GLOBAL ENVIRONMENTAL CONSULTANTS, INC.
IAQ Specialists

IAQ (Indoor Air Quality)
Mold, Bioaerosols
Environmental & Food Microbiology
Building Materials & Environments

6614 Clayton Road #302 St. Louis, MO 63117 Ph. (314) 520-3386

10-17-06

Mr. Gerard Slay,
Deputy Director
Lambert St. Louis International Airport
P.O. Box 10036
St. Louis, Missouri 63145

Please reference Lambert Airport Smoking Lounge Evaluations and testing conducted on 9-16-06

Dear Mr. Slay;

At your request, we are submitting this **Environmental Testing Report** related to our 9-16-06 evaluations of exhaust efficiency of eight (8) Smoking Lounges at Lambert International Airport, as identified in our attached air quality sampling record sheets. This report contains our Laboratory Analytical Data, our Physical Survey (Inspection) report, and Digital Video images of smoke test exhaust recorded on the enclosed CD disc. In addition, it is our understanding, from your personnel, that the HVAC systems have been, and are currently balanced and functioning per design capacities.

Executive Summary:

It is our understanding that **Global Environmental Consultants, Inc. (GEC)** was contracted by Lambert International Airports to perform an objective evaluation of the referenced smoking lounges to attempt to determine whether they were performing in a satisfactory fashion with reference to design, and to attempt to determine if a significant amount of smoke, products of combustion, or nicotine were escaping from these lounges, into the adjacent airport corridors.

It is important to note that we (GEC) are Environmental Scientists, and Health & Safety Professionals. **We DO NOT condone cigarette smoking**, and believe that it has been repeatedly proven that smoking is harmful to your health. However, the purpose of this study was as indicated above, that is, to help determine the status of the smoking lounges with respect to their intended purpose. Our measurements included **Visual Smoke** flow tests, **Airborne Particulate** tests (Products of Combustion or "POC's"), and **Airborne Nicotine** tests. Reports of each of these parameters follow:

Testing and Evaluation Results:

- **Visual Smoke Test:** As can be seen in the digital video (mailed with the final report), we used a smoke generating tube to simulate exhaled, and burning-cigarette smoke, at **each** lounge. We discharged "puffs" of smoke in the center of each lounge, at the doorframe/corridor interface, and two feet out INTO the Terminal corridor. The purpose of discharging smoke in the Center of each lounge was to VISUALLY determine whether the smoke within the lounges was being "sucked" into the ventilation system when it originated IN the lounges. The doorway discharge was to determine, to some extent, IF a smoker standing in the doorway would impact on corridor air quality. ***It is our***

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scientific opinion that a viewing of the Visual information contained in the attached video data indicates that smoke exhausted from these smoke generators WAS aggressively pulled INTO the smoke lounge when generated AT the doorframe, and smoke generated just outside of each lounge door, at an average distance of two feet directly OUTSIDE of these doors, was still drawn INTO each smoking lounge. In addition, smoke generated at the Center of each lounge was aggressively drawn directly into the overhead exhausts. While this is not a quantifiable test method, it is important because it indicates that the functioning of the exhaust system is relatively INDEPENDENT of the number of smokers present at any given time. These observations also indicate that the exhaust systems are performing very well and are not allowing significant smoke to escape from the lounges.

- **Airborne Particulate Test:** We performed Airborne Particulate tests in three locations related to **each** smoking lounge (lab test reports attached). That is, the Center of each lounge, directly **in** the Doorway of each lounge, and ten (10) feet directly **in front of** the lounge doorway (into the corridor). The method used included using an instrument which collects a measured amount of air into a previously sealed cassette; this cassette contains a "sticky" glass slide. The slide is coated with an acrylic resin, which traps airborne particles. These cassettes are manufactured in a "clean room" environment. Each cassette was exposed to the same volume of measured air at each location. Once the sample is collected, it is opened in a laboratory clean "hood", and particles are microscopically categorized and quantified by a professional microscopist. The purpose of this test is to determine if there are any appreciable differences in amounts and types of airborne particles IN the smoking lounges, as compared to OUTSIDE of the smoking lounges. ***Since the nature of an Airport includes the presence of many particulate "products of combustion" (burned jet fuel etc.) in the OUTDOOR and INDOOR air, we were unable to identify a trend in significant concentration differences from one area to another (including the smoking lounges) regarding these types of particles. This is likely due to the fact that "makeup" air, which is (necessarily) drawn into the building, AND into the smoking lounges, contains the same particulate material found just outside of the building. In fact, one of the highest readings for particulates detected by this test was from the "OUTDOOR" sample. Again, these particles would be contributory to the particulate level INSIDE of the smoking lounges in the form of "make-up" air.***

- **Airborne Nicotine Tests:** We performed Airborne Nicotine tests according to NIOSH method #2551 (lab test reports attached). We performed this type of test at the request of Airport Representatives. However, from a scientific point of view, Airborne Nicotine testing in a public facility may be marginally useful. Measurement of Airborne Nicotine does NOT necessarily indicate its SOURCE. Nicotine, AND OTHER CIGARETTE SMOKE- related chemicals, can easily be carried in the clothing and personal belongings of smokers passing through the facility. These chemicals and other smoke-related ODORS are typically carried in sticky TARS associated with smokers. In our opinion, it would be possible for a public facility to have NO smoking lounges present, and for Tar, Nicotine, and smokers Odors, to be present throughout the facility causing other patrons to smell these chemicals. Nicotine measurements (tests) in the corridor COULD detect these chemicals, even in facilities where no smoking is allowed on sight. Therefore, we would question the significance of Nicotine test results. In addition, the NIOSH method and related Permissible Exposure Limits (PEL's) are intended to determine acceptable Nicotine levels IN THE

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WORK PLACE. We would hesitate to label a Smoking Lounge as part of a "work place"; however, the adjacent corridors could be considered areas which individuals might consider smoke free. Because of these issues, we believe that measurement of the effectiveness of the exhaust system (Visual Smoke test), and "Mechanical" exhaust measurements, are very important. Our Airborne Nicotine tests were conducted at similar locations, as were the Particulate tests. That is, we sampled **IN** the smoke lounges, **at the doorway**, and **ten (10) feet directly in front of the lounge door** (in the corridor). ***Essentially, we found NO Airborne Nicotine test result above the OSHA PEL (Permissible Exposure Limit). The acceptable limit is 0.5 mg/m3. The HIGHEST result we obtained in ANY of our tested locations was 0.019 mg/m3. This highest nicotine level was even lower than the highest levels we detected in our previous nicotine measurements in 2003.***

It is very important to note that ALL testing is only relevant for the period of time at which the samples were collected. In essence, test results are merely a "snapshot" in time, and the surrounding environment may change, not just day-to-day, but minute-to-minute. Samples collected on one day can vary dramatically from samples collected on any other. This is why measurement of the actual efficiency of the ventilation systems, by the HVAC Engineering firm, is very important.

Summary:

As we indicated, we do not condone smoking. Decisions regarding the presence or absence of Smoking Lounges at Lambert International Airport are clearly a decision to be made by Airport Administration. However, ***the Lounges do appear to be functioning in the manner intended***. That is; from a practical point of view, consideration should be made regarding the potential problems and enforcement logistics, which may result from removal of the lounges. We are aware that a few other airports have no smoking lounges and, perhaps their experiences could be helpful. Our findings indicate that:

1. **Visual Smoke tests** prove that the lounges are under sufficient "negative pressure" to "suck" smoke generated IN the lounges, AND smoke in and near the doorways, out trough their intended exhaust ports.
2. **Airborne Particle tests** indicate that particle counts inside and outside of the lounges are not significantly different. This is likely due to the inherent nature of airports where burning of jet fuels creates airborne particulate products of combustion. These particles are in OUTDOOR air and are sucked into lounges as "make-up" air. These results are as expected in properly functioning smoking lounges.
3. **Airborne Nicotine tests** revealed that NONE of the test results, either INSIDE the smoking lounges, or OUTSIDE the lounges in the CORRIDORS, exceeded the OSHA Permissible Exposure Limits for nicotine. In fact, the highest nicotine reading obtained was only approximately 40 % of that limit. **We would expect SOME nicotine to be present in airports as imported on travelers clothing and personal belongings.**

(Please note that, while we tested eight (8) smoking lounges for all test parameters indicated, we experienced a minor video camera malfunction while taping the visual smoke exhaust tests in ONE of the lounges. Therefore, the enclosed CD contains video of only seven visual tests. However, we herein attest

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that we personally and directly witnessed acceptable and aggressive smoke exhaust in ALL eight tested smoking lounges.)

Conclusions:

As we indicated in our earlier report, the smoking lounges appear to be ventilating adequately. As we also indicated, **as Environmental Scientists, we do not condone smoking and sincerely believe that cigarette smoke is hazardous to human health.** We understand that some large commercial Airports have removed smoking lounges completely, and we believe that removal of the smoking lounges from Lambert Airport is an option, which should be considered. However, we also believe that removal of these lounges may cause other problems. The potential for these problems should be considered and anticipated:

- Cigarette smokers are commonly known to undergo chemical withdrawal symptoms as time between cigarettes increases. This MAY cause smokers to take unusual risks, or act aggressively if denied an opportunity to smoke.

- We have been informed of instances where smokers, who have recently deplaned, and who have no smoking lounges available, nor time to leave the security areas, have smoked in restrooms. This has, at times, caused fires in waste receptacles and paper products, from the discarded cigarettes.

- We have also heard of instances where smokers will depart the security areas in order to smoke, while knowing they have little chance to return to the gate areas in time to board their connecting flight.

- Some of the circumstances described above, and a few similar others, have caused smokers to be aggressive and pose a security problem due to aggressive behavior when attempting to enter or exit gate areas.

Recommendations:

The decision to remove, or to keep, the Smoking Lounges at Lambert St Louis International Airport is an administrative one. ***Our testing indicates that the ventilation systems are working as designed.*** However, because of reasons and observations outlined in this report, and ***IF the lounges are retained***, we make the following recommendations:

IF THE SMOKING LOUNGES ARE RETAINED:

- Ensure that the Ventilation System is constantly and properly maintained. This includes regular checks of the effectiveness of the exhaust functions, ductwork integrity and cleaning, and filter changes.

- Do NOT allow occupants of Smoking Lounges to cross the threshold of the lounge doorway while smoking. A Yellow line painted on the floor, and warning signs, might be effective. We do not

know if these boundaries are enforceable by security personnel, but if they are, that may be advisable.

- Children should not be allowed in the Smoking Lounges. Again, this may not be enforceable.

- Visibility of smokers in the lounges by passengers in the corridor could be blocked. This could be accomplished by simply painting or covering the existing glass. We understand that this will do little to prevent smoke from escaping into the corridors, but it is our experience that a certain amount of psychosomatic issues MAY cause non-smokers to object to seeing smokers, AND cause smokers to desire smoking when seeing others smoke.

Copies of testing data are included with this report.

Respectfully Submitted,

Roman ("Ray") Narconis, Jr.
President,
*Environmental Scientist/Industrial Hygienist
Global Environmental Consultants, Inc.
St Louis, MO

***Roman Narconis is qualified as a Director of an American Industrial Hygiene Association (AIHA) Accredited Laboratory** which is specifically proficient in the analysis of **Environmental Microorganisms**. He is also a **Registered Professional Industrial Hygienist (RPIH), Registration # 07571100, with the Association of Professional Industrial Hygienists**, and **is a CMRS (Certified Mold Remediation Specialist), a full member of the American Industrial Hygiene Association (AIHA),** the **American Conference of Governmental Industrial Hygienists (ACGIH) and is a spokesperson for the American Lung Association on the subjects of Indoor and Outdoor Air Quality.**

EMSL Analytical, Inc.
107 Haddon Ave., Westmont, NJ 08108

Order ID:280601373

Attn:	Ray Narconis Global Environmental Consultants, Inc. 6614 Clayton Road #302 St. Louis, MO 63117	Customer ID: Customer PO: Date Received:	GLEC62 09/20/06 9:40AM
Fax:	618-692-7498	EMSL Order:	280601373
Project:	Airport	EMSL Project ID:	
Report Date:	09/25/06	Date Analyzed:	09/21/06

Nicotine Analysis by GC/NPD of Solid Sorbent Tubes via NIOSH 2551, Issue 1, 1/15/98

Sample ID	Location	Sampling Volume (liters)	Sample Weight (µg)	Sample Conc. (mg/m³)	Sample Conc. (PPM)	Reporting Limit (mg/m³)
#1 280601373-0001	SLE18 CNTR	30	0.56	0.019	0.0028	0.0033
#2 280601373-0002	SLE18 DOORWY	30	<0.10	<0.0033	<0.00050	0.0033
#3 280601373-0003	SLE18 10' OUT	30	<0.10	<0.0033	<0.00050	0.0033
#4 280601373-0004	SLE 12 CNTR	30	2.40	0.080	0.012	0.0033
#5 280601373-0005	SLE 12 DOORWY	30	<0.10	<0.0033	<0.00050	0.0033
#6 280601373-0006	SLE 12 10' OUT	30	<0.10	<0.0033	<0.00050	0.0033
#7 280601373-0007	SLE2157 CNTR	30	0.75	0.025	0.0038	0.0033
#8 280601373-0008	SLE2157 DOORWY	30	0.13	0.0043	0.00065	0.0033
#9 280601373-0009	SLE2157 10' OUT	30	<0.10	<0.0033	<0.00050	0.0033
#10 280601373-0010	UNUSED LOUNGE CENTER	30	0.29	0.010	0.0015	0.0033
#11 280601373-0011	UNUSED LOUNGE DOORWY	30	<0.10	<0.0033	<0.00050	0.0033
#12 280601373-0012	UNUSED LOUNGE 10' OUT	30	<0.10	<0.0033	<0.00050	0.0033
Desorption Blank	LAB QC BLANK	0	<0.10	N/A	N/A	N/A

Ellen Brunner
Analyst

Scott VanEtten - Lab Manager
Or other approved signatory

EMSL Analytical, Inc.
107 Haddon Ave., Westmont, NJ 08108

Order ID:280601373

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Nicotine Analysis by GC/NPD of Solid Sorbent Tubes via NIOSH 2551, Issue 1, 1/15/98

Sample ID	Location	Sampling Volume (liters)	Sample Weight (µg)	Sample Conc. (mg/m^3)	Sample Conc. (PPM)	Reporting Limit (mg/m^3)
#13 280601373-0013	ACCROSS FROM 125 CENTER	30	9.85	0.028	0.0043	0.0033
#14 280601373-0014	ACROSS FROM 125 DOORWAY	30	0.10	0.0033	0.00050	0.0033
#15 280601373-0015	ACROSS FROM 125 10' OUT	30	<0.10	<0.0033	<0.00050	0.0033
#16 280601373-0016	GATE B6 LOUNGE CENTER	30	0.25	0.0083	0.0013	0.0033
#17 280601373-0017	GATE B 6 LOUNGE DOOR DOORWAY	30	0.14	0.0047	0.00070	0.0033
#18 280601373-0018	GATE B6 LOUNGE 10' OUT	30	<0.10	<0.0033	<0.00050	0.0033
#19 280601373-0019	STANDALONE BETWEEN A+B GATES CNTR	30	0.58	0.019	0.0029	0.0033
#20 280601373-0020	STANDALONE A+B GATES DOORWAY	30	1.30	0.043	0.0065	0.0033
#21 280601373-0021	STANDALONE A+B GATES 10' OUT	30	<0.10	<0.0033	<0.00050	0.0033
#22 280601373-0022	GATE CONT CENTER	30	2.31	0.077	0.012	0.0033
#23 280601373-0023	GATE CONT DOORWAY	30	<0.10	<0.0033	<0.00050	0.0033
#24 280601373-0024	GATE CONT 10' OUT	30	<0.10	<0.0033	<0.00050	0.0033
#25 280601373-0025	CONTROL	30	<0.10	<0.0033	<0.00050	0.0033

Ellen Brunner
Analyst

Scott VanEtten - Lab Manager
Or other approved signatory

EMSL Analytical, Inc

11040 Lin-Valle Dr. St. Louis, MO 63123
Phone: 314-845-8910, Fax: 314-845-6459

Client: Global Environmental Consultants, Inc
6614 Clayton Road #302
St. Louis, MO 63117
Attn. Ray Narconis
Project: Lambert - Products of Combustion

Reference: 390602617
Date Reported: 09/26/06
Date/Time Received: September 19, 2006
Date Analyzed: 9/25/06-9/26/06
Analyst: D. Schmidt

"Products of Combustion"
EMSL M001 modified - POC Analysis

EMSL Sample Number	Client Identification	Sample Volume (L)	POC's per cubic meter	Comments
390602617-0001	9896221	150	7464	E18 CNTR
390602617-0002	11275402	150	2838	E18 DOOR
390602617-0003	11275321	150	4988	E18 10' OUT
390602617-0004	9931128	150	8397	E12 CNTR
390602617-0005	11275408	150	10610	E12 DOOR
390602617-0006	9931125	150	14056	E12 10' OUT
390602617-0007	10335742	150	1352	E21ST CNTR
390602617-0008	10335747	150	1663	E21ST 10'OUT
390602617-0009	1033536	150	576	ACROSS D-16 CNTR
390602617-0010	10335717	150	1530	ACROSS D-16 DOOR
390602617-0011	1033572*	150	909	ACROSS D-16 10'OUT
390602617-0012	10335673	150	1131	ACROSS C-25 CNTR
390602617-0013	10335640	150	1064	ACROSS C-25 DOOR
390602617-0014	10335716	150	1641	ACROSS C-25 10'OUT
390602617-0015	10335682	150	1463	GATE B6 ~~DOOR~~ 10' OUT
390602617-0016	10323067	150	576	GATE B6 DOOR
390602617-0017	10323011	150	1995	B6 CENTER
390602617-0018	10323062	150	2794	BETWEEN A+B CNTR
390602617-0019	10323084	150	4079	BETWEEN A+B DOOR
390602617-0020	10323009	150	2483	BETWEEN A+B 10'OUT
390602617-0021	10323066	150	2550	GATE CONT.2 CNTR
390602617-0022	10323085	150	1308	GATE CONT.B DOOR
390602617-0023	10323073	150	2927	GATE CONT.B 10'OUT
390602617-0024	10323027	150	8868	OUTDOORS
390602617-0025	10335735**	150	2705	E21ST DOOR
	*Cassette number 10335712			
	~~**Sample ID not on Client COC~~			

Analytical Sensitivity is 22 particles per cubic meter

Approved EMSL Analytical Inc. Signatory
Jeffrey W. Siria PhD, Laboratory Manager