SPONGE-JET

Surface Preparation Technology

April 14, 2003

Sponge – Jet, Inc.
Mr. Michael Merritt
President
235 Heritage Ave.
Suite 2
Portsmouth, NH 03801

Dear Mr. Merritt:

According to our conversation, we are sending to your office the documentation about the consult that the Puerto Rico's Environmental Protection Agency perform as per our request about the use of the Sponge – Jet System.
The Air Quality Board Director went to the project to see the Sponge- Jet system working and we hire an Independent Environmental Laboratory to perform a Total Nuisance Dust Analysis- Respirable Dust NIOSH Method 0600.
After the visit to the project and review the air samples report the Air Quality Board submit to us a formal letter informing that is not required to submit any permit to perform surface preparation projects using the sponge-jet system. They make an special reference to the regulations because the sponge – jet system never exceed the parameters regulated by law and they compare with the black beauty blasting that required permit from the Air Quality Board and also required special enclosure preparations.
If you have any doubt or concern, please do not hesistate to contact our office for more information.

Cordially,

Marilyn Fresse.

Marilyn Fresse
Office Manager

GARDEN HILLS PLAZA PMB 150 # 1353 CARR. 19 GUAYNABO, PR 00966 TEL: 787-775-2597 \ 787-775-2563

ESTADO LIBRE ASOCIADO DE PUERTO RICO / OFICINA DE LA GOBERNADORA

JUNTA DE CALIDAD AMBIENTAL

24 de marzo de 2003

SRA LUZ AIDA LÓPEZ
SENIOR PROJECT MANAGER
ENVIRO RESOURCES INC
5 B AGUAS BUENAS
BONEVILLE HEIGHT
CAGUAS PR 00725

Estimada señora López:

Re: CAI-2003-06
Soplado de Abrasivos con Esponja
(Sponge-Jet Blasting Solution)
Baymón, Puerto Rico

El Área de Calidad de Aire, evaluó su consulta sobre el nuevo proceso de limpieza y preparación de superficie, el cual utiliza esponjas de uretano con abrasivo adherido.

Actualmente, es utilizado el proceso en seco de limpieza de soplado de abrasivos metálicos, que utiliza *Black Beauty (Sand Blasting)*, el cual requiere someter un permiso para operar una fuente de emisión ya que éste proceso no cumple con la Regla 206 (C) (1) del Reglamento para el Control de la Contaminación Atmosférica (RCCA). No obstante, están considerando reemplazar este método por el uso del método de S*ponge-Jet Blasting Solution* (Tecnología de Micro-encapsulado) el cual es un proceso en seco y durante la aplicación del material de esponja sobre la superfice de metal, hierro, etc. produce poco particulado el cual cae al suelo. No crea nube de polvo durante la operación, debido a que la esponja de uretano encapsula el mismo. El material de esponja sobre el suelo será recogido para ser reciclado y utilizado nuevamente.

La Regla 206 (C) (1) del Reglamento para el Control de la Contaminación Atmosférica (RCCA), establece que equipo de limpieza por impulsión de aire que use abrasivo en suspensión acuosa, está exenta de solicitar permiso fuente de emisión.

Informamos que el proceso de limpieza de soplado de abrasivos con esponja de uretano S*ponge-Jet Blasting Solution* (Tecnología de Micro-encapsulada), no requerirá someter permiso en el Área de Calidad de Aire.

Si necesita más información, puede comunicarse con nosotros al (787) 767-8025 extensión 282.

Cordialmente,

Evelyn Rodríguez Cintrón
Directora
Programa Mejoramiento Calidad de Aire

AI/MRS/iqr/SopladoAbrasivos

ENVIRORESOURCES, INC.

Respirable Dust Sampling Report

II 14 B DEGETAU AVENUE
CAGUAS, PUERTO RICO
787-319-5618 787-381-5618

5B AGUAS BUENAS STREET
BONNEVILLE HEIGHT,
CAGUAS, PUERTO RICO 00725
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II 14B Degetau Avenue
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Caguas, Puerto Rico 00725

ENVIRORESOURCES, INC.

787-381-5618 *787-319-5618* *Fax: 787-745-1283*

February 28, 2003

Eng. Ricardo Colón
Empresas RC
Hato Rey, Puerto Rico

Sampling & Analysis Report
Sponge Blasting, Lilly Pipes
Bayamón, Puerto Rico

Dear engineer Colón:

Enviroresources, Inc. (ER) was retained to provide the samples analysis for the reference project. The sample collection, preparation and analysis were performed according to the Total Nuisance Dust Analysis-Respirable Dust -NIOSH Method 0600.

We appreciate the opportunity to offer our services and look forward to providing to continue doing business with you in the future.

If you have any questions or need additional information, please call us at 787-319- 5618 and 787-381-5618.

Cordially,

Luz A. López
Senior Project Manager

II 14B Degetau Avenue
Caguas, Puerto Rico

ENVIRORESOURCES, INC.

5B Aguas Buenas Street
Bonneville Height
Caguas, Puerto Rico

787-391-5619 787-319-5619 Fax: 787-745-1283

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CLIENT: Empresas RC	PROJECT: Sponge Blasting Process, Lilly Plant, Bayamón
SAMPLING METHOD: NIOSH 0600 RESPIRABLE DUST	JOB #: ER-03-003
	DATE: 2/26/03

SAMPLE ID	SAMPLE DATA	TIME ON	TIME OFF	TOTAL TIME	FLOW RATE IN	FLOW RATE FINAL	AVG. FLOW RATE	VOLUMEN	T
022603 ER01	Field Blank								
022603 ER02	Field Blank								
022603 ER03	Out side sample near the entrance	2:53	4:13	80 min	2.5 (LPM)	2.5	2.5	200 L	
022603 ER04	Outside sample near the entrance - replicated	2:53	4:13	80 min	2.5	2.2	2.35	188 L	
022603 ER05	Area sample, work center area	2:50	4:15	85 min	2.5	2.5	2.5	212.5 L	
022603 ER06	Area sample, work center area - replicated	2:50	4:15	85 min	2.5	2.5	2.5	212.5 L	
022603 ER07	Personal sample	2:51	4:16	85 min	2.5	2.5	2.5	212.5 L	

03 FEB 27 AM 10:

TAT: NORMAL ______ RUSH ______ OTHER 48 Hours

ROTAMETER # A2 POMP # 01, 02, 03, 04, 05

T: TYPE OF SAMPLE, BG BACKGROUND, CE: CLEANING, CL: CLEARANCE, EL: EXCURSION LIMIT, EX: EXPOSURE, FB: FIEL BLANK, OS: OUTSIDE, PP: PREPARATION, PR: PERSONAL, RM: REMOVAL

TYPE OF PROTECTION: H F. HALF FACE, FF: FULL FACE, PAPR: POWER AIR PURIFIED RESPIRATOR, C: TYPE C

COLLECTED BY: Raúl Matos	SIGNATURE: Raúl Matos	COMPANY: Enviroresources, Inc	DATE: 02/26/03
DELIVERED BY: Raúl Matos	SIGNATURE: Raúl Matos	COMPANY: Enviroresources, Inc	DATE: 02/26/03
RECIVED BY: [signature]	SIGNATURE:	COMPANY:	DATE: / /

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

Order ID:040302797

Attn	Raul Matos Envirosources, Inc. SB Aguas Buenas Street Bomboville Height Caguas, PR 00725	Customer ID: Customer PO: Date Received:	ESOU77 02/27/03 10:12AM
Fax:	787-745-1282		
Project:	ER-03-005 / Sponge Blasting Process, Lilly Pipes, Bayamon	EMSL Order: EMSL Project ID:	040302797
Report Date:	02/27/03	Date Weighed(final):	02/27/03

Respirable Dust Analysis
Performed by NIOSH Method 0600, Issue 2, 8/15/94

Sample ID	Identification	Volume (Liters)	Sample Weight (mg)	Concentration (mg/m^3)	Analytical Sensitivity (mg/m^3)
022603-ER01 040302797-0001	Field Blank	0	0.098	N/A	N/A
022603-ER02 040302797-0002	Field Blank	0	0.047	N/A	N/A
022603-ER03 040302797-0003	Outside sample near the entrance	200	0.146	0.730	0.010
022603-ER04 040302797-0004	Outside sample near the entrance-replicated	188	0.005	0.027	0.011
022603-ER05 040302797-0005	Area sample, work center area	212.5	0.444	2.089	0.009
022603-ER06 040302797-0006	Area sample, work center area-replicated	212.5	0.914	4.301	0.009
022603-ER07 040302797-0007	Personal sample	212.5	0.797	3.751	0.009

Discernable field blanks submitted with sample set.
Results are not field blank corrected.

The total and respirable dust concentrations in mg/m^3 are calculated based on initial filter weight data obtained by the filter manufacturer which can not be confirmed by EMSL Analytical, Inc.

Dave Stanhope
Lab Technician

Stephen Siegel
Stephen Siegel, CIH- Lab Manager
Or other approved signatory

AIHA Accredited - Laboratory ID #100194

PARTICULATES NOT OTHERWISE REGULATED, RESPIRABLE 0600

DEFINITION: aerosol collected by sampler with 4-µm median cut point

CAS: None RTECS: None

METHOD: 0600, Issue 3 EVALUATION: FULL Issue 1: 15 February 1984
Issue 3: 15 January 1998

OSHA : 5 mg/m³
NIOSH: no REL
ACGIH: 3 mg/m³

PROPERTIES: contains no asbestos and quartz less than 1%; penetrates non-ciliated portions of respiratory system

SYNONYMS: nuisance dusts; particulates not otherwise classified

SAMPLING

SAMPLER:	CYCLONE + FILTER (10-mm nylon cyclone, Higgins-Dewell [HD] cyclone, or Aluminum cyclone + tared 5-µm PVC membrane)
FLOW RATE:	nylon cyclone: 1.7 L/min HD cyclone: 2.2 L/min Al cyclone: 2.5 L/min
VOL-MIN:	20 L @ 5 mg/m³
-MAX:	400 L
SHIPMENT:	routine
SAMPLE STABILITY:	stable
BLANKS:	2 to 10 field blanks per set

ACCURACY

RANGE STUDIED: 0.5 to 10 mg/m³ (lab and field)

BIAS:	dependent on dust size distribution [1]
OVERALL PRECISION ($\hat{S}_{rT}$):	dependent on size distribution [1,2]
ACCURACY:	dependent on size distribution [1]

MEASUREMENT

TECHNIQUE:	GRAVIMETRIC (FILTER WEIGHT)
ANALYTE:	mass of respirable dust fraction
BALANCE:	0.001 mg sensitivity; use same balance before and after sample collection
CALIBRATION:	National Institute of Standards and Technology Class S-1.1 or ASTM Class 1 weights
RANGE:	0.1 to 2 mg per sample
ESTIMATED LOD:	0.03 mg per sample
PRECISION:	<10 µg with 0.001 mg sensitivity balance; <70 µg with 0.01 mg sensitivity balance [3]

APPLICABILITY: The working range is 0.5 to 10 mg/m³ for a 200-L air sample. The method measures the mass concentration of any non-volatile respirable dust. In addition to inert dusts [4], the method has been recommended for respirable coal dust. The method is biased in light of the recently adopted international definition of respirable dust, e.g., + +7% bias for non-diesel, coal mine dust [5].

INTERFERENCES: Larger than respirable particles (over 10 µm) have been found in some cases by microscopic analysis of cyclone filters. Over-sized particles in samples are known to be caused by inverting the cyclone assembly. Heavy dust loadings, fibers, and water-saturated dusts also interfere with the cyclone's size-selective properties. The use of conductive samplers is recommended to minimize particle charge effects.

OTHER METHODS: This method is based on and replaces Sampling Data Sheet #29.02 [6].

EQUIPMENT:

1. Sampler:
   a. Filter: 5.0-µm pore size, polyvinyl chloride filter or equivalent hydrophobic membrane filter supported by a cassette filter holder (preferably conductive).
   b. Cyclone: 10-mm nylon(Mine Safety Appliance Co., Instrument Division, P. O. Box 427, Pittsburgh, PA 15230), Higgins-Dewell(BGI Inc., 58 Guinan St., Waltham, MA 02154)[7], aluminum cyclone (SKC Inc., 863 Valley View Road, Eighty Four, PA 15330), or equivalent.
2. Personal sampling pump, 1.7 L/min ± 5% for nylon cyclone, 2.2 L/min ± 5% for HD cyclone, or 2.5 L/min ± 5% for the Al cyclone with flexible connecting tubing.
   NOTE: Pulsation in the pump flow must be within ± 20% of the mean flow.
3. Balance, analytical, with sensitivity of 0.001 mg.
4. Weights, NIST Class S-1.1, or ASTM Class 1.
5. Static neutralizer, e.g., Po-210; replace nine months after the production date.
6. Forceps (preferably nylon).
7. Environmental chamber or room for balance, e.g., 20C ± 1 °C and 50% ± 5% RH.

SPECIAL PRECAUTIONS: None.

PREPARATION OF SAMPLERS BEFORE SAMPLING:

1. Equilibrate the filters in an environmentally controlled weighing area or chamber for at least 2 h.
2. Weigh the filters in an environmentally controlled area or chamber. Record the filter tare weight, W (mg).
   a. Zero the balance before each weighing.
   b. Handle the filter with forceps (nylon forceps if further analyses will be done).
   c. Pass the filter over an anti-static radiation source. Repeat this step if filter does not release easily from the forceps or if filter attracts balance pan. Static electricity can cause erroneous weight readings.
3. Assemble the filters in the filter cassettes and close firmly so that leakage around the filter will not occur. Place a plug in each opening of the filter cassette.
4. Remove the cyclone's grit cap before use and inspect the cyclone interior. If the inside is visibly scored, discard this cyclone since the dust separation characteristics of the cyclone may be altered. Clean the interior of the cyclone to prevent reentrainment of large particles.
5. Assemble the sampler head. Check alignment of filter holder and cyclone in the sampling head to prevent leakage.

SAMPLING:

6. Calibrate each personal sampling pump to the appropriate flow rate with a representative sampler in line.
   NOTE 1: Because of their inlet designs, nylon and aluminum cyclones are calibrated within a large vessel with inlet and outlet ports. The inlet is connected to a calibrator (e.g., a bubble meter). The cyclone outlet is connected to the outlet port within the vessel, and the vessel outlet is attached to the pump. See APPENDIX for alternate calibration procedure. (The calibrator can be connected directly to the HD cyclone.)
   NOTE 2: Even if the flowrate shifts by a known amount between calibration and use, the nominal flowrates are used for concentration calculation because of a self-correction feature of the cyclones.
7. Sample 45 min to 8 h. Do not exceed 2 mg dust loading on the filter. Take 2 to 4 replicate samples for each batch of field samples for quality assurance on the sampling procedure (see Step 10).
   NOTE : Do not allow the sampler assembly to be inverted at any time. Turning the cyclone to anything more than a horizontal orientation may deposit oversized material from the cyclone body onto the filter.

SAMPLE PREPARATION:

8. Remove the top and bottom plugs from the filter cassette. Equilibrate for at least 2 h in an environmentally controlled area or chamber.

CALIBRATION AND QUALITY CONTROL:

9. Zero the microbalance before all weighings. Use the same microbalance for weighing filters before and after sample collection. Calibrate the balance with National Institute of Standards and Technology Class S-1.1 or ASTM Class 1 weights.
10. The set of replicate field samples should be exposed to the same dust environment, either in a laboratory dust chamber [8] or in the field [9]. The quality control samples must be taken with the same equipment, procedures, and personnel used in the routine field samples. Calculate precision from these replicates and record relative standard deviation (S) on control charts. Take corrective action when the precision is out of control [8].

MEASUREMENT:

11. Weigh each filter, including field blanks. Record this post-sampling weight, W(mg), beside its corresponding tare weight. Record anything remarkable about a filter (e.g., visible particles, overloading, leakage, wet, torn, etc.).

CALCULATIONS:

12. Calculate the concentration of respirable particulate, C (mg/ft), in the air volume sampled, V (L):

$$C = \frac{(W_2 - W_1) - (B_2 - B_1)}{V} \cdot 10^3, \ mg/m^3$$

where: W_1 = tare weight of filter before sampling (mg)
W_2 = post-sampling weight of sample-containing filter (mg)
B_1 = mean tare weight of blank filters (mg).
B_2 = mean post-sampling weight of blank filters (mg)
V = volume as sampled at the nominal flowrate (i.e., 1.7 L/min or 2.2 L/min)

EVALUATION OF METHOD:

1. Bias: In respirable dust measurements, the bias in a sample is calculated relative to the appropriate respirable dust convention. The theory for calculating bias was developed by Bartley and Breuer [10]. For this method, the bias, therefore, depends on the international convention for respirable dust, the cyclones' penetration curves, and the size distribution of the ambient dust. Based on measured penetration curves for non-pulsating flow [1], the bias in this method is shown in Figure 1.

   For dust size distributions in the shaded region, the bias in this method lies within the ± 0.10 criterion established by NIOSH for method validation. Bias larger than ± 0.10 would, therefore, be expected for some workplace aerosols. However, bias within ± 0.20 would be expected for dusts with geometric standard deviations greater than 2.0, which is the case in most workplaces.

   Bias can also be caused in a cyclone by the pulsation of the personal sampling pump. Bartley, et al. [12] showed that cyclone samples with pulsating flow can have negative bias as large as0.22 relative to samples with steady flow. The magnitude of the bias depends on the amplitude of the pulsation at the cyclone aperture and the dust size distribution. For pumps with instantaneous flow rates within 20% of the mean, the pulsation bias magnitude is less than 0.02 for most dust size distributions encountered in the workplace.

   Electric charges on the dust and the cyclone will also cause bias. Briant and Moss [13] have found

electrostatic biases as large as -50%, and show that cyclones made with graphite-filled nylon eliminate the problem. Use of conductive samplers and filter cassettes(Omega Specialty Instrument Co., 4 Kidder Road, Chelmsford, MA 01824) is recommended.

2. Precision: The figure 0.066 mg quoted above for the precision is based on a study [3] of weighing procedures employed in the past by the Mine Safety and Health Administration (MSHA) in which filters are pre-weighed by the filter manufacturer and post-weighed by MSHA using balances readable to 0.010 mg. MSHA [14] has recently completed a study using a 0.001 mg balance for the post-weighing, indicating imprecision equal to 0.006 mg.

   Imprecision equal to 0.010 mg was used for estimating the LOQand is based on specific suggestions [8] regarding filter weighing using a single 0.001 mg balance. This value is consistent with another study [15] of repeat filter weighings, although the actual attainable precision may depend strongly on the specific environment to which the filters are exposed between the two weighings.

REFERENCES:

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METHOD REVISED BY: David L. Bartley, Ph.D., NIOSH/DPSE/ARDB and Ray Feldman, OSHA.