

# ASPE NEW YORK CITY CHAPTER news

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## *ASPE Monthly Meeting*

*Speaker: Mark Allen from Beacon Medaes*

*Topic: Energy Saving Technologies for  
Medical Air and  
Medical Vacuum Systems*

*Date: Wednesday, May 5, 2010*

*Location: Heartland Brewery Chop House  
127 West 43rd Street  
Between 6th Ave and Broadway*

*Time: Social 5:15 pm - 6:30 pm  
Technical Session  
6:30 pm - 8:00 pm*

*Sponsor: Beacon Medaes &  
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# AMERICAN SOCIETY OF PLUMBING ENGINEERS NEW YORK CITY CHAPTER

## *From the President's Desk*

Dear Members:

I hope that your Holiday was a happy one. Last month's meeting on solar water heating was enlightening, you saw that was coming didn't you, and well attended. There were over 70 attendees. Our thanks go out to speaker Michael DiPaolo of Regasol USA and sponsors Parabigma and LPI Controls for their efforts.

By the time you read this the CPD (Certified in Plumbing Design) and NYS Engineering Examinations will have come and gone. For those of you who have taken the examinations I am sure that you performed spectacularly. If you could not register for the CPD this year please be sure to remember to do so for 2011. Please let us know if you may be interested in participating a study group for the next CPD examination. For additional information please contact a Board member or refer to:

<http://aspe.org/CPDCertification>. As a reminder please also note that the CIPE designation is trademarked by ASPE and the Society no longer permits its use. CPD has replaced CIPE in all cases.

The 2010 ASPE Convention and EPE will be held Oct. 28–Nov. 3, 2010, at the Pennsylvania Convention Center. There will be approximately 30 technical education sessions as well as the largest plumbing product exposition in the country. ASPE National has negotiated rates at the Marriott and Loews Hotels. Additional information is coming and registration will officially open in May. We hope to have additional information by the next meeting.

The NJ Chapter of ASPE is having a 35<sup>th</sup> Anniversary Cruise on May 20<sup>th</sup>. For additional information please contact Mike Haines, NJ ASPE VP Membership with Cullen Associates at 732-988-9600. The 45<sup>th</sup> annual ASSE/ASPE Family Fishing Trip is also coming up. It is scheduled for Saturday, June 12<sup>th</sup> at Point Lookout on the Princess Marie which will set sail at 07:45am. The cost is \$65.00 per person; for additional information please contact Steven Silver, of American Pipe & Tank Lining Co., Inc., at 212-736-6618.

The topic scheduled for the June meeting will be acid neutralization systems, Harold Mermel of PEP/Town & Country will be speaking and sponsoring the meeting.

As in the past if there are any topics that you feel need to be addressed, if you have any questions regarding ASPE and if you have any suggestions for future meeting topics or sponsors please feel free to let us know.

Best Regards,

Leon Perkolaj, P.E.

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# *April Meeting Minutes*

Minutes from the April 7, 2010 meeting of the NYC chapter of ASPE.

6:15pm – The meeting was called to order by Leon Perkolaj president of New York City Chapter of ASPE. Leon welcomed and thanked everyone for coming out to the meeting. Last month's meeting was one of our better meetings. We had 135 people. We have some new members: Jay D'Agostino, Edwin Hopkins, Derek Quintana and Vincent Falkowski. Reminder that the FE, PE and CPD exams will be held this April 16<sup>th</sup> and 17<sup>th</sup>, for those of taking the exam. The fishing trip is just around the corner, anyone interested contact Steven Silver. The trip is on June 12<sup>th</sup>.

6:20pm – Bill Connors introduced Michael DiPaolo and James Kellegher. Tonight's meeting was sponsored by Leonard Powers.

6:25pm – Michael DiPaolo is the president of a company called Regasol, which is the USA corporation for the Ritter Group. Michael introduced his colleague Oliver Christ who relocated from Germany. Oliver has a graduate degree in solar thermal systems.

Note: the following is not a verbatim translation of the presentation, rather some general points of discussion.

program today is on Optimizing Large-Scale Solar Thermal Systems with CPC Vacuum Tubes Collectors and using Water as Heat Transfer Medium. The Ritter Group is from Southern Germany. Paradigma was started in the late 80's, about 80 % of the global production of hazelnuts were contaminated because of the reactor accident of Tschernobyl – a serious obstacle for the chocolate production. As one of the owners of the chocolate factory Ritter Sport, Alfred T. Ritter took this as a new challenge: HIS PARADIGM – HOW TO CREATE AN ENERGY SYSTEM TO ELIMINATE THE NEED FOR NUCLEAR POWER.

The Ritter Group - The high-tech start-up PARADIGMA was founded in 1988 and today is: Group of 10 companies in 6 countries, 5 brands – Para Digma, Ritter Solar, Linuo Paradigma, Regasol & RNO, 1500 employees worldwide, 60,000 m<sup>2</sup> (650,000 ft<sup>2</sup>) production area, \$330 Million Dollar Turnover in 2008, 1.02 Million m<sup>2</sup> (11 Mio ft<sup>2</sup>) sold collector field in 2008.

Ritter Solar has German R & D, Engineering and Precision Production Methods. It holds just about any standard you can hold in Europe and in the process of getting them in the US as well.

XL-Solar Technology: we started a special group for the design of systems using our collectors. Our applications include: domestic hot water, DHW pre-heating, space heating, solar cooling, process heat, swimming pool and district heating net.

Some major projects include:

FESTO, in Stuttgart, Germany has the world's largest CPC vacuum tube collector system for solar cooling. This system is used all year long.

Metro shopping center in Istanbul has the world's second largest CPC vacuum tube collector system. This system is also used all year long.

MESSE Trading Centre, in Wels, Austria has won an international bidding procedure for its district heating provision.

Energy Power Plant in Halle, Germany for district heating provision.

Panorama sauna bath, Germany. The world's most innovative solar system, for network heating of a recreational swimming pool.

Trade and residential park Ritter - Domestic heating network for 12 new single family passive houses. NYPA Coney Island Project at the subway maintenance yard. It has 48 collectors in a small field for domestic water applications. It will be the First Aqua System project in the USA.

Lodging house Langendamm - Solar integration in an existing old domestic heating network. DHW and space

heating with a domestic heating network for 4 buildings.

Solar Thermal Systems can be ground and or roof mounted.

With a solar system you have endless amount of solar energy. With the suns energy you never have to worry of inflation. You have to have the appropriate solar collector. The collectors performance must be in balance with the system design.

### **There are 3 basic solar collector designs:**

Flat plate collector is a metal box with insulation on the bottom of it. It includes: a collector housing, flow tubes, insulation, cover, absorber plate, inlet and outlet connections. It has heat losses through reflection, convection and conduction.

Vacuum tube collector (heat pipe and Sydney tube) – has a glass tube with a heat pipe in it. It consists of: a manifold, heat exchanger, heat pipe, vacuum tube and absorber layer. It is a closed system with a heat transfer fluid in it. As the heat is absorbed by the heat pipe the fluid turns to steam, it travels up to the top of the bulb. The cold domestic water goes around it, absorbs that heat and the fluid inside condenses back down. The vacuum between the glass tubes is an excellent insulator. Like in a thermos flask the heat can be stored for a long time. High water temperatures, even in winter, since heat is not lost to the atmosphere.

Compound Parabolic Concentrator is a CPC mirror assembly. It has a reflector plate that matches the radius of the reflector tube. The absorber layer circumference matches the width of the reflector. The reflector is a highly reflective CPC mirror that allows the sunlight to shine around the outer glass tube. The CPC reflector design allows sun rays to work at any angle (vertical, diagonal, diffuse).

Collector orientation has an effect on performance. The orientation of the panels should face due south of the suns travel. This increases the performance of the panels.

Water is used as a heat transfer medium versus glycol. Water is more effective when it comes to: specific gravity, kinematic viscosity, heat conductivity, Reynolds number, heat transfer coefficient, pressure loss, gross price, chemical durability, purchasing, filling and disposal.

The operation with water, allows direct connection to the in-house heating network, requires much less equipment and thinner pipes, reduces the necessary storage tank sizes, eliminates the costs for antifreeze and the associated running costs, reduces considerably the costs and time for commissioning and repairs, ensures a long operating life with almost constant performance moves almost all risks associated with thermal stagnation and minimizes running costs in general (e. g. for maintenance).

**The “Bucket” principle** is where solar heat is collected and stored in the collector, and if there is enough heat in the collector (“bucket” is filled) the pump is switched on and transfers the heat into the syste. The pump operates in intervals instead of speed-control.

The Solar Controller Fault Diagnosis – the AquaSystem controller signals or corrects, no or inadequate throughput air in the system, reversed pipe connections, wrong placed or defect sensors, gravity brake leaking wrong time setting, pressure loss, failure in power supply and other operation faults.

Sensors are required in a standard system. The four sensor locations are, on the roof to measure the temperature inside the collector, in the return line, in the supply line to shut off the pumps if the “bucket” is dumped and in the bottom of the tank to shut off the system if the tank is fully loaded.

### **System Design Support:**

Step 1: available footprint for the collectors, location-deviation from the sun, flat roof or on roof mounting, available space for tanks, heat demand at the moment, nominal power output of the backup heaters, DHW demand, supply and return temperatures from the heating loop and rough sketch of the roof and the existing hydraulic system.

Step 2: proposal of the collector type, estimation of the amount of collectors, estimation of the buffer tank vol-

ume, proposal how to integrate the solar system into the existing system and quotation based on the collectors, mounting hardware, controllers and sensors, and the collector interconnection sets and connection sets.

### **Frequently Asked Questions**

#### **How much heat is necessary for frost protection?**

2 – 4 % of the yearly energy yield, depends mainly on the piping system

#### **What happens in case of a failure of power supply?**

nothing in case of sunshine and little frost, no problem with water in case of full sunshine (thermal stagnation), high intrinsic safety due to steel registers (withstand 1000 bars) and flexible corrugated hoses, uninterruptible power supply for solar pump and controller is needed!

#### **What about hail?**

CPC-collectors are hail-proof according to DIN EN 12975-2, single glass tubes can be changed easy and quickly, CPC-collectors work also with single defect glass tubes.

#### **What about the profitability???**

This type of installation is high-efficient, nearly universally applicable and has the shortest payback period. Commercial payback time is 5.8 years. After this time within 14 years the solar system generates almost 11 times the invest costs. The average solar energy price is about 30 % the energy price at the beginning. The capital interest rate is double digit.

#### **Summary of the AquaSystem:**

The solar system works like an additional boiler with freely selectable temperature. Solar heat exchanger, antifreeze and additional fittings can be dropped. This reduces the costs enormously. No overheating problems anymore! Process heat support up to 120 °C (248 F) is possible. The system can come in a standstill condition without reservations. This allows the use of smaller and more efficient storage tanks. An outstanding thermal stratification in the tank and a minimum storage tank requirement ensure extremely fast availability of the solar heat.

Compared to conventional operation, approx. 50 % of pump running time and pump energy is saved over the year. The comprehensive functional monitoring of the controller discovers and signals faults immediately. This ensures optimal operation and maximal customer's benefit.

There are exclusive CPC-VTC applications today and in the future. It is stand alone heating without DHW (e. g. for office buildings or green houses). Can achieve high temperature solar district heating networks. There is simple solar reconstruction of buildings during renovations. Solar steam generation (steam heating nets, steam jet refrigeration, electric power from heat excess). There are also semi-transparent solar thermal facades for multi-story houses and sea water desalination.

When Michael finished his presentation and he opened up a Q&A session.

**Best Regards,**



**Salvatore S. Rachiele**

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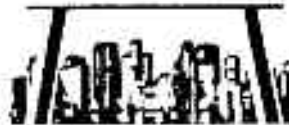
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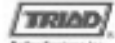
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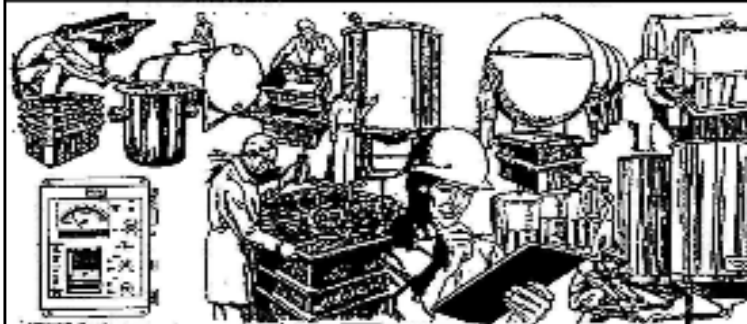
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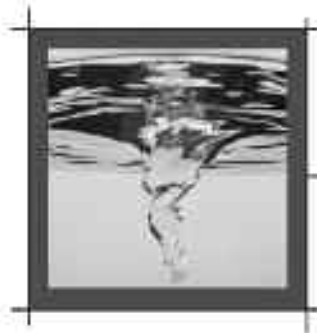
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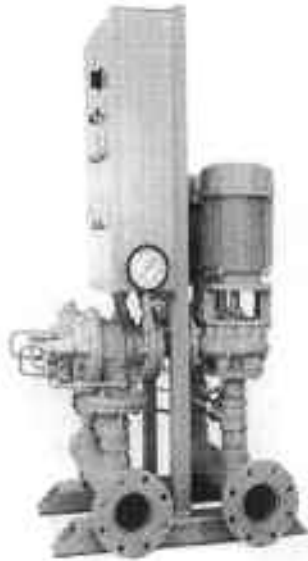


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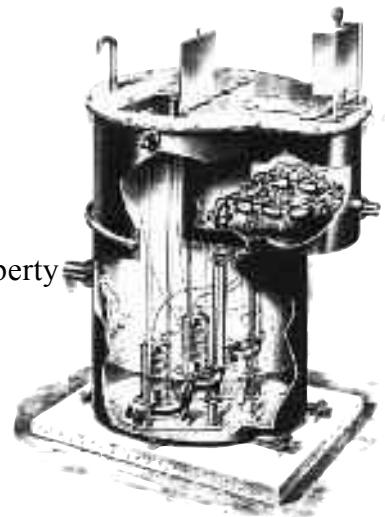
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## ***“Trace Gas Safety”***

Written and Submitted By: Brian Benson

### **Don't Be Numb To The Dangers Of Anesthesia Exposure.**

Surgical inhalation anesthesia is essential to a successful, pain-free, surgical experience. As necessary as anesthesia gases are, they can pose a hazard to anesthesiologists, nursing staff and operating room personnel. Just as a syringe which delivers life saving injections can be a danger if not handled properly, anesthesia gases and delivery systems can also be harmful to the health of those working in close proximity if not regularly monitored for proper administration. The Occupational Safety and Health Act, or (OSHA, requires employers to provide an environment free of hazards. Specifically, section 5(a) (1) of the general duty clause of OSHA, provides that employers may be fined if they fail to prevent or abate a recognized hazard.

### **How Do I Prevent or Abate a Potential Hazard?**

Periodic air monitoring is the best way to ensure that your health care facility is free of anesthetic gas issues. OSHA recommends that air sampling be conducted at least twice a year, to check both for leaks at the anesthetic locations and to ensure control measures are working effectively. Three types of air samples are recommended in the health care workplace: personal, area, and source sampling.

Personal sampling is critical to the safety of health care workers as it measures trace anesthetic exposure to workers whose regular duties require them to be in close proximity to anesthetic gas. Personal sampling is performed by having exposed employees wear chemical badge indicators to read exposure levels.

Area sampling evaluates the overall level of contaminants in the work space and measures the spread of contaminants throughout the health care facility. If the gases are above a certain level based on the personal or area sampling, additional tests will need to be performed to identify the source of the leak.

Finally, source sampling detects malfunctions and leaks at the anesthesia delivery location and identifies improper ventilation at those locations. OSHA requires that the maximum exposure limit of anesthetic gasses be 25 parts per million (PPM) measured at a time weighted average, during simulated or actual anesthetic administration.

As Benjamin Franklin famously said in between flying his kite and signing The Declaration of Independence, An ounce of prevention is worth a pound of cure. This could not be anymore true than in the case of anesthetic gas testing (Trace Gas Testing) in health care facilities. Simple testing which takes very little time and is relatively inexpensive can protect the health and well-being of employees, as well as protect the facility from expensive fines and litigation. Discussing OSHA standards with supervisors and staff as well as keeping

records of tests and any adverse events can also avoid problems. Further information about these standards can be found at the OSHA site, [www.osha.gov](http://www.osha.gov).

Knowing the OSHA requirements can keep anesthetic exposure from being a major pain to you and your co-workers!

### **The Stormwater Story**

Source: <http://www.stormh2o.com/forms/>

Written By Lance Willis

Ever wonder how the regulations you're following came about? The EPA traces their history.

Since its establishment, the National Pollutant Discharge Elimination System (NPDES) has helped make America's waters safe for fishing, swimming, and drinking. Through its regulatory constraints and enforcement mechanisms, it has controlled hundreds of thousands of water-polluting discharges from urban areas, construction sites, and industrial facilities. As a result, despite sustained economic expansion and population growth, the nation's water quality has significantly improved since the 1970s. However, while water-quality professionals may be familiar with the results of the NPDES stormwater permitting program, they may not be aware of its history. What follows is a short biography of the NPDES program.

### **Pre-Phase I**

In 1972, Congress took aim at industrial wastewater and municipal sewage discharges fouling America's waters by passing the Federal Water Pollution Control Act Amendments, commonly known as the Clean Water Act. The purpose of the act was to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

Section 402 of the act required the EPA to regulate pollution "point sources," such as sewage discharges and industrial outfall pipes, through a national permit program. NPDES established discharge, monitoring, and reporting requirements. These requirements restricted the discharge of biochemical oxygen demand, total suspended solids, and other traditionally regulated pollutants.

The Clean Water Act allowed the states to administer the NPDES program. Once the EPA approved their request, state NPDES authorities administered the program consistent with minimum federal requirements for monitoring, reporting, enforcement, and other practices. It soon became apparent, however, that point sources were responsible only for a fraction of water-polluting discharges. Stormwater runoff from agricultural fields and urban streets emerged as leading "non-point" sources of water pollution.

Between 1973 and 1987, EPA's efforts to control non-point discharges were largely ineffectual. For various reasons, NPDES stormwater regulations, published and amended in 1973, 1976, 1979, and 1984, did little to stem stormwater

runoff. Facilities required to apply for permit coverage didn't. Industry resisted requirements for best management practices (BMPs). Funding for stormwater permitting was insufficient for the task, and litigation delayed the enactment of NPDES permit requirements.

After years of delay, Congress enacted the Water Quality Act (WQA) of 1987. Using the results of the National Urban Runoff Program, a US government report based on a study of 2,300 rainstorms in 28 major metropolitan areas between 1977 and 1983, Congress required local government to address the most common sources of urban stormwater pollution.

The WQA amended the Clean Water Act to apply NPDES permit requirements to stormwater discharges from farms, factories, and city streets. It directed the EPA to consult with the states to identify stormwater discharges outside the regulatory authority of NPDES Phase I (see below). It required states to develop numeric criteria to control toxic pollutants (the National Toxics Rule), and it directed the EPA to determine to the "maximum extent practicable" the nature and extent of pollutants in such discharges.

### **Phase I**

Beginning in 1990, the EPA required large municipalities, certain industrial facilities, and construction sites disturbing at least 5 acres of land to obtain NPDES permits for their stormwater discharges. Dubbed "Phase I," the program required municipal separate storm sewer systems (MS4s) located in counties or metropolitan areas with populations larger than 100,000 to obtain NPDES permit coverage. Phase I addressed stormwater discharges from 81.7 million people in 136 urbanized areas, and it required companies in 11 categories of industrial activity to obtain NPDES permit coverage. Furthermore, industrial facilities had to develop stormwater pollution prevention plans (SWPPPs) to contain stormwater discharges before they entered nearby water bodies.

Published on November 16, 1990, the EPA's updated NPDES permit application requirements broadened the scope of the NPDES program. It clarified two key regulatory definitions: "stormwater discharges associated with industrial activity" and "large and medium municipal separate storm sewer systems." Under the original scope of the NPDES system, these definitions referred only to point-source discharges. The new rules established the NPDES permitting authority to regulate industrial stormwater discharges channeled through MS4s. They also clarified that point-source discharges included "any identifiable conveyance from which pollutants might enter the waters of the United States."

To provide flexibility for industrial facilities seeking permit coverage, the EPA developed in the early 1990s three permit application options. Facilities could submit an application for an individual permit, a group permit, or a baseline general permit. The group permit allowed industrial facilities

with similar activities to jointly submit a single application for permit coverage. More than 40,000 facilities representing 700 industrial groups subsequently filed group applications.

The baseline general permit was the EPA's initial attempt at a uniform permitting strategy for stormwater discharges associated with industrial activities. These activities were codified and referenced by standard industrial codes published by the Office of Management and Budget. In 1994, after reviewing thousands of group applications, the EPA developed an industry-specific multisector general permit (MSGP) to provide NPDES permit coverage for members of group applications. The MSGP eventually replaced the baseline general permit for all industries.

### **ISTEA**

In 1991, legislation to expand and improve the national highway system temporarily delayed aspects of the NPDES program. Provisions within the Intermodal Surface Transportation and Efficiency Act (ISTEA) temporarily delayed the deadline for Phase I industrial activities operated by municipalities with populations of fewer than 100,000 to obtain NPDES stormwater permit coverage. This was done to allow small municipalities more time to comply with NPDES industrial stormwater requirements. The Phase II Final Rule ended this temporary exemption. Since March 10, 2003, all ISTEA-exempted municipally operated industrial activities must obtain permit coverage.

### **Small Municipalities**

To promote a regional approach to stormwater management, the EPA allowed small MS4s to join as co-permittees under existing NPDES permits issued to adjoining medium or large MS4s. A regulated small MS4 taking this approach wasn't required to comply with the then-proposed Phase II six minimum measures (public education, public involvement, etc.). As a co-permittee, the small MS4 was responsible only for complying with the state's permit application requirements. An MS4 pursuing co-permitting had to describe how the adjoining municipality's program addressed discharges from the small MS4.

Because of their sheer numbers, only a small subset of municipalities, referred to as regulated MS4s, were required to obtain permit coverage under the Phase II Final Rule. A regulated small MS4 fulfills one of three criteria: It is located within the borders of a Bureau of Census-defined "urbanized area"; the permitting authority has determined that it causes or may cause discharges that adversely affect water quality; or it is "physically interconnected" to a second MS4 in a way that allows for direct discharges into the second system.

Jurisdictions with fewer than 1,000 inhabitants were exempt, as were small MS4s whose discharges did not cause water-quality impairment.

## **Phase I Lawsuit**

In 1992, the Ninth Circuit Court struck down key provisions of Phase I stormwater regulations. Under existing Phase I regulations, “stormwater discharges associated with industrial activity” included stormwater discharges from construction sites disturbing 5 or more acres of land. In its decision, the court ruled that the EPA had failed “to support its perception that construction activities on less than five acres are non-industrial in nature.” The court ruled the 5-acre rule improper.

The EPA responded by designating such construction-related discharges “discharges associated with small construction activities” under sections of the Clean Water Act, rather than “discharges associated with industrial activities.” The EPA’s strategy combined a 1-acre-size threshold with provisions based on the potential for “predicted water quality impairments” to regulate construction sites 1 to 5 acres in size. The approach allowed the permitting authority to waive discharge requirements from sites not expected to cause adverse water-quality effects. It also designated discharges from sites smaller than 1 acre based on adverse water-quality impacts. The EPA’s approach simplified the regulatory process, and it ensured the protection of water quality mandated by the Clean Water Act.

## **Report to Congress**

In its 1995 Report to Congress, the EPA identified two major sources of stormwater pollution still outside the regulatory scope of the Phase I program: discharges from MS4s not subject to Phase I, and discharges from individual facilities not subject to Phase I. In requiring the EPA to prepare its report, Congress also required the agency to establish procedures and methods to control these sources under a Phase II stormwater program.

The EPA recommended that Phase II focus on the 405 urbanized areas identified by the Bureau of Census. Though they occupy less than 2% of America’s land area, urbanized areas represent the largest areas of dense urban development. Under the EPA’s scenario, regulatory authority over industrial dischargers, as well as commercial, institutional, and retail services, would fall to municipalities within these urbanized areas, rather than to the EPA or to the states. The approach injected a measure of flexibility into the regulatory process. By focusing on urbanized areas, the EPA reasoned it could target the highest concentrations of pollutant sources—densely populated cities and its many commercial facilities. Information gathered from urbanized areas yielded important information that helped the EPA analyze approaches to Phase II MS4s.

## **Phase II FACA**

To help identify and address water-quality issues caused by stormwater runoff, the EPA formed in 1995 the Urban Wet Weather Flows Advisory Committee under the

Federal Advisory Committee Act (FACA). FACA established two subcommittees—the Sanitary Sewer Overflow subcommittee and the Stormwater Phase II subcommittee.

Composed of representatives from municipalities, states, Native-American tribes, commercial sectors, and other stakeholders, the Stormwater Phase II subcommittee met 14 times between 1995 and 1998. The 32 subcommittee members discussed potential regulatory frameworks and provided input and advice to the EPA. Among other contributions, subcommittee members helped develop the “no exposure” rule in the draft Phase II rule.

## **Phase II**

In 1998, the EPA proposed regulations to expand the NPDES Phase I stormwater program to include small municipalities and counties, as well as construction sites disturbing at least 1 acre of land. Phase II took aim at stormwater discharges from MS4s in urban areas. Such discharges contain high pollutant concentrations due in part to streets and parking lots—impervious cover on which salt, pesticides, oil, and other human-derived pollutants gather and persist until stormwater washes them into storm drains or nearby water bodies.

Phase II required local governments to develop and enact stormwater management programs with six minimum control measures. Additional requirements called for evaluation and assessment and recordkeeping and reporting. Under Phase II, all regulated MS4s were required to develop, implement, and enforce stormwater management plans that used best management practices to reduce pollutant discharges to the “maximum extent practicable.” The EPA allowed cities to select their own methods to reduce stormwater runoff and to comply with Phase II permit requirements. To help facilitate the implementation of Phase II, the EPA provides communities with a “toolbox” of fact sheets, documents, informational Web sites, technical research, and demonstration projects.

Of the 405 urbanized areas designated by the Bureau of Census, 136 had at least one MS4 regulated under Phase I. Combined, these urban areas were home to 117.5 million people. However, portions of these 136 urbanized areas, with a combined population of 35.7 million people, were not covered under Phase I regulations. Under Phase II, the EPA required operators of small MS4s located within these urbanized areas to control polluted stormwater runoff from the jurisdiction serviced by the MS4. Phase II affects more than 5,000 local governments serving populations of fewer than 100,000. The rule also applies to nontraditional MS4s, such as military bases, transportation departments, hospitals, prisons, and universities.

Phase II revises Phase I requirements, providing conditional exemptions to industrial facilities. For example, if an industrial facility meets “no exposure” criteria—that is, if stored materials or industrial processes are not exposed to stormwater—the operator can submit written certification in

lieu of applying for a permit.

Construction sites disturbing 1 to 5 acres of land were automatically designated Phase II participants. Operators of construction sites of less than 1 acre could also receive the designation if the permitting authority determined the site capable of producing pollution sufficient to violate water-quality standards. Phase II requires operators of small construction sites to obtain NPDES permit coverage and to institute erosion and sediment control practices, control wastes, and develop SWPPPs. These sites, however, may be concurrently covered by state, tribal, or local construction runoff control programs. As in Phase I, program requirements were not fully defined in the rule itself but in the NPDES permit issued by the NPDES authority.

### **State Implementation**

When Congress established the NPDES program, it included provisions that allowed states, territories, and Native-American tribes to request EPA authorization to administer the program. States requesting authorization must show adequate legal authority, procedures, and the wherewithal to administer the program. Concurrently, Congress directed the EPA to develop procedural and programmatic requirements for the state NPDES programs. Such requirements included guidelines on monitoring, reporting, enforcement, personnel and funding, and the development of standardized forms. State programs were required to meet minimum federal standards, but they could voluntarily exceed those standards.

Once authorized, states issue permits and administer the NPDES program. Their authority encompasses publicly owned treatment works and industrial permitting, federal facilities, pretreatment, and general permitting. States with partial authority administer only those program activities—pretreatment, for example—authorized by the EPA. In states not authorized to administer the NPDES program, the EPA remains the permitting authority. When the EPA issues the permit, it must obtain state certification to ensure compliance with state effluent limits, water-quality standards, and “any other appropriate requirement of state law.”

### **EPA Outreach and Training**

The EPA is committed to providing guidance and resources to communities implementing provisions of the Phase II rule. Its Water Permits Division distributes a wide selection of stormwater educational materials, such as brochures, pamphlets, and CD-ROMs. Its Stormwater Program Web site

([http://cfpub1.epa.gov/npdes/home.cfm?program\\_id=6](http://cfpub1.epa.gov/npdes/home.cfm?program_id=6)) contains a comprehensive selection of technical and regulatory information about the NPDES program, arranged according to the three types of regulated stormwater discharges: construction activities, industrial activities, and municipal separate storm systems. Other Web pages contain easily accessible

information on BMP fact sheets, illicit discharge detection and elimination, stormwater case studies, and information specific to Phase I and Phase II regulations.

The EPA’s Water Permits Division also employs a variety of outreach activities, including training courses, workshops, meetings, and conferences to inform stakeholders on regulatory and technical aspects of NPDES permitting. Workshops cover a wide range of topics, such as NPDES permit writers’ training, whole effluent toxicity training, and pretreatment training. The EPA makes available an interactive online training module called the Watershed Academy Distance Learning Program. The modules address a range of topics, from watershed ecology and social issues to cropland management and watershed modeling, among many others.

### **Lawsuits**

Since its inception in 1972, the Clean Water Act has been shaped by conflict over elements of the law and its enforcement. The Natural Resources Defense Council (NRDC) sued the EPA in 1973 over the agency’s authority to selectively exempt categories of point sources from permit requirements.

The case stemmed from regulations that exempted silvicultural (forestry) point sources, concentrated animal feeding operations below a certain size, and non-irrigation agricultural point sources. The US District Court for the District of Columbia ruled that the EPA could not exempt discharges identified as point sources under the NPDES program.

However, recognizing the administrative burden of individual permits, the court ruled that the EPA could use area or general permits to manage its workload. Additionally, the court recognized the EPA’s discretion to define “point source.”

Between 1973 and 1976, when NPDES permits were first issued, the EPA tried to establish uniform national standards for removal of traditionally regulated pollutants as a basis for technology-based limits. However, the EPA failed to include toxics in its guidelines. Furthermore, it missed its deadline to develop required effluent guidelines. As a result, in 1976 the NRDC sued the EPA. The resulting “consent decree” obliged the EPA to identify the toxic priority pollutants to control, the primary industries for technology-based control, and the methods for regulating toxic discharges. Provisions of the consent decree were incorporated into the Clean Water Act.

In response to revisions to NPDES regulations requiring more stringent application data for stormwater point sources, the NRDC and Citizens for a Better Environment sued the EPA in 1980. Under the settlement’s terms, the EPA agreed to change its stormwater regulations. Those changes were later finalized in the 1984 final rule. The rule defined stormwater point sources as channelized conveyances of stormwater runoff located in an urbanized area; discharges from commercial lands or industrial facilities; or discharges designated by the director of the NPDES program. The 1984 rule reduced the number of discharges required to submit test-

ing data.

In 1992, the United States Court of Appeals for the Ninth Circuit issued a ruling on contested provisions of the Phase I stormwater regulations. Among other findings, it upheld the definition of MS4, the standards for municipal stormwater controls, the permit exemptions for oil and gas operations, and the EPA's decision not to provide public comment for group applications for industrial stormwater discharges. However, the court found the EPA's extension of the deadline for stormwater permit applications unlawful, though it declined to strike down the deadline. The court also rejected the EPA's argument that construction activities of less than 5 acres were essentially industrial in magnitude because they employed heavy machinery and industrial equipment.

The EPA's Phase II stormwater regulations were the subject of litigation in 2003. The Ninth Circuit Court of Appeals rejected claims that the EPA exceeded its authority by requiring cities and developers to reduce stormwater pollution before discharging it into waters of the United States. However, the court vacated portions of Phase II regulations relating to the general permitting option for Phase II MS4s. Phase II regulations require MS4s to develop and apply best management practices to stem stormwater runoff pollution.

The regulations authorized the use of general permits and required dischargers to identify those BMPs in their notices of intent (NOIs). However, the EPA did not require public hearings for those NOIs. The Ninth Circuit Court ruled that "the EPA's failure to require review of NOIs ... contravene[s] the express requirements of the Clean Water Act." The decision required the EPA to allow the public an opportunity to request a public hearing.

## The Future

Sustaining the nation's steadily improving water quality will require innovation from the public and private sectors and coordination and cooperation among federal, state, and local officials.

Research will increasingly need to focus on developing new technologies, techniques, and best management practices to slow the velocity, decrease the quantity, and increase the quality of stormwater. Site designs and community plans incorporating measures minimizing impervious surfaces will become more commonplace. Conservation development paradigms, such as low-impact development and smart growth, show promise in improving not only water quality but public health and energy savings.

The stormwater permitting process will continue to evolve in response to the needs of permitting authorities and permittees. State stormwater programs limited by small staff sizes will require efficient tools to process thousands of general permit applications. Permits will have to be refined to ensure water-quality protections, consistent with state total maximum daily loads (TMDLs), that protect impaired waters

lacking TMDLs and that are understandable to the public.

New information management mechanisms are being developed in response to demands from permittees and stormwater managers. Such mechanisms will gather and store standard information from permittees and state programs in a centralized database for use as an evaluative tool to analyze the economic benefits of a stormwater program, to determine which BMPs are most effective, and to decide which steps are needed to achieve program goals.

And finally, given the sheer number of pollution sources, public education efforts will have to remain a priority. Preventing stormwater pollution is easier and far less expensive than curing it, and a national outreach strategy coordinating the efforts of the EPA and state and local offices may eventually develop as the need increases.

## Acknowledgements

I gratefully acknowledge the assistance of the following employees of the Office of Wastewater Management, Water Permits Division, Municipal Branch, stormwater permitting team: Donald Brady, Jack Faulk, Jennifer Molloy, and Ryan Albert.

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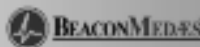
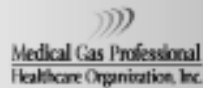
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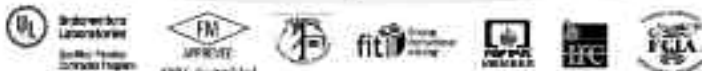
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The undersigned certifies that all statements made herein are correct and, if elected to the Society, agrees to adhere to the Society's Bylaws and accept the Classification conferred by the Society. Upon becoming a member, the applicant will endeavor to advance the objectives of the Society and the plumbing engineering profession.

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