sampling and laboratory analysis will follow method-specific standard operating procedures and quality control requirements.

For the types of monitoring typically conducted in emergency response situations, OEM's normal methods and quality assurance requirements will be followed.

The EBAM, PM2.5/PM10 low flow FRM sampling, and full air toxics sampling described in this plan are not typical for OEM projects. In order to ensure monitoring takes place as soon as possible and data will meet the data quality needs, EPA will use the measurement quality objectives and standard operating procedures described in two national monitoring programs: the $PM_{2.5}$ program for particulate monitoring/analyses, and the National Ambient Toxics Trend Network (NATTS) for metals analyses. It is felt that the quality requirements described for these programs are adequate for this study. An attachment to this document contains QA requirements for samples collected from Louisiana and coastal Mississippi.

XI. Data Management

The general plan is for screening level data collected by the on-site response teams to be handled by established OSWER procedures, processed and made available for public access via the Agency Hurricane Katrina/Rita Response Web site. Data from laboratory analysis managed by OAQPS (PM2.5, PM10, PM metals, and air toxics), data from laboratory analysis managed by the on-site Environmental Unit of the Incident Management Team (asbestos and other pollutants collected with personal samplers used in fixed-site mode), and real-time continuous data will follow established EPA procedures, including state agency review, and ultimately reaching the AQS and AIRNOW data systems. Air data from these two systems will be presented along with data on monitoring of other media through a central data presentation system operated by EPA's Office of Environmental Information along with supporting information provided by OAQPS.

EPA will provide status reports and data from ambient monitoring through the Agency's Hurricane Katrina/Rita Response Web site. Monitoring data from all environmental media will be integrated into a central data system and will be accessed by the public through EPA's Web-based EnviroMapper tool. Real-time PM2.5 maps and time-series plots for monitors located in the hurricane-affected area will be stored on the OAR Web site and will be linked from the Agency's Hurricane Katrina/Rita Air Quality Data page.

Attachment 2 contains a flow diagram of the planned data management flow.

X. Sites To Be Monitored

Attachment 3 shows the multi-pollutant monitoring sites now under consideration in New Orleans and the nearby areas. These sites were tentatively selected to cover New Orleans proper and the nearby areas where debris burning is likely to be significant, to be near population, and to have suitable logistics. The full air toxics sites in New Orleans will be located at the pre-storm Kenner site and one other in-city site.

In Mississippi, eight sites are planned in the coastal area; of which two will be pre-storm monitoring sites (Gulfport and Pascagoula). A new site will be established at Stennis airport, plus five sites not yet determined and which may be moved during the monitoring program. Attachment 4 contains a map showing known site locations.

XI. Monitoring Schedule

Sampling Period

The portable real-time PM2.5/PM10 analyzers (EBAMs) in Louisiana will operate continuously, reporting mass measurements every 15 or 60 minutes. TEOM-based real-time PM2.5 samplers at state-operated sites in New Orleans and in Mississippi will operate continuously, reporting hourly data.

Sampling for asbestos, total PM, total PM metals and mercury, VOCs, and semi-volatile organic compounds using personal sampling pumps deployed in fixed-site mode will usually be for 24 hour periods, unless battery limitations dictate shorter intervals. Organic VOC badges will be deployed for 72 hour sampling periods.

Filter based PM2.5 and PM10 measurements using low flow FRM samplers will be run at 24 hour intervals, with results available after laboratory gravimetric and metals analysis.

Hazardous air pollutants at the four new full air toxics sites will be sampled at 24 hour intervals, on a daily basis.

Sampling Schedule

Tentatively, EPA is planning on every day sampling during all or part of the first 90 days, during which time the need for and frequency of sampling types requiring laboratory analysis will be re-examined. To supplement the two new full air toxics monitoring sites in

Mississippi, sampling frequency at two existing air toxics sites, Pascagoula and Tupelo, will be increased from 1 in 12 days to daily and 1 in 6, respectively, for all or part of the first 90 days. The number of PM2.5 plus PM10 filter samples in any given day will not exceed 50 due to laboratory capacity constraints, and will begin well below that level due to the feasible schedule for sampler start-ups. As the number of sites increases, sampling frequency at each may be reduced to remain within this limit.

Attachment 1
Data Quality Requirements for Particulates, and Toxics Monitoring Metals Analyses

In order to ensure monitoring takes place as soon as possible and data will meet the data quality needs, EPA will use the measurement quality objectives and standard operating procedures described in two national monitoring programs: the $PM_{2.5}$ program for particulate monitoring/analyses, and the National Ambient Toxics Trend Network (NATTS) for metals analyses. It is felt that the quality requirements described for these programs are adequate for this study.

Particulate monitoring ($PM_{2.5}$, PM_{10}), for the most part, will follow the requirements defined in $PM_{2.5}$ monitoring documentation as listed in Table 1. Where changes to requirements have been made, they are identified as a "K" in the "Criteria" column. Since PM_{10} monitoring will utilize the same samplers and filters as $PM_{2.5}$, the QA requirements for PM_{10} will follow the $PM_{2.5}$ requirements. Most of the requirements for monitoring can be found in the code of federal regulations and the document entitled: *Quality Assurance Guidance Document 2.12: Monitoring PM2.5 in Ambient Air Using Designated Reference or Class I Equivalent Methods*. This document can be found on the Ambient Monitoring Technology Information Center (AMTIC) http://www.epa.gov/ttn/amtic/pmqainf.html. References for each requirement listed in Table 1 are identified in the last two columns with the exception of any changes accommodated for this study.

Once mass is determined from the PM_{10} and $PM_{2.5}$ filters, they will be analyzed for metals. The Table 1 requirements for the field monitoring aspects are applicable for the collection of metals. Table 2 lists the laboratory data quality requirements for the metals analysis which follows the requirements specified for the NATTS program.

QA Project Plans

Field Monitoring

The field activities will utilize the $PM_{2.5}$ Performance Evaluation Program (PEP) approved QAPP and standard operating procedures (SOPs) with some minor modifications. The OAQPS PEP lead will make these modifications known to field operators through a Quality Bulletin.

Laboratory Analysis

Research Triangle Institute (RTI) will be responsible for the particulate filter preparation and analyses for both mass and metals analysis. RTI has a direct contract with EPA through the $PM_{2.5}$ Speciation Trends Network (STN) for mass analyses and has an approved QAPP and standard operating procedure applicable for the PM_{10} and $PM_{2.5}$ mass determination that meets the filter preparation and laboratory analysis requirements in Table 1. Metals analyses will be contracted through Eastern Research Group (ERG) that will subcontract this work to RTI. ERG has an approved QAPP that ensures that the metals analyses will meet the requirements in Table 2.

Overall Precision and Bias

Precision will be estimated through the implementation of collocated samplers. For each monitoring area, 1 site will be collocated with a second set of PM_{10} and $PM_{2.5}$ monitors. This collocated set will provide an indication of repeatability of the monitors in that study area. The samplers will collect a set of filters every three days and will be shipped to RTI for gravimetric and metals analyses.

Bias will be performed independently through PEP which is used to estimate bias of the routine $PM_{2.5}$ network. Filters for this performance evaluation will be prepared, dispersed and analyzed by the Region 4 PEP laboratory. However, since the PEP does not analyze for metals, the PEP filters will be archived and may be sent to RTI for metals analysis.

Auditing Activities

Audits provide one with some assurance that the quality system developed for monitoring program is being followed and therefore that the monitoring program should be providing data of known and adequate quality. The audits provided for this program are briefly explained.

Field Audits

Auditing of field activities will be implemented by the EPA Regions 4 and 6 through:

- **Technical systems audits (TSAs) -** This is an on-site evaluation that the requirements in the QAPP and SOPs are being followed. Once the PM_{10} and $PM_{2.5}$ monitors are installed and operators are trained, a TSA will be conducted to ensure that the monitoring is being properly conducted. Due to the nature of the program, corrective actions will take place upon immediate identification of a major finding. If a disagreement occurs, EPA must provide a satisfactory conflict resolution within 24 hours. An audit finding report for each audit will be generated within 1 week of the audit.

- **Quarterly Independent Monitor Audits-** Flow rate, temperature and barometric pressure will be verified using an independent audit instrument by an independent auditor every three months. This audit can be implemented in conjunction with a TSA..

Laboratory Audits-

Auditing of laboratory activities will be implemented through

- **Technical systems audits-** Similar to field audits, RTI currently undergoes a technical systems audit by the Office of Radiation and Indoor Air (ORIA) for the STN program mentioned earlier. This audit will sufficiently cover the laboratory activities for this study.

- **Proficiency Test Samples-** The NATTS program conducts a quarterly proficiency test program where audit samples of known concentration (not known to the analyst) are sent to the laboratories for analysis. These audits are used to determine laboratory data acceptability and RTI will be included in the next set of PTs for the duration of the study.

Data Quality Assessments

OAQPS in cooperation with the EPA Regions will review routine, quality control and audit data on a monthly basis and provide a summary report of the following attributes:

- Data completeness of routine and QC data
- Precision and bias assessments
- General status of quality activities (audits, TSAs, etc.)
- Issues/corrective actions

QA Requirements for PM10 and PM2.5 Monitoring [a] S- Single Filter, G- Group of filters (i.e. batch), G1-Group of filters from 1 instrument					
Criteria	**Acceptable Range**	**Frequency**	**Samples Impacted[a]**	**40 CFR Reference**	**QA Guidance Document 2.12 Reference**
Filter Holding Times					
Sample Recovery -K	# 4 hours from sample end date/time	all filters	S	Part 50, App. L Sec 10.10	Sec. 7.11
Post-sampling Weighing	# 10 days at 25E C from sample end date, or # 30 days at 4E C from sample end date	all filters	S	Part 50, App. L Sec 8.3	Sec. 7.11
Sampling Period (including multiple power failures) - K	1320-1500 minutes, or	all filters	S	Part 50, App.L Sec 3.3 Part 50, App.L Sec 7.4.15	
Sampling Instrument					
Average Flow Rate	average within 5% of 16.67 liters/minute	every 24 hours of op	S	Part 50, App.L Sec 7.4	
Variability in Flow Rate	CV # 2%	every 24 hours of op	S	Part 50, App.L Sec 7.4.3.2	
Filter					
Visual Defect Check (unexposed)	see reference	all filters	S	Part 50, App.L Sec 10.2	Sec 7.5
Filter Conditioning Environment					
Equilibration	24 hours minimum	all filters	G	Part 50, App.L Sec 8.2	Sec. 7.6
Temp. Range	24-hr mean 20-23E C	all filters	G	Part 50, App.L Sec 8.2	Sec. 7.6
Temp.Control	" 2E C SD* over 24 hr	all filters	G	Part 50, App.L Sec 8.2	Sec. 7.6
Humidity Range	24-hr mean 30% - 40% RH or # 5% sampling RH but > 20%RH	all filters	G	Part 50, App.L Sec 8.2	Sec. 7.6
Humidity Control	" 5% SD* over 24 hr.	all filters	G	Part 50, App.L Sec 8.2	Sec. 7.6
Pre/post Sampling RH	difference in 24-hr means # " 5% RH	all filters	S/G	Part 50, App.L Sec 8.3.3	
Balance	located in filter conditioning environment	all filters	G	Part 50, App.L Sec 8.3.2	
Filter Checks					
Exposure Lot Blanks	less than 15 Fg change between weighings	3 filters per lot	G	not described	Sec. 7.7
Filter Integrity (exposed)	no visual defects	each filter	S	not described	Sec. 8.2
Filter Holding Times					
Pre-sampling	< 30 days before sampling	all filters	S	Part 50, App.L Sec 8.3	Sec. 7.9
Lab QC Checks					

QA Requirements for PM10 and PM2.5 Monitoring

[a] S- Single Filter, G- Group of filters (i.e. batch), G1-Group of filters from 1 instrument

Criteria	Acceptable Range	Frequency	Samples Impacted[a]	40 CFR Reference	QA Guidance Document 2.12 Reference
Field Filter Blank	" 30 Fg change between weighings	10% or 1 per weighing session	G/G1	Part 50, App.L Sec 8.3	Sec. 7.7
Lab Filter Blank	" 15 Fg change between weighings	10% or 1 per weighing session	G	Part 50, App.L Sec 8.3	Sec. 7.7
Balance Check	#3 Fg	beginning, 10th sample, end	G	not described	Sec. 7.9
Duplicate Filter Weighing	" 15 Fg change between weighings	1 per weighing session	G	not described	Sec 7.11
Sampling Instrument					
Individual Flow Rates	no flow rate excursions > "5% for > 5 min. 1/	every 24 hours of op	S	Part 50, App.L Sec 7.4.3.1	
Filter Temp Sensor	no excursions of > 5E C lasting longer than 30 min 1/	every 24 hours of op	S	Part 50, App.L Sec 7.4	
Calibration/Verification					
External Leak Check	< 80 mL/min	1/4 weeks	G1	Part 50, App.L, Sec 7.4	Sec. 6.6 & 8.4
Temperature Calibration	" 2EC of standard	if multi-point failure	G1	Part 50, App.L, Sec 9.3	Sec. 6.4
One-point Temp Check	" 4EC of standard	1/4 weeks	G1	Part 50, App.L, Sec 9.3	Sec. 6.7 & 8.4
Pressure Calibration	" 10 mm Hg	on installation, then 1/yr	G1	Part 50, App.L, Sec 9.3	Sec. 6.5
Pressure Verification	" 10 mm Hg	1/4 weeks	G1	Part 50, App.L, Sec 9.3	Sec. 6.7 & 8.2
One-point flow rate check	" 4% of transfer standard	1/4 weeks	G1	Part 50, App.L, Sec 9.2.5	Sec 8.4
Flow Rate (FR) Calibration	" 2% of transfer standard	if multi-point failure	G1	Part 50, App.L, Sec 9.2	Sec 6.3
FR Multi-point Verification	" 2% of transfer standard	1/yr	G1	Part 50, App.L, Sec 9.2	Sec 6.3 & 6.7
Design Flow Rate Adjustment	" 2% of design flow rate	at one-point or multi-point	G1	Part 50, App.L, Sec 9.2.6	6.7
Clock/timer Verification	1 min/mo	1/4 weeks	G1	Part 50, App.L, Sec 7.4	Table 3-1
Mirobalance Calibration	Manufacturer's specification	1/yr	G	Part 50, App.L, Sec 8.1	Sec 7.2
Lab Temperature	" 2EC	1/6 months	G	not described	Sec 3.3
Lab Humidity	" 2%	1/6 months	G	not described	Sec 3.3
Precision					
Collocated Samples	CV ≤ 10% of samples > 6 Fg/m^3	every 3 days for 1 site per monitoring area	G	Part 58, App.A, Sec 3.5 and 5.5	Sec. 10.2
Accuracy					
Temperature Audit	" 2EC	4/yr	G1	not described	Sec. 10.2

QA Requirements for PM10 and PM2.5 Monitoring [a] S- Single Filter, G- Group of filters (i.e. batch), G1-Group of filters from 1 instrument					
Criteria	**Acceptable Range**	**Frequency**	**Samples Impacted[a]**	**40 CFR Reference**	**QA Guidance Document 2.12 Reference**
Pressure Audit	"10 mm Hg	4/yr	G1	not described	Sec. 10.2
Balance Audit	" 0.050 mg or manufacturers specs, whichever is tighter	1/yr	G	not described	Sec. 10.2
Flow Rate Audit	" 4% of audit standard " 5% of design flow rate	1/2wk (automated) 4/yr (manual)	G1	Part 58, App A, Sec 3.5	Sec. 10.1 & 10.2
Calibration & Check Standards (working standards)					
Field Thermometer	" 0.1E C resolution, " 0.5E C accuracy	1/yr	G/G1	not described	Sec 4.2 & 6.4
Field Barometer	" 1 mm Hg resolution, " 5 mm Hg accuracy	1/yr	G/G1	not described	Sec 4.2 & 6.5
Working Mass Stds. (compare to primary standards)	0.025 mg	1/3 mo.	G	not described	Sec 4.3 and 7.3
Monitor Maintenance					
Impactor VSCC - K	cleaned/changed	every 5 sampling events every 30 sampling events	G1	not described	Sec 9.2
Inlet/downtube Cleaning	cleaned	every 15 sampling event	G1	not described	Sec 9.3
Filter Chamber Cleaning	cleaned	monthly	G1	not described	Sec 9.3
Leak Check [@]	see ***Calibration/Verification***				
Circulating Fan Filter Cleaning	cleaned/changed	monthly	G1	not described	Sec 9.3
Manufacturer-Recommended Maintenance	per manufacturers' SOP	per manufacturers' SOP	G1	not described	not described
Data Completeness	$\geq$ 75%	quarterly	G1	Part 50, App. N, Sec. 2.1	
Reporting Units	Fg/m^3 at ambient temp/pressure	all filters		Part 50.3	Sec. 11.1
Detection Limit					
Lower DL	# 2 Fg/m^3	all filters	G/G1	Part 50, App.L Sec 3.1	
Upper Conc. Limit	$ 200 Fg/m^3	all filters	G/G1	Part 50, App.L Sec 3.2	
Standards Recertifications					
Flow Rate Transfer Std.	" 2% of NIST-traceable Std.	1/yr	G/G1	Part 50, App.L Sec 9.1 & 9.2	Sec. 6.3
Field Thermometer	" 0.1E C resolution, " 0.5E C accuracy	1/yr	G/G1		Sec 4.2.2

QA Requirements for PM10 and PM2.5 Monitoring [a] S- Single Filter, G- Group of filters (i.e. batch), G1-Group of filters from 1 instrument					
Criteria	**Acceptable Range**	**Frequency**	**Samples Impacted[a]**	**40 CFR Reference**	**QA Guidance Document 2.12 Reference**
Field Barometer	" 1 mm Hg resolution, " 5 mm Hg accuracy	1/yr	G/G1		Sec 4.2.2
Primary Mass Stds. (compare to NIST-traceable standards)	0.025 mg	1/yr	G		Sec 4.3.7
Microbalance					
Readability	1 Fg	at purchase	G	Part 50, App.L Sec 8.1	Sec 4.3.6
Repeatability	1Fg	1/yr	G	not described	Sec 4.3.6
Bias					
FRM Performance Evaluation Program -K	"10%	15% of sites 4/yr	G/G1	Part 58, App A, Sec 3.5	Sec 10.2

1/ value must be flagged`
***= variability estimate not defined in CFR**
@= Scheduled to occur immediately after impactor cleaned/changed.
CV= coefficient of variation

Measurement Quality Objections for Hazardous Air Pollutants at Full Air Toxics Sites

PROGRAM	REPORTING Units	ACCURACY Using Replicate Samples	Precision (CV) From collection Of Duplicate Samples	REPRESENTATIVES	COMPARABILITY/ Method Selection	COMPLETENESS	MINIMUM Detection Limits
SNMOC	Ppbv	30%	± 30%	NEIGHBORHOOD	GC-FID EPA Compendium Method TO-15	>85%	SEE TABLE 11-3 OF ERG CONTRACT QAPP
CARBONYLS	Ppbv	10%	± 20%	NEIGHBORHOOD	HPLC EPA Compendium Method TO-11A	>85%	SEE TABLE 11-5 OF ERG CONTRACT QAPP
SEMIVOLATILE	Total ug/m3 For XAD Thimbles, ng/m3 for PUF	30%	±30%	NEIGHBORHOOD	GC/MS EPA Compendium Method TO-13A & SW-846 Method 8270C	>85%	SEE TABLES 11-6 and 11-7 of ERG contract QAPP
METALS	NG/FILTER	20%	±20%	NEIGHBORHOOD	ICP-MS EPA Compendium Method 10-3.5	>85%	RESEARCH TRIANGLE Institute (RTI) QAPP (See Appendix D) and Section 11
HEXAVALENT Chromium	NG/FILTER	10%	± 30%	NEIGHBORHOOD	IC-UV DETECTOR CARB Method MLD 039	>85%	0.12 NG/L

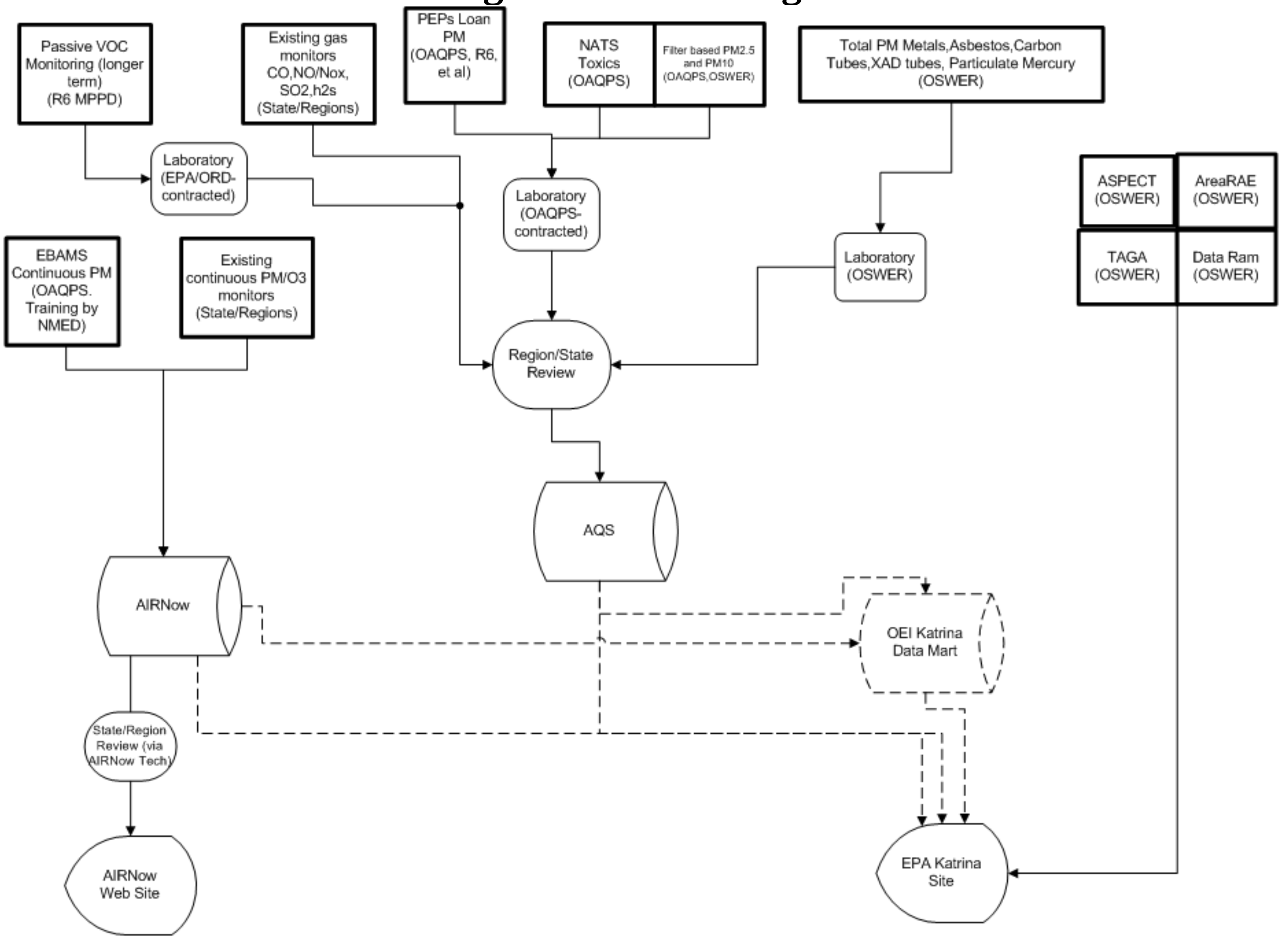
Summary of Quality Control Procedures for Metals Analysis (Method 10-3[29]) And Hexavalent Chromium (CARB 039[30])

Parameter	Frequency	Acceptance Criteria	Corrective Action
Multipoint calibration standards	Daily	Correlation coefficient ≥ 0.995	1) Repeat analysis of callibration standards. 2) Reprepare calibration standards and reanalyze.
Calibration check standard	Daily	Recovery 90-110%	1) Repeat analysis of calibration check standard. 2) Repeat analysis of calibration standards. 3) Reprepare calibration

			standards and reanalyze.
Continuing calibration verification standard	Every 10 samples	Recovery 90-110%	1) Repeat analysis of continuing calibration Verification sample 2) Reprepare continuing calibration. 3) Reanalyze samples since last acceptable Continuing calibration verification.
Duplicate and/or replicate analysis	On all duplicate samples/one every 10 samples	Relative standard deviation of ± 15-20% for all samples above 5 times MDL	1) Repeat analysis. 2) Flag data.
Method blanks	Every 10 samples	Analytes below MDL	1) Reanalyze. 2) Reprepare blank and reanalyze. 3) Correct contamination and reanalyze blank. 4) Repeat analyses of all samples since last clean clean blank.
LCS	One sample per batch	Recovery 90-110%	1) Reprepare sample batch. 2) Reanalyze.

29, 30 – Footnotes refer to footnotes in the ERG contract QAPP.

Attachment 2
Data Management Flow Diagram



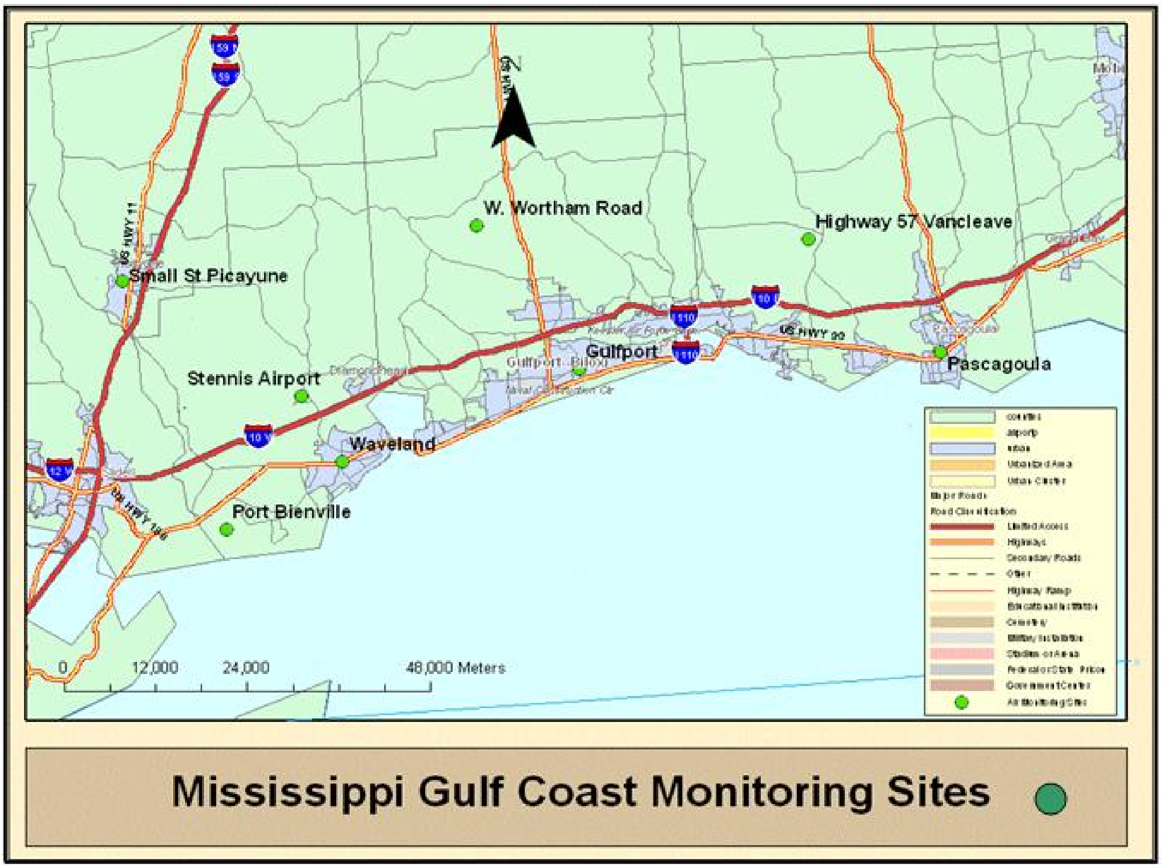
Proposed Katrina Air Data Flow Revised 09/29/2005

Attachment 3
Tentative Monitoring Sites in New Orleans

(Triangles indicate pre-storm sites; yellow circles indicate tentative sites for post-Katrina monitoring)

Attachment 4
Monitoring Sites in Coastal Mississippi

(Green circles represent pre-storm sites. Stennis site will be relocated.)



Attachment 5

Katrina Air Monitoring Schedule/Tracking Sheet - Louisiana
Best Information/Estimates as of: September 29, 2005

	Rapid Screening Data	Real Time Definitive Data on Ambient Air Quality	Time-Delayed Data
Description	**ASPECT airplane (and a similar DOE airplane) -** Remote sensing of chemical spills to guide emergency response work. Provides rough indicator of local concentrations of organic gases (benzene, etc.). **TAGA** – 2 mobile labs measuring organic gases, primarily to guide emergency response efforts. Concentration data for organic gases is high quality, but periods are short. TAGA measures VOC with several methods include real time GC, canisters and tedlar bags. OSWER – ERT- Duane Newell, Phil Campagna. **DataRAM -** About 7 hand-held nephelometer units provide rough estimate of inhalable PM. OSWER - ERT - Phil Compagna. **AreaRAE** – Handheld units measure a limited set of organic gases. Low precision. [Name of best contact?] **DOE Aircraft (GooneyBird?) –** Remote sensing of airborne and ground/water based pollutants? (Documentation on anhydrous ammonia plumes on FTP site: ftp://GooneyBird:DC_3HH!@216.81.41.189/)	**EBAMs** – Portable units with satellite data upload. Includes wind speed, direction. Will be mostly be used in pairs to measure both hourly PM10 and PM2.5. OAQPS – Jim Homolya & Nealson Watkins Region 6 – Becky Weber/Donna Ascenzi/Jim Ahfgani OSWER – Duane Newell, Phil Campagna **Fixed-site Continuous PM** – Standard state-operated monitors for hourly PM2.5 are being restored at pre-storm sites. Jennifer Mouton - LDEQ **Fixed-site NAAQS Gas Monitors** – Standard state-operated monitors for O3, SO2, CO, and NOx/NO (and H2s?) are being restored at pre-storm sites. Jennifer Mouton - LDEQ	**Passive VOC badges –** Organic **g**ases absorb onto badges carried worn by people or placed for 24 or 48 hours at a location of interest. Lab later analyzes badge for several air toxics of interest. Low precision. R6 operation only – Becky Weber, Donna Ascenzi **Summa VOC canisters –** Evacuated canisters are filled with ambient air at a site of interest. Lab later analyzes canister contents for a panel of toxic hydrocarbons. High precision. LDEQ operation only - Jennifer Mouton. **Carbon Tubes** – Tubes of absorbent carbon are loaded using a personal monitoring pump. Lab later analyzes for toxic gases. OSWER-ERT operation only - Phil Campagna) **PM filters –** Sampler draws ambient air through a filter, usually for 24 hours. Will usually be deployed in pairs to monitor for PM2.5 and PM10 simultaneously. Some samplers are battery operated and can be deployed before power is restored. Lab later analyzes filters for mass concentration and toxic metals including lead. High precision. OAQPS – Nealson Watkins & Dennis Crumpler R6 – Becky Weber, Donna Ascenzi OSWER – ERT – Duane Newll, Phil Campagna **Full Air Toxics Stations -** Several different samplers and media are used to collect gases, semi-volatile organics, and PM10. Lab later analyzes for full suite of air toxics including chemicals not measurable with Summa canisters. High precision. OAQPS- Mike Jones **Asbestos** – Can be collected on filters and analyzed in lab. OSWER – Phil Campagna. R6 – Becky Weber, Donna

	Rapid Screening Data	Real Time Definitive Data on Ambient Air Quality	Time-Delayed Data
			Ascenzi OAQPS – Deirdre Murphy
Why Collected, Risk Addressed	**ASPECT, TAGA, and AreaRAE** are primarily used for emergency response management: find spills, identify spilled material, tell whether it is safe to approach, etc. Also has provided the earliest indication of general air quality for toxics gases in areas of interest. **DataRAMs** have provided first indication of PM in areas with road activity, as can occur from resuspended flood deposits.	**Continuous PM** data can provide information on pollution from resuspended sediment or other dust-generating activity such as debris handling, and from open burning. No chemical analysis. **Fixed-site Continuous Gas Monitors** - Ozone data presently has little Katrina-related use. Other gases are useful for monitoring for possible problems caused by industry re-starts, etc.	**Passive VOC badges –**Air toxics from spills, spill-contaminated flood waters, and open burning. Personal exposures and ambient concentrations in areas where other monitoring for toxic gases is not possible. Low precision. **Carbon tubes** - Air toxics from spills, spill-contaminated flood waters, and open burning. Personal exposures and ambient concentrations in areas where other monitoring for toxic gases is not possible. Medium to low precision. **Summa VOC canisters** – Air toxics from spills, spill-contaminated flood waters, and open burning. More complete panel of toxic gases. High precision. **PM filters** – Mass concentration data can provide information on pollution from resuspended sediment or other dust-generating activity such as debris handling, and from open burning. Lab quantifies toxic metals. High precision. **Full Air Toxics** – Information on most air toxics risks from dust, open burning, mobile sources and any other significant sources affecting a location. Including aldehydes, PAHs, and other chemicals not otherwise measured, but does not include asbestos, dioxin/furans, or PCB. High precision. **Asbestos** – Asbestos may be released by demolition, debris handling, and/or burning. Data may guide these actions and inform public.
Sampling and Data Process; Cycle Time; Lab; Data management leadership	Real time display of concentrations to operators/responders. Typically planned on day 1, collected on day 2, and summarized overnight for air quality assessment and presentation to EPA managers on day 3. Data also entered into SCRIBE, etc. Data managed by OEM/ERT.	**Continuous PM or Gas measurements:** Hourly averages are automatically loaded into AIRNOW and are available on the internet within a hour or two. Limited access allowed for data review. Password protected unless full public access is granted.	**Generally** - Samples from several days of sampling may be bunched for efficient analysis. Delay needed between analysis and public posting to allow data transfer and state review of data **Passive VOC badges** – Lab analysis contract dependent. Region 6 is investigating.

	Rapid Screening Data	Real Time Definitive Data on Ambient Air Quality	Time-Delayed Data
			Carbon Tubes – Dependent upon OSWER – ERT contractor agreement. **Summa VOC** – Dependent upon LDEQ contractor agreement. **PM filters** – – Sampling, return shipping, lab analysis, and posting to AQS for agency review typically take about 10 days for mass concentration, 17 days for toxic metals. Agency controls start of public access. PM filters for battery-powered units will be analyzed by RTI for mass and toxic metals under OAQPS contract. **Full air toxics** - Sampling, shipping, lab analysis, and posting to AQS for agency review typically take about 17 days for all data. Agency controls start of public access. All samples analyzed by ERG under OAQPS contract. **Asbestos –** Sampling, shipping, and analysis by ERT or other lab typically takes 5 to 7 days. **Data management leadership** depends on office supervising the lab, unless otherwise arranged. Badges – Region 6 MPPD Carbon Tubes – OSWER - ERT Summa canisters –LDEQ PM filters –OAQPS Full Air Toxics – OAQPS Asbestos –OSWER - ERT
Siting	Determined by on-site team daily. OSWER – ERT - Phil Campagna.	**EBAMs --** 7 units available to site. Site locations are under review. **Continuous PM** – Kenner site operational with PM2.5 TEOM unit.	**Passive badges** – EPA – R6 will site as needed to provide ambient exposure data. Site locations are under review. **Carbon Tubes** – OSWER – ERT will site as needed to provide ambient exposure data. Site locations are under review. **Summa canisters -** LDEQ site and sample based on public complaint only. **Battery powered PM samplers** – Site locations are under review. Equipment available for 7 co-located PM10 & PM2.5 sites by 9/29. **AC- powered PM samplers** - Site locations are under

	Rapid Screening Data	Real Time Definitive Data on Ambient Air Quality	Time-Delayed Data
			review. **Full Air Toxics** – Two sites planned. Potentially Kenner site and one to be determined. **Asbestos** – Site locations are under review. To be collocated with PM samplers.
Number	Determined by on-site team daily. OSWER – ERT - Phil Campagna.	**EBAMs** – 7 loaned units on location in Baton Rouge. 4 new units to be purchased. 3 units identified for loans if needed.	**Passive badges** – number to be deployed will be determined each week **Carbon Tubes** – Unknown (OSWER –ERT) **Summa Canisters** – Unknown (LDEQ info.) **Battery powered PM samplers** – 14 BGI PQ200s. 7 for PM.25, 7 for PM10. **AC- powered PM samplers** – OSWER – ERT making up to 35 Hi-Vol PM10 units available. **Full Air Toxics** - 2 sites. **Asbestos** – Number to be determined
Current Status/Recent Events	Operations dictated by on-site team daily. OSWER – ERT - Phil Campagna.	**EBAM** – 7 units in Baton Rouge as of 9/26. State of New Mexico staff and R6 staff will provide training to OSWER staff and/or contractors possibly by 9/29/ **Continuous PM** - Kenner site is operational.	**Badges** are in Baton Rouge. Lab contract is being processed. **Battery powered PM samplers** - Six samplers enroute from Houston on 9/27. Three units enroute from OAQPS. Two units enroute from ORIA – Las Vegas. Three additional units enroute from EPA regions 7, 8, and 9. **AC- powered PM samplers** - PM10 samplers received, more on the way. PM2.5 samplers selected, need to be procured. **Full air toxics** - Detail plans for equipment and lab services complete. Deployment and start-up dependent on OAQPS contract funding. Site selection may also delay deployment. **Asbestos** – OSWER – ERT has lab services secured. Deployment and operations dependent upon site selection and ERT resources.

	Rapid Screening Data	Real Time Definitive Data on Ambient Air Quality	Time-Delayed Data
			Fixed-site NAAQS Gas Monitors – Kenner site is reporting hourly CO, SO2, NO/NOx/NO2, H2S, and PM2.5, with several days delay.
ETA for equipment arrival to Gulf Coast site(s)	On Site Now	**EBAMs** – Units in Baton Rouge as of 9/26.	**Badges** – 10/13/2005 **Battery powered PM samplers** - 14 BGI PQ200 units in Baton Rouge by 9/29. **AC-powered PM samplers** – Many PM10 samples there now. No ETA yet for additional PM2.5 samplers (ERT will purchase). **Full Air Toxics** - Dependent upon contract funding. Deployment and training will take one week after contract is funded
1st sampling period start	Ongoing	**EBAMs** - Dependent upon training, site selection, and susequent deployment. **Continuous PM** – Ongoing from Kenner site.	**Badges** – Upon site selection and deployment. **PM samplers** - Upon site selection and deployment. **Full Air Toxics** - Dependent upon contract funding and suitable site selection. Deployment and training will take one week after contract is funded
ETA 1st sample at lab	Not applicable or integrated.	Not Applicable	**Badges** - Dependent upon site selection and deployment. Sample at lab typically 2 days after collection. (EndOfSample + 2 Days) **PM samplers** – Dependent upon site selection and deployment. Sample at lab typically 2 days after collection. (EndOfSample + 2 Days) **Full Air Toxics** - Dependent upon contract funding. Deployment and training will take one week after contract

	Rapid Screening Data	Real Time Definitive Data on Ambient Air Quality	Time-Delayed Data
			is funded. Sample at lab typically 2 days after collection. (EndOfSample + 2 Days) **Asbestos -** Dependent upon site selection and deployment. Sample at lab typically 2 days after collection. (EndOfSample + 2 Days)
Data available for QA review by lead EPA office (spreadsheet or similar format)	Ongoing, end of each day	**EBAMs -** QA review is automatic. Data can be password protected if EPA wants to be first to see and develop any needed message. **Continuous PM -** Data goes through some QA during submission and posting to AIRNow.	**Badges** – Unknown. Dependent upon R6 lab contract data delivery requirements. **PM samplers** – Unknown, see below **Full Air Toxics** – Unknown, see below **Asbestos** – Typically 24 hours (per OSWER) (EndOfSample + 3 Days)
ETA for data to be on SCRIBE, AQS or AIRNOW for broader EPA/state review	???	**EBAMs** – Immediately upon start-up and submission to AIRSYS and then AIRNow. **Continuous PM -** Immediately upon start-up and submission to AIRNow.	**Badges -** Unknown. Dependent upon R6 lab contract data delivery requirements. **PM samplers -** Typically 10 days after sample collection for PM mass. Typically 17 days after sample collection for PM metals. (EndOfSample + 10 Days for mass) (EndOfSample + 17 Days for metals) **Full Air Toxics -** Typically 17 days after sample collection. (EndOfSample + 17 Days) **Asbestos –** Typically 5 to 7 days after sample collection. (EndOfSample + 7 Days)
ETA for public data	???	As soon as EPA chooses.	**Badges** – Upon EPA approval. **PM samplers** – Dependent upon time taken for stakeholder reviews. **Full Air Toxics -** Dependent upon time taken for stakeholder reviews. **Asbestos –** Dependent upon time taken for stakeholder reviews.

Attachment 6

Katrina Air Monitoring Schedule/Tracking Sheet – Region 4 - Mississippi
Best Information/Estimates as of: September 29, 2005

	Rapid Screening Data	Real Time Definitive Data on Ambient Air Quality	Time-Delayed Data
Description	NONE	**Fixed-site Continuous PM** – Standard state-operated monitors for hourly PM2.5 are being restored at 2 pre-storm sites, and one new/relocated site. R4- Danny France & Richard Guillot **Fixed-site NAAQS Gas Monitors** – Standard state-operated monitors for O3 are being restored at pre-storm sites. R4 – Danny France & Richard Guillot **EBAMs** – Portable units with satellite data upload. Includes wind speed, direction. Will be mostly be used in pairs to measure both hourly PM10 and PM2.5. OAQPS – Jim Homolya & Nealson Watkins Region 4 – Danny France & Richard Guillot	**PM samplers –** Sampler draws ambient air through a filter, usually for 24 hours. Will usually be deployed in pairs to monitor for PM2.5 and PM10 simultaneously. Some samplers are battery operated and can be deployed before power is restored. Lab later analyzes filters for mass concentration and toxic metals including lead. High precision. OAQPS – Nealson Watkins & Dennis Crumpler R4 – Danny France, Richard Guillot, Greg Noah **Full Air Toxics Stations -** Several different samplers and media are used to collect gases, semi-volatile organics, and PM10. Lab later analyzes for full suite of air toxics including chemicals not measurable with Summa canisters. High precision. OAQPS- Mike Jones R4 – Danny France & Richard Guillot **Asbestos** – Can be collected on filters and analyzed in lab. R4 – Danny France & Richard Guillot OAQPS - Deirdre Murphy
Why Collected, Risk Addressed	NONE.	**Continuous PM** data can provide information on pollution from resuspended sediment or other dust-generating activity such as debris handling, and from open burning. No chemical analysis. **Fixed-site Continuous Gas Monitors** - Ozone data presently has little Katrina-related use. Other gases are useful for monitoring for	**PM samplers** – Mass concentration data can provide information on pollution from resuspended sediment or other dust-generating activity such as debris handling, and from open burning. Lab quantifies toxic metals. High precision. **Full Air Toxics** – Information on most air toxics risks from dust, open

	Rapid Screening Data	Real Time Definitive Data on Ambient Air Quality	Time-Delayed Data
		possible problems caused by industry re-starts, etc.	burning, mobile sources and any other significant sources affecting a location. Including aldehydes, PAHs, and other chemicals not otherwise measured, but does not include asbestos, dioxin/furans, or PCB. High precision. **Asbestos** – Asbestos may be released by demolition, debris handling, and/or burning. Data may guide these actions and inform public.
Sampling and Data Process; Cycle Time; Lab; Data management leadership	NONE.	**Continuous PM or Gas measurements:** Hourly averages are automatically loaded into AIRNOW and are available on the internet within a hour or two. Limited access allowed for data review. Password protected unless full public access is granted. Data managed by OAR.	**Generally** - Samples from several days of sampling may be bunched for efficient analysis. Delay needed between analysis and public posting to allow data transfer and state review of data. R4 is data management lead until states re-engage. **PM samplers** – Sampling, return shipping, lab analysis, and posting to AQS for agency review typically take about 10 days for mass concentration, 17 days for toxic metals. Agency controls start of public access. PM filters for battery-powered units will be analyzed by RTI for mass and toxic metals under OAQPS contract. R4/OAQPS data management leads. **Full air toxics** – Sampling, shipping, lab analysis, and posting to AQS for agency review typically take about 17 days for all data. Agency controls start of public access. All samples analyzed by ERG under OAQPS contract. OAQPS & R4 data management leads. **Asbestos –** Sampling, shipping, and analysis by ERT or other lab typically takes 5 to 7 days. If ERT contract is used, data will be handled by OSWER – ERT. If OAR or Region 4 uses contracts, data will move through AQS. R4 will have the lead on data review and management.
Siting	NONE.	**Continuous PM** sites will be at pre-Katrina state air monitoring sites. Gulfport site operational with continuous PM2.5 (TEOM unit). Two TEOM sites to be set up by the state at	**PM samplers** – 3 fixed sites selected with potentially 5 more sites. 3 selected sites are in Pascagoula, Gulfport, and on NASA – Stennis / Stennis AFB property.

	Rapid Screening Data	Real Time Definitive Data on Ambient Air Quality	Time-Delayed Data
		Pascagoula and the Stennis site. **EBAMs –** Potentially for use at burn sites. Number and locations to be determined.	**Full air toxics** - NATTS sites. Two new sites selected: Gulfport, and on NASA – Stennis / Stennis AFB property. Two pre-Katrina sites to sample more frequently: Pascagoula and Tupelo. **Asbestos -** – 3 fixed sites selected with potentially 5 more sites. 3 selected sites are in Pascagoula, Gulfport, and on NASA – Stennis / Stennis AFB property. These samplers will be collocated with any PM filter sampler sites.
Number	NONE.	**Continuous PM** – Gulfport site operational with PM2.5 TEOM unit. Potentially one more TEOM site to be set up by the state at Pascagoula.	**PM samplers** – 11 BGI PQ200 battery powered units available. **Full Air Toxics** – Gulfport and Stennis sites awaiting ERG contract for equipment. Pascagoula and Tupelo already equipped. **Asbestos** – At least 8 units available.
Current Status/Recent Events	NONE.	**Continuous PM** – Gulfport and Pascagoula sites operational with PM2.5 TEOM units.	**PM samplers** - Detailed plans for equipment and lab services complete. Region 4 re-deploying equipment to Mississippi 9/27 – 9/29. Operations dependent on lab contract funding. **Full air toxics** - Detail plans for equipment and lab services complete. Deployment and start-up dependent on OAQPS contract funding. **Asbestos** – Detailed plans for equipment and lab services un-settled. Lab analysis method will be modified AHERA. Contract vehicle for R4 samples is undefined.
ETA for equipment arrival to Gulf Coast site(s)	NONE.	**Continuous PM –** Dependent upon state deployment. **EBAMs** – Dependent upon request for equipment from R4.	**PM samplers** - At least 3 sites deployed 9/27 – 9/29. Remaining site deployment dependent upon site selection. **Full Air Toxics** – Dependent upon contract funding. Deployment and training will take one week after contract is funded. **Asbestos** - At least 3 sites deployed 9/27 – 9/29. Remaining site deployment

	Rapid Screening Data	Real Time Definitive Data on Ambient Air Quality	Time-Delayed Data
			dependent upon site selection.
1st sampling period start	NONE.	**Continuous PM** – Gulfport site operational with PM2.5 TEOM unit. Pascagoula site dependendent on state actions; potentially operational by 10/5. .	**PM samplers** – Projected start up of 3 sites on 10/3. **Full Air Toxics** - Dependent upon contract funding. Deployment and training will take one week after contract is funded. **Asbestos** - Projected start up of 3 sites on 10/3.
ETA 1st sample at lab	NONE.	Not Applicable	**PM samplers** – Dependent upon site selection and deployment. Sample at lab typically 2 days after collection. Potentially 10/5. **Full Air Toxics** - Dependent upon contract funding. Deployment and training will take one week after contract is funded. Sample at lab typically 2 days after collection. **Asbestos** - Dependent upon site selection and deployment, and establishment of lab contract. Sample at lab typically 2 days after collection.
Data available for QA review by lead EPA office (spreadsheet or similar format)	NONE.	**Continuous PM –** Immediately, as data goes through some QA during submission and posting to AIRNow. **EBAMs** - QA review is automatic. Data can be password protected if EPA wants to be first to see and develop any needed message.	**PM samplers** – Unknown, see below **Full Air Toxics** – Unknown, see below **Asbestos** – Typically 24 hours (per OSWER) (EndOfSample + 3 Days)
ETA for data to be on SCRIBE, AQS or AIRNOW for broader EPA/state review	N/A.	**Continuous PM –** Immediately upon start-up and submission to AIRNow. **EBAMs** – Immediately upon start-up and submission to AIRSYS and then AIRNow.	**PM samplers** - Typically 10 days after sample collection for PM mass. Typically 17 days after sample collection for PM metals. (EndOfSample + 10 Days for mass) (EndOfSample + 17 Days for metals) **Full Air Toxics** - Typically 17 days after sample collection. (EndOfSample + 17 Days) **Asbestos –** Typically 5 to 7 days after sample collection. (EndOfSample + 7 Days)
ETA for	NONE.	As soon as EPA chooses.	**PM samplers** – Dependent

	Rapid Screening Data	Real Time Definitive Data on Ambient Air Quality	Time-Delayed Data
public data			upon time taken for stakeholder reviews. **Full Air Toxics** - Dependent upon time taken for stakeholder reviews. **Asbestos –** Dependent upon time taken for stakeholder reviews.

State of Louisiana
Department of Environmental Quality

KATHLEEN BABINEAUX BLANCO
GOVERNOR

MIKE D. McDANIEL, Ph.D.
SECRETARY

September 22, 2005

John Blevins, Director,
Compliance Assurance and Enforcement Division (6EN)
Carl E. Edlund, Director,
Multimedia Planning and Permitting Division (6PD)
U.S. EPA, Region 6
1445 Ross Avenue
Suite 1200
Dallas, Texas 75202-2733

RE: Request for concurrence with LDEQ's Debris Management Strategy

Dear Mr. Blevins and Mr. Edlund:

In the aftermath of Hurricane Katrina, it is estimated that approximately 260,000 homes were damaged and may have to be demolished. Based on information obtained from the 2000 US Census (i.e. date home constructed), an estimated 170,000 of these homes may potentially contain asbestos. The debris generated from the demolition of homes and other structures must be removed from the affected areas. Demolition in New Orleans alone is expected to generate twelve million tons of debris. Disposal of such a large amount of debris presents many challenges, especially so in the area of waste segregation. Because of public health and safety issues, there is a real need to complete demolition and disposal as expeditiously as possible.

The LDEQ has received and reviewed the "Demolition Guidance for Structurally Unsound Buildings Damaged by Hurricane Katrina" and the "Emergency Hurricane Debris Burning Guidance" provided by your staff. The LDEQ will attempt through a good faith effort to implement these guidance documents and federal and state requirements to the extent practical without impacting the timely clean-up and removal of material. The LDEQ is currently working to identify sites known to have Regulated Asbestos Containing Material (RACM) within the affected area.

The LDEQ strategy is focused on handling the material in as timely a fashion as possible to facilitate the clean-up and safe return of citizens to the affected area. While we plan to make a good faith effort to meet state and federal requirements and to take all feasible measures to remove and dispose of known RACM, the nature and urgency of the clean up efforts may result in the need to dispose of this asbestos containing material in other ways. Many of the structures that will have a need for immediate renovation, or more likely demolition, are subject to the requirement for a thorough investigation for the presence of asbestos in accordance with 40 CFR 61.145. However, the number of state accredited inspectors necessary to perform such inspections may be unavailable due to the exceptionally large number of such structures. Similarly, the LDEQ believes there may not be enough accredited asbestos workers available to segregate RACM from the rest of the debris.

Many residential and commercial structures containing asbestos are not regulated by the Department or are constructed of asbestos containing material not typically regulated by the Department. According to EPA's guidance, it is recommended that these structures also be inspected to identify and segregate asbestos containing material. As stated previously, an estimated 170,000 of the 260,000 damaged residential homes potentially contain asbestos.

The LDEQ believes the exposure to any fibers released during the demolition activity will be relatively short-term in nature. This short-term exposure scenario presents a low risk of adverse health impacts for workers. Since this work will largely occur in areas no longer inhabited, no adverse health impact to the general public is anticipated.

In addition, the LDEQ is planning to use combustion as one means of disposal as is the US Corps of Engineers. This would include the use of air curtain type of destructors with overfire air. Further, the LDEQ intends to require an amended water misting system on the exhaust side of the air curtain destructors to further reduce particulate emissions. The LDEQ also intends to provide air monitoring for asbestos and lead on the downwind side of the air curtain destructors. All of the air curtain destructors will be operated in uninhabitable areas of the city. The Department will conduct periodic representative sampling of ash prior to disposal or reuse. It is currently estimated that through the use of this method the New Orleans area will be free of demolition and debris within 6 months and reconstruction can begin. If the LDEQ were forced to inspect each individual structure for the presence of asbestos it could take years to complete the inspection and removal process before moving forward with reconstruction.

As you are aware the New Orleans area also faces the issue of the Formosan Termite. This organism is very hardy and cannot be allowed to escape from the New Orleans area. Combustion of the woody debris greatly facilitates the destruction of material that could contain these termites and further serves to contain them without the extensive, broad use of pesticides in the metropolitan area.

The LDEQ requests your concurrence that, given the circumstances, this is a reasonable approach for the timely removal and disposition of this debris resulting from Hurricane Katrina.

If you have any questions or need any further information, please contact Cheryl Nolan at (225) 219-3001 or Peggy M. Hatch at (225) 219-3715. Thank you in advance for your consideration.

Sincerely,

Harold Leggett, Ph.D.
Assistant Secretary
Office of Environmental Compliance

Building/Structural DebriA large number of damaged homes will be assessed in accordance with this plan as more fully described herein (Appendices 5.6 and 5.9). The Louisiana Department of Environmental Quality has provided the following estimates of the evaluations that will be made in the parishes as shown:

Parish	Total Number of Homes	Estimated Percentage of Homes Damaged	Estimated Number of Homes Damaged
Orleans	215,091	80%	172,078
Plaquemines	10,481	100%	10,481
St. Bernard	26,790	90%	24,111
Jefferson	187,907	30%	56,372
Total Homes Damaged			263,037

For those homes that will have to be demolished, the LDEQ plan outlines work to take place in 4 square block increments. Assessments will be made to determine whether the resulting debris can be reused, removed to landfills, burned or otherwise disposed. Where burning may occur, above ground pits will be constructed and air curtain destructors equipped with misters will be employed to burn waste. Ash will be collected and disposed or reused. Extensive monitoring will be conducted for both asbestos and lead. If monitoring indicates a concern, the burn rate will be reduced until monitoring show a return to acceptable levels. The LDEQ's best case estimate using this scenario indicates the demolition will be complete and sites ready to rebuild in six months following the necessary approvals under applicable state and federal statutes and/or authorities.