February 19, 2020

Branch 2
03001183

Ms. Betsy Ullrich, Senior Health Physician
Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406-1415

Dear Ms. Ullrich:

This explanatory letter is to request an amendment for the University of Puerto Rico, Rio Piedras Campus (UPR-RP) license number 52-01986-04. Our institution is interested to amend incise 4.B to include Dr. Olga Mayol-Bracero into the license user list (curriculum vitae is included on Appendix A). Dr. Mayol-Bracero is a full Professor at the Environmental Science Department and her research works relates on Atmospheric Chemistry and Aerosols Research. For her research, Dr. Mayol-Bracero uses instruments with the following radiation sources:

Instrument	Instrument Qty	Radiation Type	Radionuclide	Maximum activity	Chem. form
Continuous Particular Monitor BAM-1020	2	Beta	^{14}C	75 uCi	Sealed source
Aerosol Charge Neutralizer Model 2U500 / Scanning Electrical Mobility Spectrometer (SEMS)	1	Alpha	^{210}Po	0.5 mCi each strip (2 strips for instrument)	Open source (Strip)
Aerosol Neutralizer	1		^{85}Kr	2 mCi	Sealed source

Since the first two instruments are new acquisitions, we are requesting these be included under the license with the following radionuclides (Appendix B and C):

Radionuclide	Maximum activity	Chem. form
^{14}C	150 uCi	Sealed source
^{210}Po	4 mCi	Open source (Strip)

All these instruments are under Dra. Olga Mayor -Bracero care and responsibility.

Cordially,

Dr. Luis A. Ferrao
Chancellor

NMSS/RGN1 MATERIALS-002

618200

c: Jorge Ramos, OPASO Director
Lymari Orellana, EHS Officer
Radiation Safety Committe - UPRRP

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EDUCATION

University of Puerto Rico, Ph.D., [redacted] Analytical Chemistry
University of Puerto Rico, MS, [redacted] Analytical Chemistry
University of Puerto Rico, BS, [redacted] Chemistry

RESEARCH INTERESTS

Chemical, physical, and optical properties of atmospheric aerosols. Size-resolved chemical composition and sources of aerosols in tropical regions (biomass burning, marine, African dust, urban, biogenic), carbonaceous aerosols with special interest in black carbon, aerosols and their role in cloud condensation nuclei properties. Aerosols-clouds-climate interactions and the impact of atmospheric aerosols on degradation of structures. Urban and local air pollution. Air quality.

EMPLOYMENT AND EXPERIENCE

January 2014 to present	Department of Environmental Science (former ITES), University of Puerto Rico FULL PROFESSOR and Director of the ATMOSPHERIC CHEMISTRY AND AEROSOLS RESEARCH LAB (ACAR)
January 2007 to 2013	Institute for Tropical Ecosystem Studies (ITES), University of Puerto Rico ASSOCIATE PROFESSOR
January 2002 to 2006	Institute for Tropical Ecosystem Studies, University of Puerto Rico ASSISTANT PROFESSOR
1998 to 2001	Max Planck Institute for Chemistry, Mainz, Germany POSTDOCTORATE Indian Ocean Experiment (INDOEX), Republic of Maldives Large-Scale Biosphere-Atmosphere Experiment in Amazonia (LBA-EUSTACH), Rondonia, Brazil

January 1989 to 1998	Environmental Analytical Laboratory, University of Puerto Rico FULL-TIME GRADUATE STUDENT
Summers of 1994-1997	Energy and Environment Division, Lawrence Berkeley National Laboratory, California RESEARCH ASSISTANT
Summer 1992	National Institute of Standards and Technology, Gaithersburg, Maryland RESEARCH ASSISTANT

RESEARCH ACCOMPLISHMENTS

Theses

Olga L. Mayol-Bracero, *Chemical and Physical Characterization of Submicron Organic Aerosols in the Tropical Trade Winds in the Caribbean*, Ph.D. Thesis, University of Puerto Rico, May 1998.

Olga L. Mayol-Bracero, *Evaluation of a Continuous Composite Sampler for Volatile Organic Compounds in Water*, MS Thesis, University of Puerto Rico, November 1993.

Books

Mayol-Bracero, O. L. Chapter 9: "Aire", In *Atlas Ambiental de Puerto Rico*, Eds. T. del Mar López-Marrero & N. Villanueva-Colón, La Editorial, Universidad de Puerto Rico, 2006, pp 89-98.

Peer-Reviewed Publications (total: 48)

1. Andrews, E., P.J. Sheridan, J.A. Ogren, D. Hageman, A. Jefferson, J. Wendell, A. Alastuey, L. Alados-Arboledas, M. Bergin, M. Ealo, A.G. Hallar, A. Hoffer, I. Kalapov, M. Keywood, J. Kim, S. Kim, F. Kolonjari, C. Labuschagne, N. Lin, A. Macdonald, **O.L. Mayol-Bracero**, I.B. McCubbin, M. Pandolfi, F. Reisen, S. Sharma, J.P. Sherman, M. Sorribas, and J. Sun, 0: Overview of the NOAA/ESRL Federated Aerosol Network, *Bull. Am. Meteorol. Soc., 100(1), 123–135 (doi:10.1175/BAMS-D-17-0175.1, 2019).*
2. Subramanian, R., Aja Ellis, Elvis Torres-Delgado, Rebecca Tanzer, Carl Malings, Felipe Rivera, Maité Morales, Darrel Baumgardner, Albert Presto, and **Olga L. Mayol-Bracero**, Air Quality in Puerto Rico in the Aftermath of Hurricane Maria: A Case Study on the Use of Lower Cost Air Quality Monitors, *ACS Earth and Space Chemistry*, 2(11), 1179-1186, DOI: 10.1021/acsearthspacechem.8b00079, 2018.
3. Schmeisser, L., Andrews, E., Ogren, J. A., Sheridan, P., Jefferson, A., Sharma, S., Kim, J. E., Sherman, J. P., Sorribas, M., Kalapov, I., Arsov, T., Angelov, C., **Mayol-Bracero, O. L.**, Labuschagne, C., Kim, S.-W., Hoffer, A., Lin, N.-H., Chia, H.-P., Bergin, M., Sun, J., Liu, P., and Wu, H.: Classifying aerosol type using in situ surface spectral aerosol optical properties, Atmos. Chem. Phys., 17, 12097-12120, https://doi.org/10.5194/acp-17-12097-2017, 2017.
4. Weinzerl, B. et al., The Saharan Aerosol Long-range TRansport and Aerosol-Cloud-Interaction Experiment (SALTRACE): overview and selected highlights, *BAMS*, DOI: 10.1175/BAMS-D-15-00142.1, 2017.

5. Denjean, C, P. Formenti, K. Desboeufs, S. Chevaillier, S. Triquet, M. Maillé, M.Cazaunau, B. Laurent, **O. L. Mayol-Bracero**, P. Vallejo, M. Quiñones, I. Gutierrez, F. Cassola, P. Prati, J. A. Ogren, E. Andrews Size distribution and optical properties of African mineral dust after intercontinental transport, J. Geophys. Res. Atmos., 121, 7117–7138, doi:10.1002/2016JD024783, 2016.
6. Andrade, M., N. Rojas, M. L. Melamed, **O. L. Mayol-Bracero,** M. Grutter, L. Dawidowski, J. C. Atuña, C. Rudamas, L. Gallardo, R. Mamani-Paco, M. Andrade, N. Huneeus, Fostering a collaborative atmospheric chemistry research community in the Latin America and Caribbean Region, *BAMS*, doi:10.1175/BAMS-D-14-00267.1, 2016.
7. Raga, G., Baumgardner, D., **O. L. Mayol-Bracero**, History of aerosol-cloud interactions derived from observations in mountaintop clouds in Puerto Rico, *Journal of Aerosol and Air Quality Research*, 16: 674–688, 2016.
8. Valle-Díaz, C.J., Torres-Delgado, E., Colón-Santos, S.M., Lee, T., Collett Jr., J.L., McDowell, W.H., **Mayol-Bracero, O.L.**, Impact of Long-Range Transported African Dust on Cloud Water Chemistry at a Tropical Montane Cloud Forest in Northeastern Puerto Rico, Journal of Aerosol and Air Quality Research, 16: 653–664, 2016.
9. DeMott, P., Hill, T.C.J., McCluskey, C.S., Prater, K.A., Collins, D.B., Sullivan, R.C., Ruppel, M.J., Mason, R.H., Irish, V.E., Lee, T., Hwang, C.Y., Rhee, T.S., Snider, J.R., McMeeking, G.R., Dhaniyala, S., Lewis, R.E., Wentzell, J. Abbatt, J., Lee, C., Sultana, C.M., Ault, A.P., Axson, J.L., Diaz-Martinez, M., Venero, I., Santos-Figueroa, G., Stokes, M.D., Deane, G.B., **Mayol-Bracero, O.L.,** Grassian, V.H., Bertram, T.H., Bertram, A.K., Moffet, B.F., and Franc, G.D., Sea spray aerosol as a unique source of ice nucleating particles, DOI 10.1073, PNAS, 2015.
10. Denjean, C., S. Caquineau, K. Desboeufs, B. Laurent, M. Maille, M. Quiñones Rosado, P. Vallejo, **O. L. Mayol-Bracero**, and P. Formenti, Long-range transport across the Atlantic in summertime does not enhance the hygroscopicity of African mineral dust, *Geophys. Res. Lett.*, 42, doi:10.1002/2015GL065693, 2015.
11. Fitzgerald, E.; Ault, A. P.; Zauscher, M.; **Mayol-Bracero, O. L.**; Prather, K. A. Comparison of mixing state of long-range transported Asian and African mineral dust. *Atmospheric Environment*, 115(0): 19-25, 2015.
12. Spiegel, J. K., N. Buchmann, **O. L. Mayol-Bracero**, L. A. Cuadra-Rodriguez, C. J. Valle Diaz, K. A. Prather, S. Mertes, W. Eugster Do cloud properties in a Puerto Rican tropical montane cloud forest depend on occurrence of long-range transported African dust? *Pure and Applied Geophysics*, DOI 10.1007/s00024-014-0830-y, 2014.
13. Prospero, J. M. and **O.L. Mayol-Bracero**, Understanding the Transport and Impact of African Dust, *B. Am. Meteorol. Soc.*, doi:10.1175/BAMS-D-12-00142.1, 2013.
14. Gioda, A., **O. L. Mayol-Bracero**, F. N. Scatena, K. C. Weathers, V. L. Mateus, and W. H. McDowell, Chemical constituents in clouds and rainwater in the Puerto Rican rainforest: Potential sources and seasonal drivers. *Atmos. Environ.*, 68, 208-220, 2013.
15. Trebs, I., **O. L. Mayol-Bracero**, T. M. Pauliquevis, U. Kuhn, R. Sander, L. Ganzeveld, F. X. Meixner, J. Kesselmeier, P. Artaxo, and M. O. Andreae (2012), Impact of the Manaus urban plume on trace gas mixing ratios near the surface in the Amazon Basin: Implications for the NO-NO2-O3 photo-stationary state and peroxy radical levels, *J. Geophys. Res.*, doi:10.1029/2011JD016386, 2012.

16. Erazo, A., **O. L. Mayol-Bracero**, R. R. Davila, Improving slow sand filters for low-income, water- limited communities, *Opflow*, http://dx.doi.org/10.5991/OPF.2012.38.0009, February 2012.
17. Fröhlich-Nowoisky, J., Burrows, S. M., Xie, Z., Engling, G., Solomon, P. A., Fraser, M. P.,**Mayol-Bracero, O. L.,** Artaxo, P., Begerow, D., Conrad, R., Andreae, M. O., Després, V. R., and Pöschl, U.: Biogeography in the air: fungal diversity over land and oceans, *Biogeosciences*, 9, 1125-1136, https://doi.org/10.5194/bg-9-1125-2012, 2012.
18. Gioda, A., G.J. Reyes-Rodriguez, G. Santos-Figueroa, J. Collett Jr., S. Decesari, M.C. Ramos, H.J.C. Bezerra Netto, F.R. Aquino Neto, **O.L. Mayol-Bracero**, Speciation of water-soluble inorganic, organic and total nitrogen in a background marine environment: cloud water, rainwater and aerosol particles, *Journal of Geophysical Research*, 116, doi:10.1029/2010JD015010, 2011.
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20. Martin, S. T., M. O. Andreae, P. Artaxo, D. Baumgardner, Q. Chen, A. H. Goldstein, A. Guenther, C. L. Heald, **O. L. Mayol-Bracero**, P. H. McMurry, T. Pauliquevis, U. Pöschl, K. A. Prather, G. C. Roberts, S. R. Saleska, M.A. Silva Dias, D. V. Spracklen, E. Swietlicki, and I. Trebs, Sources and Properties of Amazonian Aerosol Particles, *Reviews of Geophysics*, 48, RG2002, doi:10.1029/2008RG000280., 2010.
21. Reyes-Rodriguez, G.J, Gioda, A., **Mayol-Bracero, O.L.,** Collett, J.: Organic carbon and total nitrogen, and water – soluble ions in clouds from a tropical montane cloud forest in Puerto Rico, *Atmos. Environ.*, doi:10.1016/j.atmosenv.2009.05.049, 2009.
22. Gioda, A., **Mayol-Bracero, O.L.,** Reyes-Rodriguez, G.J., Santos-Figueroa, G., Collett Jr., J., Water-soluble organic and nitrogen levels in cloud and rainwater in a background marine environment under influence of different air masses, *Journal of Atmospheric Chemistry*, DOI 10.1007/s10874-009-9125-6, 2009.
23. Gioda, A., **O. L. Mayol-Bracero**, F. Morales-García, J. Collett, S. Decesari, L. Emblico, M. C. Facchini, R. J. Morales-De Jesús, S. Borrmann, S. Walter, J. Schneider, S. Mertes, Chemical composition of cloud water in the Puerto Rican Tropical Trade Winds, *Water, Air and Soil Pollution*, DOI 10.1007/s11270-008-9888-4, 2008.
24. Allan, J. D., Baumgardner, D., Raga, G. B., **Mayol-Bracero, O. L.**, Morales-García, F., García-García, F., Montero-Martínez, G., Borrmann, S., Schneider, J., Mertes, S., Walter, S., Gysel, M., Dusek, U., Frank, G. P., and Krämer, M.: Clouds and aerosols in Puerto Rico – a new evaluation, Atmos. Chem. Phys., 8, 1293-1309, https://doi.org/10.5194/acp-8-1293-2008, 2008.
25. Trebs, I., M. O. Andreae, W. Elbert, **O. L. Mayol-Bracero,** .L. L. Soto-García, Y. Rudich, A. H. Falkovich, W. Maenhaut, P. Artaxo, R. Otjes, J. Slanina, Aerosol inorganic composition at a tropical site: Discrepancies between filter-based sampling and a semi-continuous method, *Aerosol Science and Technology*, 42, 255-269, 2008.
26. Rauber, R.M., B. Stevens, H. T. Ochs III, C. Knight, B. A. Albrecht, A.M. Blyth, C.W. Fairall J. B. Jensen, S. G. Lasher-Trapp, **O. L. Mayol-Bracero,** G. Vali, J. R. Anderson, B. A. Baker, A.

R. Bandy, F. Burnet, J-L. Brenguier, W. A. Brewer, P. R. A. Brown, P. Chuang,W. R. Cotton, L. Di Girolamo, B. Geerts, H. Gerber, S. Göke1, L. Gomes, B. G. Heikes, J. G. Hudson, P. Kollias, R. P. Lawson, S. K. Krueger, D. H. Lenschow, L. Nuijens, D. W. O'Sullivan, R. A. Rilling, D. C. Rogers, A. P. Siebesma, E. Snodgrass, J. L. Stith, D. C. Thornton, S. Tucker, C. H. Twohy, P. Zuidema, "Rain in (Shallow) Cumulus over the Ocean—The RICO Campaign", *Bulletin of the American Meteorological Society,* 88, 1912-1928, 2007.

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28. Fuzzi, S., S. Decesari, M. C. Facchini, F. Cavalli, L. Emblico, M. Mircea, M.O. Andreae, I. Trebs, A. Hoffer, P. Guyon, P. Artaxo, L.V. Rizzo, L.L. Lara, T. Pauliquevis, W. Maenhaut, N. Raes, X. Chi, **O.L. Mayol-Bracero**, L.L. Soto-García, M. Claeys, I. Kourtchev, J. Rissler, E. Swietlicki, E. Tagliavini, G. Schkolnik, A.H. Falkovich, Y. Rudich, G. Fisch, L.V. Gatti, Overview of the inorganic and organic composition of size-segregated aerosol in Rondônia, Brazil, from the biomass burning period to the onset of the wet season, *J. Geophys. Res.,* D01201, doi:10.1029/2005JD006741, 2007.
29. Chand, D., P. Guyon, P. Artaxo, O. Schmid, **O. L. Mayol-Bracero**, G. Frank, L. V. Gatti, F.X. Meixner, M. A. L. Moura, M. O. Andreae, Optical and physical properties of aerosols in the boundary layer and free troposphere over the Amazon Basin during the biomass burning season, *Atmos. Chem. Phys.* 6, 2911-2925, 2006.
30. Ortiz-Zayas, J., E. Cuevas, **O.L. Mayol-Bracero,** L. Danoso, I. Trebs, D. Figueroa-Nieves, W. McDowell, Urban influences on the nitrogen cycle in Puerto Rico, *Biogeochemistry,* DOI 10.1007/s10533-006-9005-y, 79, 109-133, 2006.
31. Minvielle, F., G. Cautenet, M.O. Andreae, F. Lasserre, G. Foret, S. Cautenet, J.F. Leon, **O.L. Mayol-Bracero**, R. Gabriel, P. Chazette, R. Roca, Modelling the transport of aerosols during INDOEX 1999 and comparison with experimental data - 1: carbonaceous aerosol distribution, *Atmos. Environ., 38,* 1811-1822, 2004.
32. Minvielle, F., G. Cautenet, F. Lasserre, G. Foret, S. Cautenet, J.F. Leon, M.O. Andreae, **O.L. Mayol-Bracero**, R. Gabriel, P. Chazette, R. Roca, Modelling the transport of aerosols during INDOEX 1999 and comparison with experimental data. Part 2: Continental aerosols and their optical depth, *Atmos. Environ., 38,* 1823-1837, 2004.
33. Guyon, P., B. Graham, G. Roberts, **O.L. Mayol-Bracero**, W. Maenhaut, P. Artaxo, M.O. Andreae, Sources of optically active aerosol particles over the Amazon forest, *Atmos. Environ., 38,* 1039-1051, 2004.
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2003.

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37. Guyon, P., B. Graham, G. Roberts, **O.L. Mayol-Bracero**, W. Maenhaut, P. Artaxo, M.O. Andreae, In-canopy gradients, composition, sources and optical properties of aerosol over the Amazon forest, *J. Geophys. Res.*, 108, Art. No. 4591, 2003.
38. **Mayol-Bracero, O. L.**, M.O. Andreae, R. Gabriel, T.W. Kirchstetter, T. Novakov, J. A. Ogren, P. Sheridan, D. Streets, Carbonaceous aerosol over the Indian Ocean during INDOEX: Chemical characterization, optical properties, and probable sources, *J. Geophys. Res.*, 107, 10.1029/2000JD000039, 2002.
39. **Mayol-Bracero, O. L.**, P. Guyon, B. Graham, M.O. Andreae, P. Artaxo, M.C. Facchini, S. Decesari, S. Fuzzi, Water-soluble organic compounds in biomass burning aerosols over Amazonia: 2. Apportionment of the chemical composition and importance of the polyacidic fraction, *J. Geophys. Res.*, 107, 10.1029/2001JD000522, 2002.
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41. Dickerson, R. R., M.O. Andreae, T. Campos, **O.L. Mayol-Bracero**, C. Neususess, D.G. Streets, Emissions of Black Carbon and Carbon Monoxide from South Asia, *J. Geophys. Res.*, 107,10.1029/JD000501, 2002.
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43. Gabriel, R., **O.L. Mayol-Bracero**, M.O. Andreae, Chemical characterization of aerosol collected over the Indian Ocean: Water-soluble ions, *J. Geophys. Res., 107,* 10.1029/2001JD000034, 2002.
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Selected Presentations (from 2010 to present)

1. **Mayol-Bracero, O. L.** Atmospheric Chemistry and Aerosol Research (ACAR) Program at UPR-RP, NASA ROSES Workshop "Early Warning of Synoptic Air Quality Events to Improve Health and Well Being in the Greater Caribbean Region", January 27, 2020.
2. Torres-Delgado, E. and **O. L. Mayol-Bracero**, Deposition of water and nutrients in a Caribbean cloud forest influenced by aerosols from different sources, Abstract GC51l-0956, presented at 2020 AGU Fall Meeting, San Francisco, California, 9-13 December 2019.
3. Martínez-Sánchez, O., **O.L. Mayol-Bracero**, A. Heymsfield, Fifteen-Year Trend in African Dust Outbreaks across the Eastern Caribbean, Abstract 1A.1, presented at 2020 Annual Meeting, AMS, Boston, Massachusetts,10-14 January 2020.
4. Torres-Delgado, E., D. Baumgardner, **O. L. Mayol-Bracero**, Effects of African dust particles in the nutrient, radiation, and water budget of a tropical forest. American Association of Hispanics in Higher Education 14th annual conference, Costa Mesa, California, 28 Feb 2019.
5. Martínez-Sanchez, O., **O. L. Mayol-Bracero**, Andrew Heymsfield, Fifteen-year Trend in African Dust Outbreaks across the eastern Caribbean, AGU Fall Meeting, Washington, DC, December 2018.
6. León Bergodere, P. **Olga L. Mayol-Bracero,** Ernie R. Lewis, Arthur Sedlacek III, Stephen R. Springston, Intercomparison Of Particle-Soot Absorption Photometer (PSAP) Sample Filter Media, School of Atmospheric Measurements in Latin America and the Caribbean, San Juan, PR, November 2018.
7. Torres-Delgado, E., **O.L. Mayol-Bracero,** Effects Of African Dust In The Nutrient, Radiation, And Water Budget Of A Tropical Forest, School of Atmospheric Measurements in Latin America and the Caribbean, San Juan, PR, November 2018.
8. Morales Medina, M., **O. L. Mayol-Bracero**, Felipe Rivera, Elvis Torres-Delgado, R. Subramanian, Aja Ellis, Carl Malings, Rebecca Tanzer, Albert A. Presto, Low-Cost Sensors In The Study Of Air Quality In San Juan Metro Area Following Hurricane Maria, School of Atmospheric Measurements in Latin America and the Caribbean, San Juan, PR, November 2018.
9. Gómez-Andujar, N., E. Torres-Delgado, **O. L. Mayol-Bracero,** Temporal Relationships Between African Dust And Chlorophyll-A In The Eastern Caribbean Basin, School of Atmospheric Measurements in Latin America and the Caribbean, San Juan, PR, November 2018

10. Martínez-Sánchez, O., **Olga L. Mayol-Bracero**, Andrew Heymsfield, Fifteen-Year Trend In African Dust Outbreaks Across The Eastern Caribbean, School of Atmospheric Measurements in Latin America and the Caribbean, San Juan, PR, November 2018
11. **Avilés-Piñeiro, G., Gilmarie Santos-Figueroa, Olga L. Mayol-Bracero,** Long Term Monitoring Of Mineral "African" Dust Concentrations In Puerto Rico, School of Atmospheric Measurements in Latin America and the Caribbean, San Juan, PR, November 2018
12. Santos, G., B. Bolaños, **O. L. Mayol-Bracero,** Impact Of African Dust Incursions To Fungal Content And Aerosol Composition At The Caribbean Region, School of Atmospheric Measurements in Latin America and the Caribbean, San Juan, PR, November 2018.
13. **Mayol-Bracero, O. L.,** E. Torres, F. Rivera, M. Morales, R. Tanzer, C. Malings, A. Ellis, A. A. Presto, D. Baumgardner, S. Borrmann, R. Rondanelli, M. Del Hoyo, R. Losno, R. Subramanian, Air Quality in Puerto Rico in the Aftermath of Hurricane María, iCACGP-IGAC Conference, September 25, 2018, Takamatsu, Japan.
14. **Torres-Delgado, E.**, R. Subramanian, A. Ellis, C. Malings, R. Tanzer, M. Morales-Medina, F. Rivera-Adorno, D. Baumgardner, A. Presto, S. Borrman, R. Rondanelli, M. del Hoyo, R. Losno, **O. L. Mayol-Bracero,** Air quality monitoring in the San Juan Metro Area in the Aftermath of Hurricane María using lower-cost RAMP monitors, 10th International Aerosol Conference, St, Louis Missouri, USA, 06 Sep 2018, Oral.
15. **Mayol-Bracero, O.L.,** Physical, Atmospheric Chemistry and Aerosols Research at UPR-RP, Oral Presentation, Faculty Colloquium, August 2, 2017, Brookhaven National Laboratory, Upton, New York
16. **Mayol-Bracero, O.L.,** G. Santos, E. Torres, H. Rivera, J.A. Ogren, E. Andrews, P. Sheridan, Measurements of Atmospheric Particles at Cape San Juan Atmospheric Observatory, Puerto Rico (CPR station), WMO GAW Symposium, April 10-13, 2017, Geneva, Switzerland.
17. Torres, E., **O. L. Mayol-Bracero,** Overview of African dust studies at UPR's Atmospheric Chemistry and Aerosols Research Group, LTER site review, March 27-28, 2017, Luquillo, Puerto Rico
18. **Mayol-Bracero,** O.L., G. Santos-Figueroa, F. Morales-García, Dust Concentrations and Composition During African Dust Incursions in the Caribbean Region, Abstract #A21E-0124, AGU Fall Meeting, San Francisco, Calif., 12-16 Dec 2016
19. Torres, E., **O. L. Mayol-Bracero**, African Dust as a source of nutrients to a Tropical Montane Cloud Forest in the Caribbean, . IGAC Science Conference, 26-30 September 2016, Breckenridge, Colorado.
20. Santos, G., B. Bolaños-Rosero, S. M. Waters, J. K. Hatt, K. Konstantinidis, and **O. L. Mayol-Bracero**, Fungal content in aerosols at the Caribbean region during African Dust incursions, . IGAC Science Conference, 26-30 September 2016, Breckenridge, Colorado.
21. Reyes, R., **O. L. Mayol-Bracero**, S. Springston, J. Uin, E. Lewis, A. Sedlacek III, Aerosol sources during the wet and dry season of the GOAmazon 2014/15 campaign using the Ångström absorption exponent, BNL OEP Poster Session, August 11, 2016.
22. Rosado, J., **O. L. Mayol-Bracero**, A. Sedlacek III, E. Lewis, A comparison of different Aethalometer correction schemes, BNL OEP Poster Session, August 11, 2016
23. Torres-Delgado, E., R. Reyes, J. Rosado, **O. L Mayol-Bracero**, A. Sedlacek III, E. Lewis, S. Springston, J. Uin, Comparison of filter-based and in-situ black carbon measurements from

different combustion sources, BNL OEP Poster Session, August 11, 2016

24. **Mayol-Bracero, O.L.,** Atmospheric Aerosols Research in the Caribbean Island of Puerto Rico, Oral Presentation, EE Seminar, Environmental & Climate Sciences Dept., August 8, 2016
25. **Mayol-Bracero, O.L.,** Physical, Chemical and Optical Properties of Atmospheric Aerosols and their Impacts, Oral Presentation, Faculty Colloquium, July 12, 2016
26. Torres-Delgado, E., R. Reyes, J. Rosado, **O. L Mayol-Bracero**, A. Sedlacek III, E. Lewis, S. Springston, J. Uin, Comparison of filter-based and in-situ black carbon measurements during the GOAmazon 2014/15 campaign, 97th Annual AMS Meeting, Seattle, Washington, January 2017.
27. **Mayol-Bracero, O.L.** Aerosols Measurements in Puerto Rico, Annual Meeting of the WMO Scientific Advisory Group on Aerosols, June 1, 2016, Seoul, South Korea.
28. Mayol-Bracero, O. L. The IGAC's Americas Working Group and Aerosols Activities in Latin America and the Caribbean, Annual Meeting of the WMO Scientific Advisory Group on Aerosols, June 1, 2016, Seoul, South Korea.
29. Martinez, O. et al. 10-year trend in African Dust Episodes and its Effects on the Bimodal Rainfall Pattern across the Northeast Caribbean, 32nd Meeting of the American Meteorological Society – Hurricanes and Tropical Meteorology, San Juan, PR, April 17-22, 2016.
30. Torres, E. et al. Indirect Effect of African Dust Particles on Cloud Microphysical and Chemical Properties in a Tropical Montane Cloud Forest in the Caribbean, 32nd Meeting of the American Meteorological Society – Hurricanes and Tropical Meteorology, San Juan, PR, April 17-22, 2016.
31. Santos, G. et al. Chemical and Molecular Characterization of Aerosols in the Caribbean During African Dust Events: Focusing on Fungal Content, 32nd Meeting of the American Meteorological Society – Hurricanes and Tropical Meteorology, San Juan, PR, April 17-22, 2016.
32. Martinez, A. et al. A study of Black Carbon concentrations over Puerto Rico, 32nd Meeting of the American Meteorological Society – Hurricanes and Tropical Meteorology, San Juan, PR, April 17-22, 2016.
33. **Mayol-Bracero, Olga L.** Aerosols and Climate, Latin American and Caribbean Aerosol Measurements School: From measurements technologies to applications La Paz, Bolivia, June 22, 2015.
34. Torres-Delgado, E., C. J. Valle-Diaz, D. Baumgardener, W. H. McDowell, G. González, **O. L. Mayol-Bracero**, Understanding the effect of African dust particles on cloud chemistry and microphysics in a tropical montane cloud forest in the Caribbean. Latin American and Caribbean Aerosol Measurements School: From measurements technologies to applications, La Paz, Bolivia, 24 June, 2015.
35. Martínez Cortés, A. M., G. Mocnik, A. D. A. Hansen, **O. L. Mayol-Bracero**. A study of Black Carbon concentrations over Puerto Rico, presented at the Latin American and Caribbean Aerosol Measurements School: from measurements technologies to applications, La Paz, Bolivia, 24 June 2015.
36. **Mayol-Bracero, Olga L.** Properties and Impacts of Long-range Transported African Dust on Puerto Rico, Symposium on Airborne Dust, Climate Change, and Human Health, Miami, Florida, May 20, 2015

37. **Mayol-Bracero, Olga L.** Atmospheric Chemistry and Aerosols Research Group at UPR-RP, AMP UPRRP, Puerto Rico, May 1, 2015
38. Formenti, P., C. Denjean, K. Desboeufs, B. Laurent, S. Chevaillier, M. Maillé, M. Cazaunau, P. Vallejo, M. Quiñones, I.E. Gutierrez-Molina, F. Cassola, P. Prati, E. Andrews, J. Ogren, **O. L. Mayol-Bracero**, Size distribution and optical properties of long-range transported African dust, Abstract EGU2015-7702, presented at 2015 General Assembly, EGU, Vienna, Austria, 12-17 April 2015.
39. Denjean, C., S. Caquineau, K. Desboeufs, B. Laurent, M. Quiñones, P. Vallejo, **O. L. Mayol-Bracero**, P. Formenti, Does the long-range transport of African mineral dust across the Atlantic enhance their hygroscopicity?, Abstract EGU2015-7790, presented at 2015 General Assembly, EGU, Vienna, Austria, 12-17 April 2015.
40. Desbeoufs,K., . Formenti; S. Triquet; B. Laurent; C. Denjean; I. E. Gutteriez-Moreno; **O. L. Mayol-Bracero**, Characterisation of nutrients wet deposition under influence of Saharan dust at Puerto-Rico in Caribbean Sea, presented at 2015 General Assembly, EGU, Vienna, Austria, 12-17 April 2015.
41. Laurent, B., P. Formenti, K. Desboeufs, J. Vincent, C. Denjean, G. Siour, and **O. L. Mayol-Bracero**, Modeling of intercontinental Saharan dust transport: What consequences on atmospheric concentrations and deposition fluxes in the Caribbean? presented at 2015 General Assembly, EGU, Vienna, Austria, 12-17 April 2015.
42. Torres-Delgado, E., C. J. Valle-Diaz, D. Baumgardener, W. H. McDowell, G. González, **O. L. Mayol-Bracero**, Rain chemistry and cloud composition and microphysics in a Caribbean tropical montane cloud forest under the influence of African dust, presented at the European Geosciences Union General Assembly 2015, EGU, Vienna, Austria, 16 April 2015.
43. Vallejo, P., P. Fprmenti, K. Desboeufs, M. Quiñones, S. Chevaillier, S. Santos, E. Andrews, J.A. Ogren, **O. L. Mayol-Bracero**, Chemical Composition of the Aerosol Fine Fraction during African Dust Events as part of the Dust-ATtACk Experiment in the Caribbean Region, Abstract EGU2015-14063, presented at 2015 General Assembly, EGU, Vienna, Austria, 12-17 April 2015.
44. Torres-Delgado, E., C. J. Valle-Diaz, D. Baumgardener, W. H. McDowell, G. González, **O. L. Mayol-Bracero**, Impact of African dust on cloud and rain chemistry and cloud microphysics in Caribbean cloud forest, presented at the 35rd Puerto Rico Interdisciplinarity Scientific Meeting 50th Junior Technical Meeting, Universidad de Puerto Rico, Río Piedras Campus, San Juan, Puerto Rico, 29 March 2015.
45. Martínez Cortés, A. M., **O. L. Mayol-Bracero**. A study of equivalent black carbon concentrations over Puerto Rico using a light transmission method, presented at the 35th Puerto Rico Intedisciplinary Scientific Meeting (PRISM), 50th Junior Technical Meeting, University of Puerto Rico-RP, Puerto Rico, March 2015.
46. Valle-Díaz, C.J., E. Torres-Delgado, T. Lee, J.L. Collett Jr., W.H. McDowell, L.A. Cuadra-Rodríguez, K.A. Prather, **O.L. Mayol-Bracero**, Impact of long-range transported African dust events on cloud chemistry at a Caribbean tropical montane cloud forest. Abstract S3.3, presented at 13th Quadrennial iCACGP Symposium - 13th IGAC Science Conference on Atmospheric Chemistry, Natal, Brazil, 22-26 September 2014.
47. Torres-Delgado, E., C. J. Valle-Díaz, D. Baumgardner, W. H. McDowell, **O. L. Mayol-Bracero**,

Rain chemistry and cloud composition and microphysics in a tropical cloud forest under the influence of African dust, presented at the 13th Quadrennial ICACGP Symposium 13th IGAC Science Conference on Atmospheric Chemistry, Natal, Brazil 23 September 2014.

48. Quiñones, M., **O. L. Mayol-Bracero**, P. Vallejo, I. Gutiérrez, E. Andrews, J. A. Ogren, and P. Formenti, African dust impact on the size distribution of aerosols in the Caribbean: Observations from Atmospheric Observatory in Cabezas de San Juan, Puerto Rico, Abstract S149. 6th Symposium on Aerosol-Cloud-Climate Interactions, 94th Annual Meeting, American Meteorological Society, Atlanta, Georgia, 2-6 Feb 2014.
49. DeMott, P. J., T. C. Hill; M. J. Ruppel, K. A. Prather; D. B. Collins, J. L. Axson, T. Lee, C. Y. Hwang; R. C. Sullivan, G. R. McMeeking, R. Mason, A. K. Bertram, **O. L. Mayol-Bracero**, and E. R. Lewis (2014). Investigations of Marine Ice Nucleating Particles. Abstract 10.1. 6th Symposium on Aerosol-Cloud-Climate Interactions, 94th Annual Meeting, American Meteorological Society, Atlanta, Georgia, 2-6 Feb 2014.
50. Valle-Diaz, C.J., E. Torres-Delgado, T. Lee, J. L. Collett, L, A. Cuadra-Rodriguez, K. A. Prather, **O. L. Mayol-Bracero**, Impact of Long-Range Transported African Dust Events on Cloud Chemistry at a Caribbean Tropical Montane Cloud Forest, Abstract A41G-0160, presented at 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec 2013.
51. Martínez-Sánchez, O., **O. L. Mayol-Bracero**, P. Sepulveda-Vallejo, A. Heymsfield, Low and Mid Level Tropical Atmosphere Characterization during African Dust Outbreaks Using Particle Size Distribution Data Retrieved from ICE-T and PRADACS Field Studies, Abstract A23E-0307, presented at 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec 2013.
52. DeMott, P. J., T. C. Hill, M. J. Ruppel, K. A. Prather, D. B. Collins, J. l. Axson, T. Lee, C. Y. Hwang, R. C. Sullivan, G. R. McMeeking, R. Mason, A. K. Bertram, **O. L. Mayol-Bracero**, Ernie R. Lewis, Measurements to Fill Knowledge Gaps on Ice Nucleating Particle Sources over Oceans, Abstract A32C-05, presented at 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec 2013.
53. Weinzierl, B., A. Ansmann, O. Reitebuch, V. Freudenthaler, T. Müller, K. Kandler, D. Althausen, R. Busen, M. Dollner, A. Dörnbrack, D. A. Farrell, S. Gross, K. Heimerl, A. Klepel, T. B. Kristensen, **O. L. Mayol-Bracero**, A. Minikin, D. Prescod, J. M. Prospero, S. Rahm, M. Rapp, D. N. Sauer, A. Schaefler, C. Toledano, M. Vaughan, M. Wiegner, The Saharan Aerosol Long-range Transport and Aerosol-Cloud-Interaction Experiment SALTRACE 2013 – Overview and Early Results, Abstract A52D-02, presented at 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec 2013.
54. Spiegel, J.K., N. Buchmann, **O. L. Mayol-Bracero**, C. J. Valle-Diaz, L A. Cuadra-Rodriguez; K.A. Prather; S. Mertes; W. Eugster, 6th International Conference on Fog, Fog Collection and Dew, Yokohama, Japan, May 2013.
55. Scholl, M., **O.L. Mayol-Bracero**, C.J. Valle-Diaz, and T. Heartsill-Scalley, Quantifying cloud water in the hydrologic budget of the Luquillo Mountains, Puerto Rico, 6th International Conference on Fog, Fog Collection and Dew, Yokohama, Japan, May 2013.
56. **Mayol-Bracero, O. L.** Atmospheric Chemistry in Puerto Rico, 1st America's Working Group, Bogota, Colombia, January 2013.
57. **Mayol-Bracero, O. L.,** Puerto Rico African Dust and Cloud Study, LTER Annual Meeting, UPRRP, January 2013.

58. **Mayol-Bracero, O. L.,** Atmospheric Observatory at CSJ, Fideicomiso Conservación de Puerto Rico, San Juan, PR, December 13, 2012.
59. Mertes, S., L. Schenk, J. Schneider, A. Roth, **O. L. Mayol-Bracero**, Physico-chemical characterization of cloud drop residues and interstitial particles observed inside trade wind cumuli during the Puerto Rican African Dust And Cloud Study (PRADACS), Abstract A23F-0295, presented at 2012 Fall Meeting, AGU, San Francisco, Calif., 3-7 Dec 2012.
60. Valle-Díaz, C.J., Torres-Delgado, E., Zurcher F., Gioda A., Lee, T., Collett J., Fitzgerald E.M., Zauscher, M.D., Cuadra-Rodríguez, L.A., Prather, K.A., Spiegel J.K., Eugster, W., Mertes, S., Schenk, L., Roth, A., Schneider, J., Baumgardner, D., **Mayol-Bracero, O.L.** An Overview of the Puerto Rico African Dust and Clouds Study (PRADACS) – Aerosol and Cloud Measurements at a Caribbean Tropical Montance Cloud Forest. International Global Atmospheric Chemistry Conference, Beijing, China, September 2012.
61. Baumgardner, D., R. Newton, **O.L. Mayol-Bracero**, C.J. Valle-Diaz, F. Zurcher, S. Mertes, Identifying cloud processed aerosol particles with light depolarization, European Aerosol Conference, Granada, Spain, September 2012.
62. Schneider, J., A. Roth, J. Schmale, S. Mertes, L. Schenk, **O. L. Mayol-Bracero**, C. J. Valle, F. Zurcher, and S. Borrmann, Mass spectrometric analysis of cloud residuals in tropical trade wind cumuli at Pico Este, Puerto Rico, during PRADACS 2011, European Aerosol Conference, Granada, Spain, September 2012.
63. Mertes, S., L. Schenk, J. Schneider, J. Schmale, F. Zurcher, **O.L. Mayol-Bracero**, Aerosol particle activation and cloud drop charges observed inside trade wind cumuli during the Puerto Rican African Dust And Cloud Study, International Conference of Clouds and Precipitation, Leipzig, Germany, July 2012.
64. Valle-Díaz, C.J., Torres-Delgado, E., Zurcher F., Gioda A., Lee, T., Collett J., DeMott P.J., McMeeking, G., Hill T., Franc G., Díaz-Martínez, M., Fitzgerald, E.M., Zauscher, M.D., Cuadra-Rodríguez, L.A., Prather, K.A., Spiegel J.K., Eugster, W., Mertes, S., Schneider, J., **Mayol-Bracero, O.L.** The Puerto Rico African Dust and Clouds Study (PRADACS) – Aerosol and Cloud Measurements at a Caribbean Tropical Montance Cloud Forest. International Conference of Clouds and Precipitation, Leipzig, Germany, July 2012.
65. **Mayol-Bracero, O.L.** and J. M. Prospero, Improving our Understanding of African Dust Transport using the Caribbean Basin as the Receptor, Universidad Autónoma de México, México DF, June 6, 2012.
66. **Mayol-Bracero, O.L.,** Measurements of Atmospheric Particles in the Tropics: From the 90s to the Present, Seminars for Volunteers at the LFDP, EL Verde Field Station, Río Grande, Puerto Rico, March 2012.
67. McMeeking, G., A. Danielczok, H. Bingemer, H. Klein, T. C. Hill, G. D Franc, M. D. Martinez, I. Venero, **O. L. Mayol-Bracero**, K. Ardon-Dryer, Z. Levin, J. Anderson, C. Twohy and P. J DeMott, Measurements of ice nuclei concentrations and compositions in the maritime tropics, Abstract A13A-0203, presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec 2011.
68. **Mayol-Bracero, O. L.,** Atmospheric Chemistry at ITES UPR-RP: Chemical and Physical Characterization of Atmospheric Particles in the Tropics, AAAS Workshop, Cuba, December 2011.
69. **Mayol-Bracero, O.L.,** Atmospheric Chemistry at ITES UPR-RP: Chemical and Physical

Characterization of Atmospheric Particles in the Tropics, Invited, Seminar Environmental Science Graduate Program, UPR-RP, October 29, 2011.

70. Valle-Díaz, C.J., Torres-Delgado, E., **Mayol-Bracero, O.L.**, Zurcher, F., Gioda, A.; Lee, T., Collett, J., Prather, K.A. Size-Resolved Chemical Composition of Cloud and Rain Water Collected During the Puerto Rico African Dust and Clouds Study (PRADACS). First International Workshop on the Long-Range Transport and Impacts of African Dust on the Americas. San Juan, PR, October 2011.
71. Gioda, A., C. J. Valle-Diaz, **O. L. Mayol-Bracero,** Impact of African Dust Events in the Chemical Composition of Cloud Water Sampled at Pico Este, Puerto Rico, First International Workshop on the Long-Range Transport and Impacts of African Dust on the Americas. San Juan, PR, October 2011.
72. DeMott, P., Gavin R. McMeeking, Myrelis Diaz Martinez, Thomas C. Hill, Gary D. Franc, Anja Danielczok, Heinz Bingemer, Ingrid Venero, James R. Anderson, **O. L. Mayol-Bracero**, J. R. Snider, Göhkan Sever and Ryan C. Sullivan, African Dust and Other Aerosols as Sources of Ice Nuclei in the Eastern Caribbean Region, First International Workshop on the Long-Range Transport and Impacts of African Dust on the Americas. San Juan, PR, October 2011.
73. Spiegel, J. K., T. Peter, **O. L. Mayol-Bracero**, C. J. Valle, F. Zurcher, N. Buchmann, and W. Eugster, Does long-range transported African Dust affect cloud droplet size distributions in a Tropical Montane Cloud Forest in Puerto Rico?, First International Workshop on the Long-Range Transport and Impacts of African Dust on the Americas. San Juan, PR, October 2011.
74. Baumgardner, D., R. Newton, **O. L. Mayol-Bracero**, C. J. Valle-Diaz, F. Zurcher, S. Mertes, Cloud Processing of Dust Preliminary Results From ICE-T and PRADACS, First International Workshop on the Long-Range Transport and Impacts of African Dust on the Americas. San Juan, PR, October 2011.
75. Vallejo, P., P. Formenti, S. Chevaillier and **O. L. Mayol-Bracero**, African Dust in the Caribbean: Impact on the Chemical and Physical Composition of Aerosols at the Atmospheric Observatory in Cabezas de San Juan, Puerto Rico, First International Workshop on the Long-Range Transport and Impacts of African Dust on the Americas. San Juan, PR, October 2011.
76. Marrero, W., **O. L. Mayol-Bracero,** Chemical Characterization of Atmospheric Particles from Different Sources in the Guanica's Dry Forest: Inorganic and Organic Fraction, First International Workshop on the Long-Range Transport and Impacts of African Dust on the Americas. San Juan, PR, October 2011.
77. Santos-Figueroa, G., M. Díaz-Martinez, **O. L. Mayol-Bracero**, Chemical and Molecular Characterization of Primary Biogenic Aerosol Particles in the Caribbean During African Dust Events, First International Workshop on the Long-Range Transport and Impacts of African Dust on the Americas. San Juan, PR, October 2011.
78. Morales-García, F., A. Kasper-Giebl, H. Puxbaum, S. Metzger, S. Decesari, **O. L. Mayol-Bracero**, Origin and Composition of Aerosols Collected in the Caribbean: Marine Air, African Dust, and Anthropogenic Pollution, First International Workshop on the Long-Range Transport and Impacts of African Dust on the Americas. San Juan, PR, October 2011.
79. Torres Delgado, E., C. J. Valle Diaz, **O. L. Mayol-Bracero**, F. Zurcher, A. Gioda, T. Lee, J. Collett, E. Fitzgerald, M. Zauscher, K. A. Prather, Size resolved chemical composition of

cloud and rain water during the Puerto Rico African Dust and Cloud Studies (PRADACS) campaign, 46th IUPAC General Assembly and 70th Colegio de Químicos Annual Conference and Exhibition, San Juan, Puerto Rico, August 2011.

80. Vallejo, P, K. Mendez, P. Formenti, S. Chevaillier, and **O. L. Mayol-Bracero**, African dust in the Caribbean: impact on the chemical and physical composition of aerosols at the Atmospheric Observatory in Cabezas de San Juan, Puerto Rico, 43rd IUPAC World Chemistry Congress, 46th IUPAC General Assembly and 70th Colegio de Químicos Annual Conference and Exhibition, San Juan, Puerto Rico, August 2011.
81. Santos-Figueroa, G., F. Morales-García, **O. L. Mayol-Bracero**, The Carbonaceous Fraction of Atmospheric Aerosols in the Caribbean Region, 10th ICCPA Conference, Vienna, Austria, June 2011.
82. **Mayol-Bracero, O.L.,** The Impact of Transport on the Physico-Chemical Properties of Caribbean Aerosols during RICO: African Dust and Pollution from North America, Invited, African dust workshop for teachers, NASA & Hampton University – UPR-M, Parguera, June 2011.
83. Valle-Díaz, C.J., **Mayol-Bracero, O.L.,** Zurcher, F., Gioda, A.; Lee, T., Collett, J., Prather, K.A., Size-Resolved Chemical Composition of Cloud and Rain Water Collected During the Puerto Rico African Dust and Clouds Study (PRADACS), Geophysical Research Abstracts, Vol. 13, EGU2011-9594, 2011.
84. **Mayol-Bracero, O.L.,** Atmospheric Chemistry and Aerosols, Experiences of an Atmospheric Scientist, PR-SLAMP, Rio Piedras, PR, February, 2011.
85. **Mayol-Bracero, O. L.,** Atmospheric Chemistry and Aerosols at ITES UPR-RP: Chemical and Physical Characterization of Atmospheric Particles in the Tropics, IGERT Meeting, January 2011.
86. Marrero-Ortiz, W., **O.L. Mayol-Bracero**, Inorganic and Organic Chemical Composition of Atmospheric Particles in the Guánica's Dry Forest, Abstract A41A-0048 presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 December 2010.
87. Valle-Diaz, C. J., **O.L. Mayol-Bracero**, F. Zurcher, A. Gioda, T. Lee, J. L. Collet Size-resolved Chemical Composition of Cloud and Rain Water Collected during the Puerto Rico African Dust and Clouds Study (PRADACS) Campaign, Abstract 13A-0179 presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 December 2010.
88. Morales-García, F., A. Kasper-Giebl, H. Puxbaum, S. Metzger, S. Decesari, **O. L. Mayol-Bracero**, The Organic Fraction of Aerosols in the Caribbean, IGAC-ICACGP Joint Conference, Canada, July 2010.
89. **Mayol-Bracero, O.L.,** H. Rivera, J.A. Ogren, E. Andrews, P. Sheridan, Overview of the Physical and Radiative Properties of Atmospheric Particles at Cape San Juan, Puerto Rico (CPR station), NOAA ESRL Annual Conference, Boulder, Colorado, March 2010.
90. Erazo-Oliveras, A., **Mayol-Bracero,O.L.,** Ríos-Dávila, R.A., Improving Slow Sand Filters for Communities with Low Incomes and Limited Water, 30th Puerto Rico Interdisciplinary Scientific Meeting (PRISM), University of Puerto Rico-RUM, PR, March 2010.
91. Marrero-Ortiz, W. **O. L. Mayol-Bracero**, Chemical composition of atmospheric particles in the Guanica's dry forest: carbonaceous aerosols in African dust, LTER Annual Meeting, University of Puerto Rico, Rio Piedras, January 2010.

92. Erazo, A., R. Rios-Davila, **O.L. Mayol-Bracero**, Improving Slow Sand Filters (SSF) for communities with low incomes and limited water Access, LTER Annual Meeting, University of Puerto Rico, Rio Piedras, January 2010.

SKILLS

Analytical instrumentation: GC/MS, TD/GC/MS, GC/FID, GC/ECD, Purge and Trap, Thermal Desorption, Evolved Gas Analysis, Thermal/optical analysis, IC, SEM/EDS, HPLC, ICP and H-NMR. **Sampling instrumentation**: Nutech Gas Sampler, Lundgren Cascade Impactor, Dekati low-pressure impactor, MOUDI, Hi-Volume Particle Sampler, High-Volume Dichotomous Sampler, Stacked-Filter Units, Condensation Particle Counter, SMPS, nephelometer, aethalometer, sunphotometer, PSAP, CLAP, cloud samplers, rain collectors, liquid water content, backscattered cloud probe, and weather monitoring.

MEMBERSHIP OF INTERNATIONAL COMMITTEES AND OBSERVATION NETWORKS

2016 – present	Member of the WMO Scientific Advisory Group on aerosols.
2015 – present	Member of the Scientific Steering Committee of the International Commission on Atmospheric Chemistry and Global Pollution (iCACGP)
2009 – 2014	Member of the Scientific Steering Committee of the International Global Atmospheric Chemistry Programme (IGAC)
2014 – 2017	Contributing-leading author to the UNEP and CCAC Regional Assessment of Short-Lived Climate Pollutants (SLCPs) in Latin America and the Caribbean.
2013 – present	Member of the implementation committee of the IGAC Americas Working Group
2004 – present	Cape San Juan Atmospheric Observatory (PI Olga L Mayol-Bracero) as part of NOAA ESRL's aerosol network.
2005 – present	Cape San Juan Atmospheric Observatory, part of NASA's Aeronet.
2004 – 2015	Cape San Juan Atmospheric Observatory, WMO GAW contributing station.
2015 – present	Cape San Juan Atmospheric Observatory, WMO GAW regional station.

NATIONAL AND INTERNATIONAL PROJECTS AND COLLABORATIONS

2018 – present	Development: An Aerosol and Cloud Analysis System for the Caribbean, NSF MRI
2018 – present	Early Warning of Synoptic Air Quality Events to Improve Health and Well Being in the Greater Caribbean Region, NASA ROSES
2018 – present	Reconstruction of atmospheric observatory at Pico Este, Puerto Rico, after the impact of Hurricane Maria, NSF RAPID
2018 – present	Reconstruction of Cape San Juan Atmospheric Observatory after the Impact of Hurricane Maria, NASA
2018 – present	Long-term aerosol measurements in Puerto Rico (LAMP), DOE ARM IOP
2017 – present	**Impact of electrical generators on air quality of San Juan Metro Area after Hurricane Maria**, project in collaboration with D. Baumgardner (DMT), R. Subramanian (Carnegie Mellon University) and M. Bergin (Duke

University).

2015 – present **Black carbon concentrations over Puerto Rico using the Aethalometer,** project in collaboration with G. Mocnik (Aerosol d.o.o.) and A. Hansen (Magee Scientific).

2015 – present **The Caribbean Aerosol-Health Network,** project in collaboration with University of Miami (J. Prospero), Caribbean Institute of Hydrology and Meteorology (CIMH) (D. Farrel and A. Sealy), Université des Antilles et de la Guyane (J. Molinie).

2013 – present **Luquillo Critical Zone Observatory (LCZO):** The role of hot spots and hot moments in tropical landscape evolution and functioning of the critical zone. NSF Funded (Impacts of intercontinental transport of African dust on incoming radiation, cloud formation, and nutrient inputs), project in collaboration with University of New Hampshire (W. McDowell), USGS – Virginia (M. Scholl), USDA International Institute of Tropical Forestry (G. Gonzalez), University of Miami – RSMAS (J. Prospero), UNAM – Mexico (D. Baumgardner), UPR – Humacao (D. Fernandez), The Hebrew University of Jerusalem, Israel (A. Angert), NOAA ESRL (J. A. Ogren, E. Andrews)

2013 – present **National Center for Atmospheric Research, Diversity Funds,** Trends in African Dust Episodes and its Effects on the Bimodal Rainfall Pattern across the Northeast Caribbean. Project in collaboration with Dr. A. Heymsfield (NCAR)

2013 – present The **Saharan Aerosol Long-range Transport and Aerosol-Cloud-Interaction Experiment (SALTRACE),** in collaboration with the SALTRACE Team, leader Dr. Bernadett Weinzierl (German Aerospace Center, Institute of Atmospheric Physics, Germany)

2013 – present **Primary biogenic aerosol particles in PR, sources and contribution to total aerosol burden (PiBAP),** in collaboration with University of Puerto Rico – Medical Sciences Campus (B. Bolaños) and Georgia Tech (K. Konstantinidis)

2010 – 2016 **Dust, Aging and Transport, from Africa to the Caribbean (Dust – ATTACk),** in collaboration with Dr. P. Formenti (Université Paris Est Créteil - Laboratoire Interuniversitaire des Systèmes Atmosphèriques)

2010 – 2016 **Aerosol climatology (AEROCLIM) in Puerto Rico,** in collaboration with NOAA ESRL (J. A. Ogren, E. Andrews).

2011 – 2013 **Ice in Clouds Experiment – Tropics (ICE-T),** project in collaboration with ICE-T researchers (A. Heymsfield - NCAR, P. J. Collett – Colorado State University, J. Anderson – Arizona State University, and K. Prather – UCSD and Scripps)

2009 – 2013 **Puerto Rico African Dust and Cloud Study (PRADACS)** – NSF Funded project (Impact of African Dust on Clouds and Precipitation in a Caribbean Tropical Montane Cloud Forest, in collaboration with UCSD/Scripps (K. Prather – CoPI), U. of Colorado – Boulder (E. Andrews – CoPI), Colorado State University (J. Collett), ETH – Switzerland (W. Eugster), Max Planck Institute for Chemistry – Germany (S Borrmann, J. Schneider), Institute for

Tropospheric Research – Leibzig (S. Mertes), University of Paris – East LISA (P. Formenti, K. Desboeufs), UNAM – Mexico (D. Baumgardner)

2004 – 2008 **Puerto Rico Aerosols and Clouds Study (PRACS)**, NSF funded project, in collaboration with UNAM – Mexico (G. Raga, D. Baumgradner), Institute for Tropospheric Research – Leibzig (S. Mertes), Max Planck Institute for Chemistry – Germany (S. Borrmann, J. Schneider, G. Frank. U. Dusek), University of Mancheter (J. Allan, M. Gysel), Vienna University of Technology - Austria (H. Puxbaum, A. Kasper-Giebl), Institute of Atmospheric Sciences and Climate, Bologna, Italy (M. C. Facchini, S. Decesari), Pontifícia Universidade Católica do Rio de Janeiro - PUC-Rio, Brazil (A. Gioda)

2004 – 2008 **Rain In Cumulus over the Ocean Experiment (RICO)** – NSF funded project (Tropical Marine Aerosols in the Trade Winds: Towards a Better Understanding of the Role of Organic Aerosols in CCN), in collaboration with University of Illinois (R. Rauber, H. Ochs), University of Leeds, UK (M. H. Smith, J. McQuaid), Meteo-France (L. Gomes), University of Warsaw and SIO (E. Grzeszczak, P. Flatau), Arizona State University (J. Anderson).

2002 – 2005 **The Smoke Aerosols, Clouds, Rainfall and Climate: Aerosols from Biomass Burning Perturb Global and Regional Climate (LBA - SMOCC)** in Brazil, in collaboration and with the financial support of the Max Planck Institute for Chemistry – Mainz (M. O. Andreae), in collaboration with University of Sao Paulo (P. Artaxo), Institute of Atmospheric Sciences and Climate, Bologna, Italy (M. C. Facchini, S. Decesari), and Lawrence Berkeley National Laboratory – LBNL, CA (T. Novakov, T. W. Kirchstetter), LBA stands for Large Scale Biosphere-Atmosphere Experiment in Amazonia.

2001 – 2013 **Cooperative LBA Airborne Regional Experiment (LBA – CLAIRE),** as part of postdoctoral experience in the Max Planck Institute for Chemistry, Mainz, Germany, as part of postdoctoral experience in the Max Planck Institute for Chemistry, Mainz, Germany

1999 – 2001 **European Studies on Trace Gases and Atmospheric Chemistry as a Contribution to the Large-Scale Biosphere-Atmosphere Experiment in Amazonia (LBA-EUSTACH)**, as part of postdoctoral experience in the Max Planck Institute for Chemistry, Mainz, Germany

1998 – 2001 **INDian Ocean EXperiment (INDOEX)**, as part of postdoctoral experience in the Max Planck Institute for Chemistry, Mainz, Germany

SUPERVISION OF STUDENTS AND POSTDOCS

2002 – present **Graduated:** Postdoc (2), PhD Chemistry (4), MS Chemistry (1), MS Environmental Health (1), BS Chemistry, with thesis (5), BS Environmental Science, with thesis (5) – University of Puerto Rico, BS Chemistry (25), BS Physics (4), BS Biology (2), BS Environmental Science (3)
Current: Postdoc (1), PhD Chemistry (1), PhD Environmental Science (3), PhD Physics (1), MS Environmental Science (1), BS Environmental Science

(3), BS Chemistry (3)

PROFESSIONAL ORGANIZATION MEMBERSHIPS

American Geophysical Union
European Geophysical Society

FOREIGN LANGUAGES

Fully bilingual (Spanish-English)
Can speak, read and understand some French, Portuguese, and German.

GRADUATE AND POSTDOCTORATE ADVISORS

Theses Advisors: Osvaldo Rosario (UPR-RP, Puerto Rico), Tica Novakov (Lawrence Berkeley National Laboratory, USA)
Postdoctorate Advisor: Meinrat O. Andreae (Max Planck Institute for Chemistry, Germany)

Beta Source Data Sheet

For Beta Attenuation Particulate Monitors

Met One Instruments, Inc.

Overview

Met One Instruments Inc. airborne particulate monitors, including models BAM-1020 and E-BAM variations, contain a small Carbon 14 radioactive beta source with a maximum activity of 75 microcuries. The instruments are manufactured in compliance with U.S. NRC safety criteria listed in 10 CFR 32.27. This document is intended to provide information for particulate monitor customers, and to assist in the filing of any necessary foreign registrations for Met One products.

Purpose and Reason for Radioactive Material

The beta attenuation method allows very accurate, near real-time measurement of airborne dust mass, without errors caused by variations in the particulate type or elemental composition. This beta attenuation principle has been in use for many decades in the manufacturing of paper and other materials, and has been adapted by various manufacturers of continuous particulate monitors worldwide. A complete description of the method is included in the BAM manuals.

Licensure

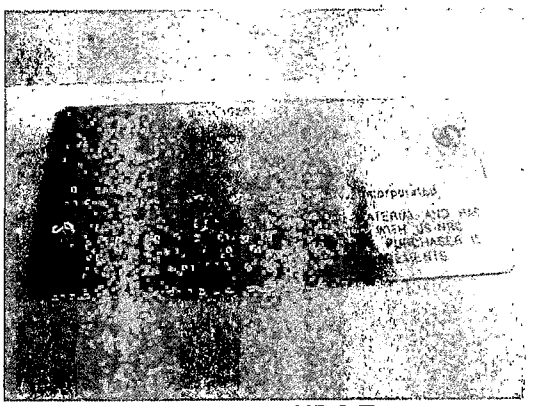
Met One Instruments, Inc. is licensed with the state of Oregon to transfer, receive, possess, and use radioactive materials of the specified activity level. In addition, Met One holds an "Exempt-Distribution Material License" from the U.S. NRC which allows for the manufacture of aerosol detectors containing 75 µCi sources, and for the transfer of these instruments to persons who are exempt from the requirements for a license. The BAM-1020 and E-BAM units contain an "exempt quantity" of less than 100 µCi of Carbon 14 as defined in 10 CFR 30.71- Schedule B. As such, the purchaser is exempt from any regulatory requirements in the USA. This is a similar arrangement to that used for common household smoke alarms, which also usually contain a very small amount of radioactive material. Per regulation, an engraved metal tag identifying the source type and activity is permanently attached to each BAM instrument, but no radioactive hazard symbols are to be attached to the unit, due to the exempt quantity.

Specifications

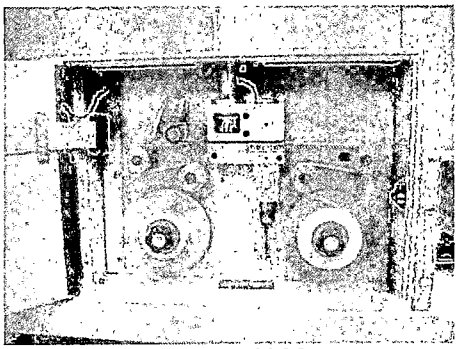
Source Type:	Sealed Source. Solid radionuclide material sealed within a metal capsule.
Radionuclide:	Carbon-14 (^{14}C) in the form of Barium Carbonate ($BaCO_3$).
Half-Life of Nuclide:	5730 Years.
Nuclide Energy Spectrum:	Nominal 50 KeV. Maximum 156 KeV (thousand electron-volts)
Radiation Type:	β Beta electrons only. Does not emit Alpha, Gamma, Neutron, or X-ray.
Rated Activity:	60 µCi (microcuries). 2.22 MBq (mega Becquerel).
Activity Tolerance:	±15 µCi. Maximum Activity 75 µCi. Below NRC exempt quantity of 100 µCi.
Rated Shelf Life of Source:	15 Years.
Source Manufacturer:	Eckert & Ziegler Nuclitec GmbH. Formerly QSA Global, AEA Technology.
Max Roof Dose Rate:	0 µSv (microsieverts) at roof. 0 µSv at 1.0 meter distance from unit.
UN Transport Classification:	UN2910.
ISO-2919 Classification:	C34242.
U.S. Export Control Classification:	EAR99
State License:	ORE-90941 Oregon Dept of Human Services, Public Health Division.
Federal License:	U.S. NRC Materials License 36-23875-01E.

Photos and Diagrams

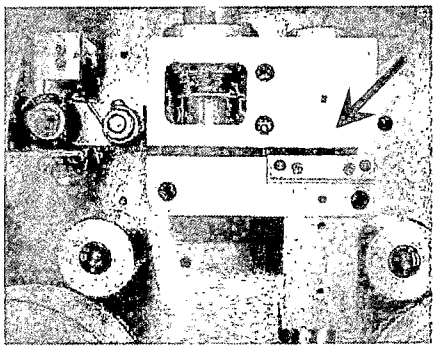
VZ-623 Sealed Beta Source



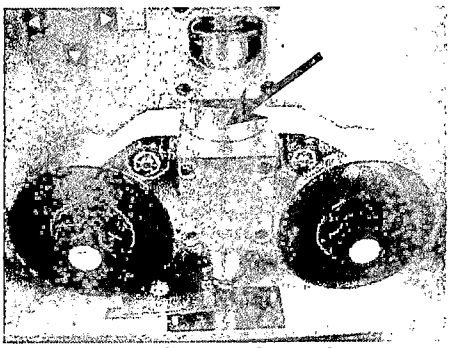
Instrument NRC Tag



BAM-1020



BAM-1020 Source Location



E-BAM Source Location

Safety

The beta source is assembled into protective metal mountings in the BAM-1020 or E-BAM by factory technicians under a comprehensive set of safety procedures. The source is not directly accessed during any of the routine instrument field maintenance procedures. The instruments are designed to prevent the possibility of the beta source dislodging from the unit during a fall from height, vehicle crash, or other catastrophic event. No objects or tools (such as dental picks) should be inserted into the area of the source face which could gouge or scratch the metal foil surface. In no case should the beta source ever be removed from the unit except by trained factory technicians.

Due to the weak 156 KeV max energy of Carbon 14, the beta electrons penetrate only about 25 cm (10 inches) of air. As a result, any detection devices would need to be positioned immediately adjacent to the source face in order to detect any radiation. *Absolutely no detectable beta radiation is emitted from the instrument with the door closed.* The instrument has undergone safety evaluation as a condition of the U.S. NRC license. Because of this weak ability of Carbon 14 beta electrons to penetrate air or human tissue, and the lack of any accompanying gamma, health exposure risks are generally limited to direct inhalation or ingestion of the barium carbonate material.

In the USA and many other countries, the user is allowed to dispose of the BAM-1020 or E-BAM unit in normal trash disposal areas, just like a smoke alarm. However, Met One Instruments has a beta source recycling program which is recommended, especially in regions where simple disposal is not appropriate or allowed. In this case, the entire instrument must be returned to the factory for disposal. Contact Met One for details.

Met One Instruments, Inc.
1600 NW Washington Blvd • Grants Pass, Oregon 97526 • (541) 471-7111 • www.metone.com • e-mail: sales@metone.com

U.S. NUCLEAR REGULATORY COMMISSION

Amendment No. 03

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with letters dated October 7 and December 15, 2010,
1. Met One Instruments	3. License number 36-23875-01E is amended in its entirety to read as follows:
2. 1600 Washington Blvd. Grants Pass, Oregon 97526	4. Expiration date February 28, 2021
	5. Docket No. 030-35578 Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Carbon-14	Eckert & Ziegler Nuclitec GmbH, Model No. VZ-623 Check Source as Barium Carbonate foil	A. Not applicable (See License Condition 11)

9. Authorized use:

Pursuant to Section 32.26, 10 CFR Part 32, "Specific Domestic Licenses to Manufacture or Transfer Certain Items Containing Byproduct Material," the licensee is authorized to distribute aerosol detectors as specified in Condition 10 to persons exempt from the requirements for a license pursuant to Section 30.20, 10 CFR Part 30, or equivalent provisions of the regulations of any Agreement State.

CONDITIONS

10. The following aerosol detector devices may be distributed pursuant to this license provided the amount of carbon-14 contained in the devices does not exceed the amounts specified in the following table:

Device Model	Maximum Quantity per Device
BAM-1020	75 microcuries (2.77 MBq)
E-BAM	75 microcuries (2.77 MBq)
BAM 1030	75 microcuries (2.77 MBq)

11. This license does not authorize possession or use of licensed material.

12. The licensee may distribute only from its facility located at 1600 Washington Blvd., Grants Pass, Oregon.

MATERIALS LICENSE SUPPLEMENTARY SHEET

License Number
36-23875-01E

Docket or Reference Number
030-35578

Amendment No. 03

CONDITIONS

(Continued)

13. The licensee shall file periodic reports as specified in Section 32.29(c), 10 CFR Part 32.

14. Except as specifically provided otherwise by this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Letter and application dated August 17, 2000;
B. Facsimiles dated September 14, 2000, September 29, 2000 ; and October 31, 2000;
C. Registration Certificate NR-1124-D-101-E;
D. Application dated November 11, 2001;
E. Registration Certificate NR-1124-D-102-E;
F. Facsimile dated April 10, 2002;
G. Applicaiton dated June 14, 2004;
H. Letter received October 12, 2004;
I. Facsimile dated October 22, 2004;
J. Facsimile dated December 29, 2004;
K. Facsimile dated January 13, 2005;
L. Letter dated October 7, 2010;
M. Letter dated December 15, 2010;
O. E-Mail dated February 7, 2011; and
P. E-Mail dated February 14, 2011.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date March 7, 2011

By /RA/
Richard Struckmeyer
Licensing Branch
Division of Materials Safety and
State Agreements
Office of Federal and State Materials and
Environmental Management Programs
Washington, DC 20555

Brechtel Manufacturing Incorporated
1789 Addison Way
Hayward, CA 94544

Description of BMI Aerosol Charge Neutralizer Body

Author: Fred Brechtel
Date: 3/1/13
Version: 1.2

The purpose of the neutralizer is to impart a known distribution of electrical charge to sampled ambient aerosol so that the number fraction of particles of a given size selected by a differential mobility analyzer (DMA) can be related to the total ambient number concentration. The neutralizer can also be used to reduce particle losses in aerosol generation systems due to electrostatic precipitation. The DMA only selects particles that are electrically charged, under normal conditions, the vast majority of ambient particles carry no charge; some 10 to 25% carry a single charge with smaller number fractions of particles carrying multiple charges. In some cases however, for example during electrical storms or when sampling atomized aerosol, a significant fraction of the aerosol can be charged with an unknown distribution of charge as a function of particle size. The charging efficiency of particles is a strong function of particle size, especially for particle diameters smaller than 100 nm.

A photo of a disassembled neutralizer assembly is shown at the end of this document. The ion source of the neutralizer consists of two radioactive Polonium-210 strips (0.5 mCi each, Model 2U500, NRD LLC, Grand Island, NY, Tel: 800-525-8076) that emit alpha particle radiation that ionize the air molecules near the strips. *Note that the BMI neutralizer is not shipped with the ion sources installed, they must be purchased separately from NRD.* The half-life of Po-210 is 138.4 days. The range of the alpha particles in air is 3.8 cm and the radiation is incapable of penetrating the stainless steel body of the neutralizer. In fact, the alpha particles cannot penetrate the layer of dead skin (~50 micrometers thick) on the human body. The sources used in the BMI neutralizer do not require special handling precautions beyond those described in the NRD LLC technical literature. The positive and negative ions produced via the ionization process interact with the particles in the sample flow depending on the size of the particle and its electrical charge. The interactions between the ions and particles produce a known distribution of charge as a function of particle size.

The ability of the neutralizer to produce a known distribution of charge is limited by the residence time of particles inside the neutralizer, the density of ions produced by the radioactive sources and the maximum allowable number concentration of sampled aerosol. The neutralizer may not completely neutralize all particles when the total number concentration exceeds $10^5/cm^3$. One figure of merit for a neutralizer is the ratio of the particle residence time in the neutralizer chamber (6.4 seconds for 1 lpm flow) and the characteristic time to fully neutralize the particles (0.0025 sec). The value of the ratio should be significantly greater than one. The figure of merit for the BMI neutralizer is 2514. In comparison, a commercially available neutralizer using Krypton-85 gas as the

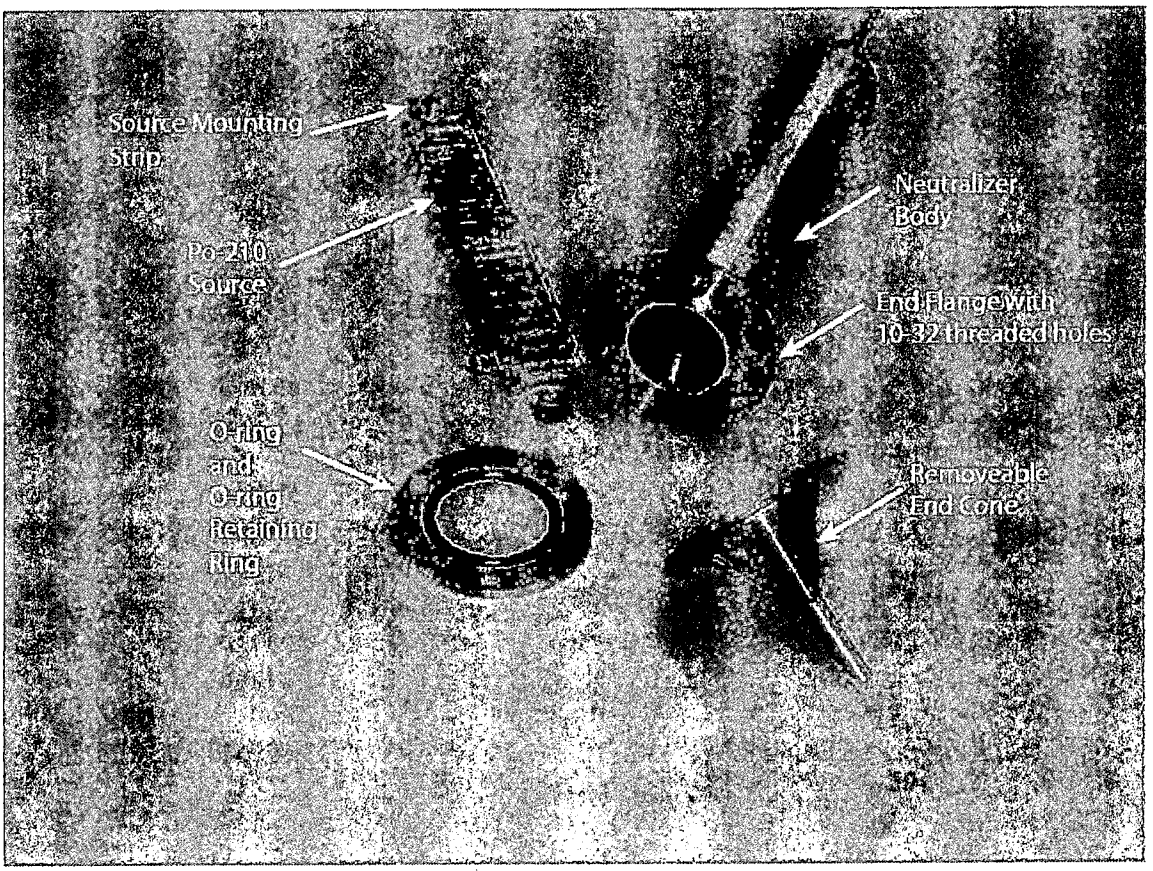
ion source has a figure of merit of 219. The advantage of Kr-85 is that it has a half-life of 10.7 years.

The useful life of the sources used in the BMI neutralizer is approximately three years from the date stamped on the Po-210 sources (not necessarily the same date as the source installation date). Given the relatively short half-life of Po-210, after three years the source activity will be reduced by a factor of 244. The figure of merit for the neutralizer after three years of service is 16, which is still appreciably greater than one but we recommend source replacement after three years of use. The date on the underside of the source as well as the source installation date should always be recorded on the outside surface of the neutralizer when sources are replaced.

If the neutralizer is operated under severe aerosol loadings for prolonged time periods the inside surfaces can become coated with particles. This can occur when airflows from aerosol atomizers are passed through the neutralizer. The effectiveness of the Po-210 sources can be greatly reduced if coated with particles. The 1.5" diameter neutralizer body is not designed to neutralize undiluted sample flows from atomizers. Unless high loadings are required during an experiment, the atomizer output should be diluted before entering the neutralizer to the lowest acceptable concentration level. Follow the cleaning instructions provided by the manufacturer of the radioactive sources used in the neutralizer to remove particle coatings from sources. Once the sources have been removed from the body, the body can be cleaned with isopropyl alcohol or methanol.

Procedure for removing/installing and replacing Po-210 sources:
Remove the complete neutralizer assembly from instrumentation prior to replacing the sources. Using a backing wrench on the swagelock union fitting, loosen the swagelock nuts on each end of the neutralizer closest to the neutralizer body. If a body-mounting clamp was shipped with the unit, remove the two screws of the clamp holding the neutralizer body to the instrumentation and set aside the piece of the clamp that comes loose. With the swagelock nuts loose, it should be possible to gently pry the instrument sample tubing ends away from the neutralizer body so that it can be lifted out of the instrument. Do not exert undue stress on the stainless steel tubing at the ends of the neutralizer body – the material is annealed and considerably softer than typical stainless steel.

Once the neutralizer body has been removed, access to the sources is gained as follows (reference the picture of the disassembled neutralizer assembly at the end of this document). Remove the three 10-32 screws holding the removable end cone and separate the end cone from the neutralizer body. A small amount of black grease has been applied to the screws to prevent binding. The grease is somewhat tenacious so take care not to spread it on to surfaces of the instrument or your skin. Using a ¼" box-end wrench, remove the small nut and lock washer inside the neutralizer body holding the source mounting bracket. Once this nut is removed, the loose end of the source-mounting bracket may be grasped between the thumb and index finger and gently lifted so it just clears the brazed threaded stud. Pull the source-mounting bracket out of the neutralizer body. The far end of the source-mounting bracket is captured by a brazed bracket and has



Picture of disassembled BMI neutralizer. Note that the two Po-210 sources must be purchased separately from NRD LLC.

Neutralizer technical specifications:

Overall length: 10.375"
Body outside diameter: 1.25"
Body length: 6"
Outside diameter of end cone mounting flange: 2.25"
Outside diameter of stainless steel end tubulations: 0.25"
Material: Stainless steel, ultra-high vacuum brazed
Power: None required
Weight: <1.5 lb

Feel free to contact me with any questions/comments you might have:

Fred J Brechtel
fredj@brechtel.com

Happy neutralizing!

NRC FORM 532
(05-2016)

U.S. NUCLEAR REGULATORY COMMISSION

ACKNOWLEDGEMENT - RECEIPT OF CORRESPONDENCE

Name and Address of Applicant and/or Licensee

University of Puerto Rico
ATTN: Luis Ferrao Delgado, Chancellor
Chancellor's Office
P.O. Box 23305
San Juan, PR 00931-3305

Date
03/05/2020

License Number(s)
52-01986-04

Mail Control Number(s)
618200

Licensing and/or Technical Reviewer or Branch
CIRDA, DNMS

This is to acknowledge receipt of your: ☑ **Letter and/or** ☐ **Application** **Dated:** 2/19/2020

The initial processing, which included an administrative review, has been performed.

☑ **Amendment** ☐ **Termination** ☐ **New License** ☐ **Renewal**

☑ **There were no administrative omissions identified during our initial review.**

☐ **This is to acknowledge receipt of your application for renewal of the material(s) license identified above. Your application is deemed timely filed, and accordingly, the license will not expire until final action has been taken by this office.**

☐ **Your application for a new NRC license did not include your taxpayer identification number. Please complete and submit NRC Form 531, Request for Taxpayer Identification Number, located at the following link: http://www.nrc.gov/reading-rm/doc-collections/forms/nrc531.pdf**

Follow the instructions on the form for submission.

☐ **The following administrative omissions have been identified:**

Your application has been assigned the above listed MAIL CONTROL NUMBER. When calling to inquire about this action, please refer to this control number. Your application has been forwarded to a technical reviewer. Please note that the technical review, which is normally completed within 180 days for a renewal application (90 days for all other requests), may identify additional omissions or require additional information. If you have any questions concerning the processing of your application, our contact information is listed below:

Region I
U. S. Nuclear Regulatory Commission
Division of Nuclear Materials Safety
2100 Renaissance Boulevard, Suite 100
King of Prussia, PA 19406-2713
(610) 337-5260, (610) 337-5313,
(610) 337-5398, (610) 337-5513 or (610) 337-5239