



Introducing Envirometrics, Inc.

Envirometrics, Inc. is an engineering and technical services firm specializing in environmental management and air pollution control. Since 1984, we have served an international clientele of manufacturing plants, public and investor-owned utilities, commercial facilities, public agencies and other engineering and environmental consulting firms.

Our team of dedicated professionals has the technical expertise, familiarity with the regulatory climate, field experience, and quality assurance programs in place to provide our clients with prompt, personal, and high quality service. Our services include:

*“Envirometrics’
engineering design,
support and on-site
services were a great
benefit to the City . .
.”*

Darrell Dunn, City of Monroe

Engineering Design

Envirometrics prepares feasibility studies, designs, and bid specifications for the construction or purchase of combustion and incineration equipment, ventilation systems, and air pollution control equipment.

Permitting and Regulatory Support

Envirometrics prepares permit applications, air quality modeling studies, and regulatory studies. We install and operate meteorological and ambient monitoring networks.

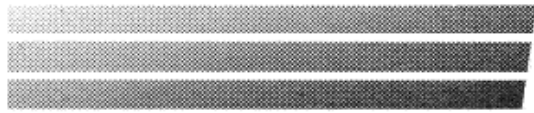
IAQ and Building Design Support

Envirometrics assists in the design of healthy, comfortable and energy efficient buildings with parametric and Computational Fluid Dynamics (CFD) modeling.

Environmental Management

Envirometrics assists with the development of regulatory policy analyses and implementation studies, environmental audits, data management programs, emissions monitoring systems, and operations and maintenance programs.

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Engineering Design

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Air Pollution Control Equipment

Envirometrics designs and assists with the purchase and installation of ventilation systems, scrubbers, adsorbers, baghouses, incinerators, and continuous monitoring systems. Depending on the client's needs, we can provide:

- ✓ Analysis of process and waste streams, emissions and existing control equipment
- ✓ Laboratory and pilot-scale studies
- ✓ Technical and economic evaluation of alternative control technologies (BACT/ MACT analysis)
- ✓ Design of control equipment, preparation of bid specifications or supplier selection
- ✓ Purchase, installation and start-up assistance

Ventilation Systems

Scrubbers

Fabric Filters

Waste Incinerators

Adsorbers

Continuous Emission Monitoring Systems

Pilot Plants

Odor Control Systems

Envirometrics has extensive experience in measuring odors and analyzing odorous sources. We design collection systems, carbon units, and packed tower scrubbers.

Waste Incineration

Envirometrics designs and specifies incineration systems for municipal solid waste, hazardous wastes, odors, and VOC-rich exhaust streams.

Pilot Control Systems

Envirometrics can supply a pilot-scale baghouse, scrubber, or air stripper for determining design parameters, process applicability, or the performance of new control techniques.

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Example Projects

Engineering Design

Air Pollution Control Equipment for Metals Refining Facility - Spokane WA Prepared specifications for scrubbers for etching bath exhausts, baghouses for the highly corrosive environment of the purification ovens, carbon adsorption units for fume hoods, and the capture hoods and local exhaust system. Met requirement to obtain permits and start up plant in 90 days.

Determination of Necessary Stack Height - Seattle WA Carried out a Computational Fluid Dynamics (CFD) analysis of air flow patterns between two buildings to determine the minimum stack height necessary to avoid building downwash and impingement of odorous exhaust on the air intakes of the downwind building.

Odor Control System Testing and Design - Monroe WA Conducted source emissions and receptor studies and engineering design for an odor control retrofit to an existing municipal waste water treatment plant. This project required the identification of sources to be controlled, the design of covers and enclosures and layout of the ducting system, and design of a packed bed scrubber. This project also involved the initial installation of a pilot-scale scrubber to define the required gas transfer coefficients for final design. Public attitudes changed from heated complaints to not one single complaint after initial contacts with the public and installation of the scrubber.

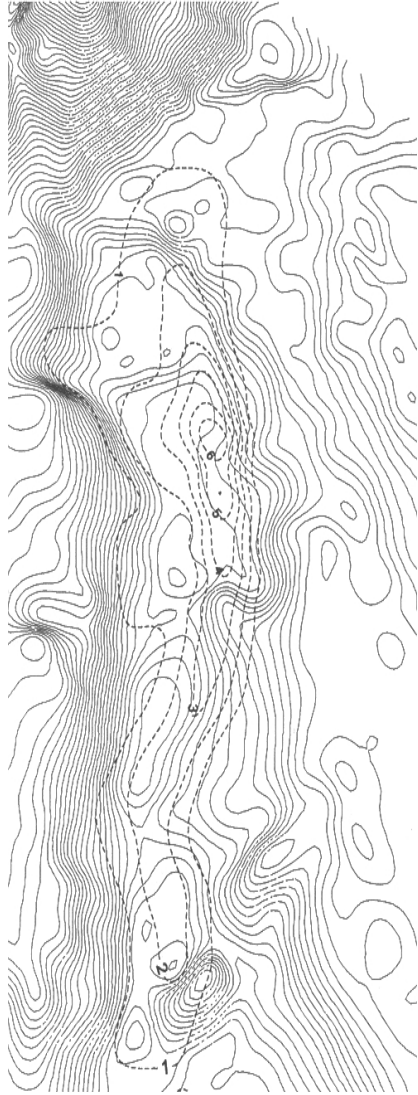
Design of Exhaust Ventilation at Manufacturing Facility (Spokane, WA) Designed an exhaust hood to capture volatile organic chemicals from a manufacturing process and carried out confirmation modeling with CFD to verify acceptable capture efficiency, air flows and pressure drop. Increased capture efficiency allowed expansion of production. Evaluated and recommended a control system to remove the captured chemicals.

Odor Scrubber Design - Seattle WA Developed design for a 20,000 cubic feet per minute, cross-flow scrubber to control multiple odors, which required a near-neutral scrubbing liquor first stage and a caustic second stage. Our design allowed recycle of chlorine from the second to the first stage, resulting in reduced operating costs. Capital costs were reduced by locating a used scrubber shell and modifying the design to incorporate available equipment.

Hazardous Waste Burner Design - Ferndale WA Developed and lab tested two alternate designs for burning coke dust. Field tests of the prototypes confirmed the simpler of the two designs would provide satisfactory combustion. Construction drawings were prepared for the burner arrangement and hoppers to hold two day's fuel supply. This system has now been installed in the client's facilities world-wide, saving fuel costs and waste disposal costs.

Blowby Vent Oil Mist Sampler - Spokane WA Developed sampling system to allow measurement and analysis of small quantities of oil in gas turbine oil-blowby vent, allowing design of cost-effective control system.

Permitting & Regulatory Support



Envirometrics, Inc. prepares permit applications, air quality modeling studies, and regulatory studies. We install and operate meteorological and ambient monitoring networks.

Construction and Operating Permits

Envirometrics can complete all aspects of air quality permitting, including emission inventories, control technology evaluations, dispersion modeling, negotiation with regulatory agencies, and development of compliance monitoring plans. We have prepared the simplest Notice of Construction to the most complex Prevention of Significant Deterioration (PSD), New Source Review, and Title V Air Operating Permits.

Environmental Impact Studies

Envirometrics prepares and reviews air quality reports for environmental impact statements and transportation conformity assessments.

Dispersion Modeling

Envirometrics develops emissions data for traffic, industrial equipment, and fugitive sources. We conduct meteorological dispersion modeling for simple and complex industrial facilities, roadways, and area sources in flat, level terrain and in mountainous terrain using standard models (such as AERMOD or CalPuff) or special models developed by Envirometrics, Inc. for unusual situations.

Meteorological and Ambient Monitoring

Envirometrics installs and operates monitoring networks, develops monitoring quality assurance plans, and conducts statistical analyses of monitoring data. We can supply meteorological monitoring systems and ambient monitoring equipment.

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Permitting and Regulatory Support

50 MW Power Plant Air Operating Permit - Tacoma WA Developed Title V federal air operating permit for fluidized bed power plant, firing coal, wood waste and refuse-derived fuel, including emission inventories, applicable regulations, and compliance demonstration and monitoring methods. In addition to the conventional state and local regulations, this plant was potentially subject to Prevention of Significant Deterioration permit conditions, non-attainment area conditions, New Source Performance Standards, and specialized state and local regulations. We presented technical arguments which allowed the agency to accept modifications to the permit that opened up restrictions on the plant and allowed it to certify compliance.

12 MW Diesel Generator Power Plant PSD Application - Nome AK Prepared Prevention of Significant Deterioration (PSD) application package, including estimates of ambient air concentrations on steep slopes using the CTDMPlus model, estimates of NO₂ using Ozone Limiting Method, and Best Available Control Technology (BACT) cost-effectiveness review.

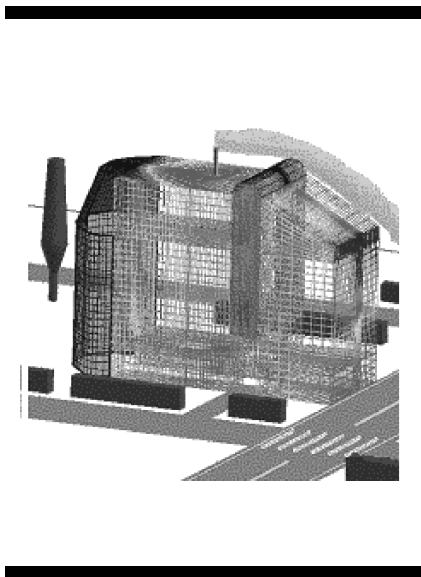
Arterial Widening Air Quality Study - Snohomish County WA Estimated ambient concentrations for several alternative roadway upgrades. This project included modeling two non-signalized intersections, which required use of a special model of vehicle queuing behavior. The "do-nothing" alternative was shown to have the most adverse air quality impacts.

Meteorological Monitoring Tower and Data QA/QC (Kodiak, AK) Prepared Quality Assurance Project Plan (QAPP) for development of a meteorological monitoring tower at the Kodiak Generating Station. Because potential tower locations were constrained and with significant potential obstructions to air flow, Envirometrics conducted a CFD analysis of the proposed location to demonstrate data would comply with guidelines. Move your mouse over the visualization of turbulent kinetic energy (tke) to see a time-lapse movie (2 M) of the tke flow. Quality Assurance procedures and Quality Control activities were described in the QAPP. The tower and meteorological equipment were delivered to Kodiak and installed at the station. Meteorological data were downloaded daily and assembled into weekly, monthly and quarterly reports

Transit Systems Operations Base Air Quality Study - Whatcom County WA This study for an Environmental Impact Statement required the development of bus operations and construction period emission inventories and estimation of impacts near adjoining intersections and roadways and around a parking area. By demonstrating conformity with air quality standards, the transit agency was able to obtain federal funding for the project.

Manufacturing Facility Air Toxics Study - Bellevue WA Prepared review of ambient impacts which required modeling in a narrow valley using complex terrain models. Contrary to earlier modeling by the agency, which resulted in an order to install expensive control equipment, this review showed the standards are achieved without additional controls

Indoor Air Quality & Building Design Support



Envirometrics, Inc. assists in the design of healthy, comfortable and energy efficient buildings with parametric and Computational Fluid Dynamics (CFD) modeling.

Cross-over Analysis

Envirometrics uses physical, parametric and Computational Fluid Dynamics (CFD) techniques to assist architects and engineers in determining the locations and configurations of exhaust stacks, air intakes, cooling towers, and other related features on buildings that will meet ASHRAE requirements and minimize re-entrainment and other adverse effects. These studies can also be used to estimate odor control requirements and traffic exhaust impacts.

Indoor Air Quality

Envirometrics developed the High Volume Small Surface Sampler (HVS3) for the U.S. Environmental Protection Agency to measure surface dust in indoor environments. The dust is collected in a manner that allows bulk chemical analysis.

Internal and Natural Ventilation Modeling

Envirometrics uses both analytic and CFD models to analyse natural ventilation flows and to visualize air flows and temperature distributions in the interior spaces of buildings.

Pedestrian Comfort Studies

Envirometrics performs pedestrian comfort and safety assessments of expected wind exposures for open spaces, sidewalks, walkways and entrances

Wind Loading Studies

Envirometrics develops CFD models to meet the requirements of the International Building Code for wind loads analysis. These studies estimate the worst conditions that the building structure, glazing and cladding will have to endure.

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Example Projects

Indoor Air Quality and Building Design Support

Pedestrian Comfort Study for Entrance to Building- Seattle WA Computational Fluid Dynamics (CFD) modeling and wind-climate analysis were carried out to analyze the frequency of high winds at the surface surrounding a new building. In this case the primary entrance was to be located near an architectural feature that was anticipated to result in accelerated winds, causing potential difficulties for pedestrians entering the building. In addition, the building was located at the top of an exposed hillside, which would also increase the expected windspeeds. The street-level winds near the doorway and along the sidewalks were analyzed under expected high-wind conditions. The study found that the street-level windspeeds would exceed acceptable levels only under rare conditions

Sampling System Development Developed the High Volume Small Surface Sampler (HVS3) for the U.S. Environmental Protection Agency to measure levels of surface-deposited dust and conducted several studies to validate the HVS3 in the field. An ASTM method has been adopted, establishing this as the preferred method for measuring surface dust.

Laboratory Building Remodel Cross-over Analysis - Seattle WA Provided support for the mechanical engineering design for remodeling a University laboratory/classroom building. This previously naturally-ventilated building was converted to mechanical ventilation, requiring new air handling units, cooling towers and lab hood vents. Because of the unique roof configuration, ensuring cooling tower and lab hood exhaust plumes would not reach the air intakes required a micro-climate study and computational fluid dynamics (CFD) modeling of air flows around and over the building. Working closely with the owner, mechanical engineer and architect we were able to find and implement a design that limited the risks and met other design constraints.

Wind Loading Study for a High-Rise Building - Seattle WA CFD modeling was performed to provide the International Building Code-required analysis of wind loading on a new high-rise building. The highest wind-induced pressures and the distribution of pressures over the building surfaces was simulated in CFD. The results were used by the structural engineer to determine the cladding attachment systems for different portions of the building.

Occupational Exposure Assessment - Seattle, WA Measured exposure levels of employees at this manufacturer of sports equipment. Management was concerned that the molding process might release a toxic compound. The results showed that the local exhaust ventilation system effectively reduced breathing zone concentrations well below Labor & Industry limits, reducing anxiety among management and employees.



Environmental Management

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Regulatory Policy Studies

Envirometrics assists government agencies with the development of standards, implementation and maintenance plans, and the evaluation of alternative regulations. We assist regulated industries with strategic studies of the potential impacts of new requirements, including the preparation of life-cycle cost studies of control requirements.

Environmental Audits/Management Systems

Envirometrics carries out due diligence reports for investment and property transactions, compliance audits, and environmental cost accounting studies. We can assist with the development of environmental management systems and audit profiles for ISO 14000.

Training

Envirometrics conducts short courses and in-house training in Clean Air Act requirements, emissions inventory development and data management, meteorological dispersion modeling, ambient and source sampling, and the development of environmental management systems.

Green House Gases Emission Inventories

Envirometrics prepares or audits emission inventories of greenhouse gases to establish baselines or annual assessments. We prepare documentation to certify project emissions reductions for credits or sale as "Green Tags."

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Example Projects

Environmental Management

Evaluation of Medical Waste Incineration Policy Options for Municipal Government - Seattle WA Prepared a detailed study of medical waste disposal, including characterization of the local medical waste stream and medical waste incinerators, review of other disposal options, review of permit compliance, an assessment of health risks of incinerator emissions, review of local, state and federal regulations, three case studies of regulation of medical waste incinerators, and an analysis of six different regulatory approaches appropriate to a municipality.

Emission Inventory and Meteorological Data Analysis (Dhanbad, Bihar, India) An emission inventory was developed for the Jharia coalfields and surrounding region. Sources included coal mining, coal fires, a thermal power plant, other industrial sources, road dust, vehicular emissions and domestic sources, including cottage industries. Envirometrics also analyzed local meteorological data sets, all of which were missing critical data. Methods were developed for estimating the missing data using other parameters and known climatological patterns. Results from the emission inventory and air dispersion modeling were used to relocate portions of the population catastrophically impacted by underground and surface coal fires to areas of acceptable air quality

Waste Characterization and Incinerator Feasibility Study - North Slope Borough AK Carried out a comprehensive study of waste disposal options and an existing municipal waste incinerator for the Prudhoe Bay oil fields. Waste characterization and engineering studies showed the existing incinerator would require significant modifications to achieve economical operation. Feasibility studies examined the comparative capital and operating costs of large and small incinerators, recycling, composting, a new local landfill, and long haul to an existing landfill.

Evaluation of Acid Deposition Control Policies for Washington Used macro-ecologic model and regional acid deposition model for sulfates and nitrates to estimate effects of alternative control policies. Developed regional emission inventory, inventories of the resources at risk, dose-effect functions, and economic cost functions from empirical studies and expert opinion. Estimated costs and benefits of control policies and made a statistical analysis of net economic values.

Hazardous Waste Incineration in Cement Kiln - Rio de Janeiro RJ BRAZIL Prepared study of permitting requirements and system design and operation modifications necessary to meet U.S. standards for incineration of hazardous wastes in a cement kiln.

Urban Air Quality Strategy in Asia Developed study of the current technology in diesel vehicle particulate matter control, reviewed existing industrial emissions standards and advised national environmental agencies in the Philippines and Indonesia on the preparation of air quality implementation plans.