Curriculum Vitae for
GERARD A. MACRI, Ph.D.
Forensic Chemist
27 Willow Parkway
New Windsor, NY 12553
845-742-6967 (Cell)
845-561-9291 (Fax)
Email: gmac2486@aol.com
Website: mychemexpert.com

PROFESSIONAL EXPERIENCE

Gerard Macri & Associates (2002 to Present)

Performs forensic investigations, scientific/chemical analyses and serves as an expert witness in the areas of chemical identification, chemical forensic evidence, comparison of material compositions, chemical reactions and products, chemical fires and explosions, chemical overexposure risks and assessments, and other chemical investigations. Provides risk assessments of chemical overexposures, hazardous chemical properties, hazardous chemical reactions and incompatible mixtures, proper hazardous materials handling, storage and disposal, chemical design and process development services, and compliance with Federal and NY State environmental regulations.

American Resource Recycling Corporation, President and Principal Consultant (1988- Present)

This company serves as a consulting firm to assist clients in achieving environmental, health and safety compliance as required by regulatory agencies such as Occupational Safety & Health Administration (OSHA) for worker Right-to-Know, Environmental Protection Agency (EPA) and the State Department of Environmental Conservation (DEC) for hazardous waste management and disposal and air emissions abatement, and the local sewer authority for attainment of local discharge limits specified by sewer ordinance or pretreatment standards. The company also identifies and develops plans for recognition of chemical hazards and risk assessment for overexposure to chemicals and potentially hazardous chemical combinations which could result in fires, explosions, or otherwise violent reactions. This firm has successfully developed and implemented a variety of Chemical Hygiene, Hazard Communication and other Occupational Safety & Health Programs at several educational, research, and manufacturing facilities in the tristate area. The company provides chemical engineering design and process development expertise to manufacturing and chemical processing entities.

Gemark Corporation, President & Owner (1981-88)

Gemark is a refiner and recycler of silver and plastic from scrap photographic film as well as other by-products. Responsibilities as owner and Chief Operating Officer were to manage the plant's overall technical operations and meet production objectives. Designed and constructed a chemical processing plant in a 20,00 SF facility capable of extracting and refining 25,000 troy ounces of 999

fine silver bullion from 500,000 lbs of scrap photographic film per month. Developed an innovative and efficient chemical process for the recovery of silver and polyester plastic base from scrap X-ray film. Produced high grade 999 fine silver bullion with better than 99% recovery yields. Recovered gold, platinum, and palladium from jewelry and electronic scrap.

Midland Processing, Inc., Technical Director (1975 - 81)

This firm recycled silver and plastic from scrap materials. Responsibilities included the supervision of 10 chemists and technicians in the analysis and process improvement of precious metals from a variety of sources, the supervision of all analytical and process research and development, pilot plant operations and the production implementation of innovative silver and gold recovery processes and the continuous improvement of emission pollution controls to conform with EPA and DEC air and water quality standards.

Manhattan College, Assistant Professor of Chemistry (1971- 74)

Taught General Chemistry, Quantitative Analysis, Physical Chemistry, Advanced Inorganic Chemistry, and Science. Research interests included the analysis, characterization, synthesis and structure of transition metal complexes.

University Of Utah, Research Associate (1970-71)
Post Doctoral research investigations in the area of very fast reaction kinetics of inorganic systems using high-energy laser radiation.

Brookhaven National Laboratory, Research Associate (1969-70)
Post Doctoral research studies in surface bond chemistry.

Orange County Community College, **Adjunct Professor** (1978-1985)
Taught undergraduate chemistry courses and laboratory.

Ulster County Community College, Adjunct Professor (1989 -1991)
Taught undergraduate chemistry courses and laboratory.

Mount St Mary College, Adjunct Professor (1989- 1991)
Taught undergraduate chemistry courses and laboratory.

Vassar College, Adjunct Professor (1989 - 1991)
Taught undergraduate chemistry courses and laboratory.

EDUCATION

Polytechnic Institute of New York, Brooklyn, New York (1964- 1969)
Ph.D. in Chemistry, **Master of Science in Chemistry**

St. Francis College, Brooklyn, New York (1960 – 1964)
Bachelor of Science in Chemistry

Minor: **Mathematics**
Honors: **Graduated Summa cum Laude, GPA 3.8/4.0**

PUBLICATIONS

"Mechanism of Ion-Pair Formation of Metal Benzenedisulfonates in Methanol" (Ph.D. thesis), Inor. Chem., 9, 1009 (1970).

"Pressure Jump Relaxation Kinetics of the Complexation of Nickel Malonate in D_2O", J. Inor. Nucl. Chem., 33, 4227 (1971).

"Electrical Conductance of Anhydrous Metal Benzenedisulfonates in Methanol", J.Amer.Chem. Soc., 92, 6502 (1970).

MEMBERSHIPS

American Chemical Society (ACS) (1980 – present)
ACS -Chemical Health and Safety Division (1990 – present)

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Forensic Chemist

CHEMICAL BACKGROUND AND EXPERIENCE

INDUSTRIAL CHEMICAL APPLICATIONS

- Chemical Hazard Risk Assessment
- Safe use and storage of flammable and combustible chemicals (following OSHA regulations and National Fire Protection Association, NFPA, guidelines)
- Safe handling of toxic and flammable chemicals to minimize risk of overexposure, Material Safety Data Sheets, personal protective equipment, fume hoods and ventilation systems in chemical usage, chemical compatibility of materials of construction
- Chemical exposure limits, toxic and flammable chemicals hazard assessment
- Reactions and explosions caused by incompatible chemical mixtures
- Chemical Hygiene Plans (CHP), Hazard Communication and Right-to-Know Programs
- Spill Response and Clean-Up Plans, chemical waste management and disposal practices, chemical and petroleum bulk storage regulations (Federal and NYS), design and controls for secondary containment systems

CHEMICAL FORENSIC INVESTIGATIONS

- Chemical investigation & identification of unknown substances on clothing articles resulting from slip and fall cases including: food products, waxes, oils, greases, soaps, dyes, etc.

- Investigation of slippery conditions created by aircraft certain anti-icing compounds causing damage to aircraft.

- Chemical investigation & identification of harmful contaminants and adulterants present in various consumer products including: shaving lotions, facial cosmetics, eye drops, Band-Aids, etc.

- Potentially hazardous chemical combinations which could result in fires, explosions, or other violent reactions.

- The absence of suspected harmful contaminants and adulterants present in various consumer products.

- The presence or absence of harmful and/or dangerous chemical components in various consumer or commercial products, and/or products with inadequate warning labels, and/or

MSDS information; inadequate hazard warning labels related to the mixing of incompatible products and /or lack of warning for reasonably foreseeable improper storage, mishandling, or misuse of the product.

- Chemical accidents and/or personal injury resulting from the use of consumer or commercial products due to inadequate or inconsistent hazardous warnings on labels and/or Material Safety Data Sheets (MSDS).

- Investigation and documentation of applicable consumer complaints recorded on the Consumer Product Safety Commission and/or Food and Drug Administration databases related to cases of inadequate hazard warning labels or improper handling, responses, and corrective actions related to consumer complaints.

- Chemical investigation of air constituents from commercial products or activities/operations containing hazardous or toxic chemicals and the potential for human overexposure.

- Chemical investigation & identification of manufacturer's "tracers" added to brand name gasoline.

- Chemical investigation & identification of manufacturer's plaster of Paris splint materials and the chemical composition/physical distribution of accelerators, or other chemicals causing localized rapid set times and resultant high temperatures leading to skin burns and lesions.

- Chemical investigation of the probable causes of malodorous VOCs (volatile organic compounds) originating from wood preservatives and microbial biosynthesis reactions following mold remediation using a combination of chemical disinfectants.

- Chemical investigation into the manufacturing and design defects of a highly caustic sewer/drain cleaner which because of the inadequate and misleading labeling and MSDS precautions resulted in personal injury of a user.

- Detection of the presence and measurement of any flammable gases in a 12 inch pipeline once used to convey #5 bunker fuel oil from a barge to a central power plant at the US Military Academy (West Point, NY).

- Analytical determination of unknown substances for the most probable starting chemical compounds using various combinations of analytical instrumentation methods.

- Sampling and testing of chemical process streams for chemical constituents and composition.

- Evaluation of chemical operations for compliance with design performance criteria and/or environmental regulations.

- Field-tested waste water and storm water sampling methods using time-weighted and flow-weighted averages to insure representative samplers of target streams.

- Determination of analytical data uncertainty and degree of reliability in reported data.

- Sampling and testing of water, soil, and unknown residues for chemical composition, reaction products, combustion fragment products, and/or probable sources of origination.

TESTIMONY EXPERIENCE

- Served as expert witness for liability claims on behalf of plaintiff/defendant attorneys, as well as insurance companies.

- Testified in a slip and fall case, in which the plaintiff slipped on a spill of a food substance in the dairy aisle causing injury to the right leg. Scientific evidence based on spectroscopic analysis of the stain was presented that proved the substance extracted from the plaintiff's pants was a food substance from the floor of the establishment and not a grease or oil which could have originated from another source (Plaintiff).

- Testified on behalf of the plaintiff regarding the product design and labeling defects of a caustic commercial drain cleaner, which because of inadequate and inconsistent instructions for product use and PPE precautions, resulted in a steam explosion during use and caused personal injury to user (Plaintiff).

- Testified on behalf of the building maintenance company whose employee applied an adhesive to repair the cover of a window air exchanger unit that this action could not have released harmful levels of VOCs sufficient to exceed the OSHA permissible exposure limits inside an apartment dwelling (Defense).

- Expert disclosure on behalf of the property management company, demonstrated that the building's ventilation and electrical system was not a contributing factor in an explosion and flash fire caused by the tenants (a sign painting company), who mistakenly mixed together two incompatible chemicals. These two chemicals (a powerful oxidizer and a flammable) did not require a source of ignition or oxygen to spontaneously ignite and explode (Defense).

Other Expert Reports, Rebuttal Reports, Affidavits, and Supporting Documents:

- Personal injury claim from alleged tainted eye drops (Defense).

- Gasoline manufacturer's claim of illicit gas blending with competitors' products. Demonstrated the lack of reliability and accuracy in the chemical analysis of tracers present in brand name gasoline thereby refuting allegations of illicit gas blending (Plaintiff).

- Action against a pharmaceutical supplier/packager. Resolution of the actual versus advertised concentration and potency of glucosamine/chondroitin in packaged pharmaceutical mixtures (Plaintiff).

- Action against a supplier of monopropylene glycol coolant used for a high temperature welding apparatus for improperly representing the concentration of glycol and other chemical constituents in the final packaged product.

- Personal injury and property damages claim for alleged inadequate ventilation and electrical wiring contributing to a fire and explosion caused by an exothermic chemical reaction from the mixing of two incompatible chemicals (Defense).

- Personal property damage claim arising from alleged improper mixing of chemicals used in mold remediation practices. Produced evidence of odors generated by microbial action (Defense).

- Personal injury claim allegedly resulting from the improper application of plaster of Paris splints causing burns to patient (Defense).

- A claim of poor indoor air quality arising from a co-tenants' gold refining operations (Defense).

- Personal injury claim by a worker against the manufacturer of a sewer drain cleaner. Produced evidence of incidents/examples of violent chemical reactions not adequately addressed in manufacturer's warning labels, Material Safety Data Sheets (MSDSs), and product brochures (Plaintiff).

- Personal injury claim for an alleged asthmatic reaction to carpet shampoo cleaner. Demonstrated that the active chemical in the cleaner was degraded by natural chemical reactions in the environment. The room ventilation air changes further reduced the computed air concentration of the chemical to immeasurable quantities (Defense).

CHEMICAL CHARACTERIZATION OF UNKNOWN MATERIALS

- Chemical analysis of unknown materials from various laboratory "orphan" experiments:
  - Perform bench-scale spot tests to determine the presence of selected inorganic cations or anions, flammability, water/air reactivity, organic functional groups, solubility and corrosivity
  - Sample preparation and specifications for more detailed analytical investigations: Xray fluorescence, Inductively Coupled Plasma (ICP) and Atomic Absorption (AA) Spectroscopy for metals analysis. Fourier Transform Infra-Red (FTIR) and Gas Chromatography/Mass Spectrometry (GC/MS) for non-metals and organic analysis
- Chemical analysis of unknown materials from various plant and field sources:
  - Liquid and sludges in abandoned drums and containers, contaminated soils, and malodorous residues at indoor locations
  - Contaminated water sources, unaccountable discharges into sewer and storm water drains

- Identification and treatment of hazardous chemicals by chemical oxidation, reduction, precipitation, and neutralization reactions on bench-scale and plant-scale levels to generate a non-hazardous and more easily disposable mixture: cyanides, formaldehyde, hydrazine, iodine, bromine, borohydrides, metallic sodium or potassium, air/water reactives, heavy metals, etc.

SOIL, WASTEWATER, AND GROUNDWATER CONTAMINATION INVESTIGATIONS

- Evaluation of the extent of migration of semi-volatile PAHs (polynuclear aromatic hydrocarbons) in soil near a metal finishing facility
- Investigation & determination of the extent of VOC (volatile organic compound) contamination in the groundwater at a metal finishing facility
- Investigation & determination of the extent of VOC contamination in the groundwater and soil and the potential for vapor intrusion into the air space of a commercial warehouse
- Investigation & determination of the extent and probable source of VOC contamination in the sewer and storm water discharges at a solvent-based adhesive tape manufacturing plant
- Investigation & determination of the extent and probable source of heavy metal contamination in the sewer discharge at a circuit board manufacturing plant

CHEMICAL FIRE AND EXPLOSION INVESTIGATIONS

- Chemical investigation & determination of an explosion resulting from a chemical reaction of two incompatible waste products accidentally combined into the same waste container
- Chemical investigation & determination of an explosion and flash fire in an exhaust duct from build up of combustible organic residue in an adhesives manufacturing facility.
- Chemical investigation & determination of a fire resulting from electrostatic discharge in the presence of combustible oily residue and solvents in an adhesive manufacturing plant.
- Prediction of the behavior of chemical compounds and mixtures under various conditions and environments. Identification of incompatible chemical mixtures or unstable conditions

CHEMICAL PLANT PRODUCTION AND OPERATIONS

- Project Manager (PM) and Lead Scientist of a variety of chemical plants and projects.
- Responsible for:
  - Conducting pilot tests to verify design concept and refine design parameters
  - Define operational controls and design performance criteria
  - Assist engineering staff in review of construction documents, Process & Instrumentation Diagrams, calculations, sizing, controls and operating manuals, and specifications of equipment.
  - Assist construction management team in procedures, design specifications, and installation methods
  - Identify and evaluate chemical hazards, safety precautions
  - Perform air emission estimates and develop pollution control design concepts

- Perform pilot testing of design concepts and provide start-up supervision, perform trial runs, and debugging of new and upgraded chemical systems at the following facilities:
  - PM at a silicon chip manufacturer for a waste treatment ion exchange system for a metal etchant
  - PM at a silicon chip manufacturer for a centralized 300,000 gal/day waste treatment system
  - PM at a government army installation for the implementation of an improved wastewater treatment process which will consistently meet discharge permit limits
  - PM at a government army installation for a project tracking the source of 250,000 gal/day of extraneous non-sanitary waste water entering the sanitary waste collection system using various specific chemical properties and tracers to identify the source and mitigate the flow
  - PM at a pressure sensitive tape manufacturer for a flammable solvent secondary containment system and smoke removal from the air generated from a tape curing process
  - PM at a precious metal recovery company for an improved process for precious metal recovery from various process streams
  - PM at a silver recovery company for specifying chemical processes involving hydrolysis, chemical reduction of metals, solids coagulation, drying, calcining and pyrometallurgical smelting of silver
  - PM at a silver recovery company for a chemical process involving the surface stripping of photographic film for the recovery of silver and plastic base.
  - Investigation into the behavior and physical characteristics of fatty acid and other organic molecular monolayers on the surface of water bodies to retard water evaporation from watershed reservoirs
  - Investigation into the nature and structure of the surface bond between lubricant oils and steel ball bearings
  - Identification of surface-active chemicals to strip inks, labels, and other surface coatings form metals and plastics for recovery of the base metal or plastic