6. Pollution Prevention and Good Housekeeping

Requirement:

DelDOT shall develop and implement an operation and maintenance program with a goal of preventing and/or reducing discharges of pollutants associated with our operations as described in the Application page 13, Permit page 10, Part II.A.6.

Performance:

DelDOT staff and contractors continue to implement the practices set forth in Section 110 of the Standard Specifications for Erosion, Sediment Control and Water Pollution, modified in 2007. This Section addresses practices to control stormwater runoff from soil disturbance activities, spill prevention, material management and good housekeeping practices. Details may be found in Section 4 of this report (Construction Site Stormwater Runoff Control).

A. Road Repair and Maintenance

There are various ways in which the Department maintains the roadways that help reduce the discharge of pollutants. Routine maintenance and improvements reduce the pollutants coming from the roadway in several ways. The patching of potholes and sealing of cracks reduces the amount of pavement that will break away and be transported into the nearest waterway. Repairing potholes also decreases the wear and tear on vehicles, thus reducing the fluids, miscellaneous sediments, and tire particles that could be dislodged from vehicles. Money for roadway maintenance activities is programmed into the District's Maintenance funds.

DelDOT has a Standard Operating Procedure developed for responding and managing spills on the roadways classified as **Category E, Type E-1** incidents (Traffic Hazards, Fuel, Oil or other HAZMAT spills on or near the roadway). Most DelDOT vehicles have been equipped with spill kits in the event of an accidental spill or as a first responder to a vehicle accident; employees have been trained on spill response and protection of water quality.

All road projects are required to follow the Delaware Sediment and Stormwater Regulations. Projects designated as minor, medium or major shall have an approved sediment and stormwater management plan. Medium and major projects must also have a site reviewer who is a Certified Construction Reviewer (CCR).

B. Sweeping Program

DelDOT's sweeping program reduces pollutants by maintaining the cleanliness of the roadway. The street sweeping program includes the roadways, shoulder, intersections, and toll plaza lanes on primary, secondary and tertiary roads. The roadways are swept on the following cycle: roads with ADT (Average Daily Traffic) greater than 20,000 are swept 4 times a year, roads with ADT between 5,000 and 20,000 are swept 2 times a year and roads with ADT less than 5,000 are swept once a year.

DelDOT currently has 31 sweepers in its fleet statewide. Eleven of the vehicles operate in Kent and Sussex Counties. No new sweepers were added to the fleet in 2009.

C. Litter Program

DelDOT's Litter Program reduces the discharge of floatables to the MS4. DelDOT's maintenance staff and prison crews help reduce the discharge of floatables to the MS4 through routine pick up of trash and debris from the roadways and medians and right-of-way. DelDOT staff is also responsible for removal of dead animals and clean up of illegal dump sites from the roadside. In 2009 crews picked up 66,814 bags of trash from Delaware highways. DelDOT staff is also responsible for removal of dead animals and clean up of illegal dump sites from the roadside. Additional litter control programs are described below.

Adopt-a-Highway

Adopt-a-Highway is a cooperative program between DelDOT's Division of Public Relations and volunteers to reduce litter along State roadways and subsequent discharge to waters of the State. This program supplements effort by DelDOT's maintenance forces to control litter. The volunteer groups are required to collect litter a minimum of twice per year and submit activity reports following each cleanup for inclusion in the program. Each group maintains approximately two miles of roadway. DelDOT maintains an Adopt-a-Highway website (www.deldot.gov) and submits press releases to solicit volunteers. In 2009 there were 242 volunteer groups in Kent County and 327 in Sussex County maintaining approximately 1,138 lane miles. In 2009 Adopt-a-Highway crews picked up 6,170 bags of trash from Delaware highways.

Anti-Litter Campaign

The Division of Motor Vehicle offices offered free car litter bags to all motorists. DelDOT is also bringing the anti-litter message to young people by partnering with school districts. Another partnership with the Department of Natural Resources and Environmental Control resulted in the fines to at least four persons who littered along a DelDOT roadway.

Roadside Clean-up

DelDOT held its fifth annual "Imagine a Litter Free Delaware" cleanup day along roads, highways and community areas in September 2009.

D. Snow and Ice Program

Effective salt management practices can help reduce the amount of road salt that enters the environment. This translates into savings for DelDOT, protection against liability, and minimization of impacts of salt on our environment. DelDOT has many practices in place, both for the roadway and all maintenance facilities.

DelDOT continues to follow the salt management practices established by the "Statewide Salt Best Management Practices for DelDOT Maintenance Yards" plan developed in 2004. All salt stored at the maintenance facilities is stored under roof. Only during loading and unloading does the potential exist for salt to enter the stormwater system. Standard procedures call for DelDOT maintenance staff to clean up loading areas as soon as practicable after a storm event. Compliance with these procedures is ensured through annual inspections.

Salt application rates to roadways can vary depending on storm conditions, but the goal is 100 to 400 pounds of salt per lane mile, as recommended by AASHTO. The rate is achieved by calibrating the equipment annually and sending maintenance personnel to a one-day seminar provided by The Salt Institute. The seminar instructs on proper salt application procedures and quantities, balanced with safety and environmental considerations.

DelDOT has developed and continues to implement advanced snow fighting practices. These include ground speed spreader controls, anti-icing, pre-wetting, and plow balance valves. These advanced techniques in snow and ice removal help DelDOT meet its goal of improved service to customers, reduced impact to infrastructure, and conservation of salt. This also helps meet the goals of the NPDES Program by reducing the impact on the environment in the following ways:

- Ground speed spreader controls provide accurate control of material application.
- Anti-icing is the application of liquid deicers (salt brine) to road surfaces prior to a precipitation event to prevent the formation or development of bonded snow and ice. The Department presently has eleven brine units of 1300-gallon capacity and six units of 1800-gallon capacity that slide into the bed of a dump truck. We have also acquired four 5000-gallon tanker trailers equipped with spraying capabilities to be pulled by the Departments current fleet of truck tractors.
- Pre-wetting adds moisture to salt to "jump start" the melting action of the salt and causes the salt to stick to the road and prevent scatter or bouncing.
- Plow balance valves decrease the amount of weight that the plow cutting edge bears on the road surface, decreasing damage to the road surface.

E. Stormwater Conveyance Systems

Maintenance of the stormwater conveyance system ensures proper functioning of the stormwater system and BMPs and thereby reduces the pollutants that are carried to nearby waterways. Money for this is programmed into the Districts' Maintenance funds. The MS4 and BMP inspections performed for DelDOT by KCI Technologies and Century Engineering continually generate and prioritize maintenance work orders.

This maintenance work includes three components:

- *Open system drainage* – General work to control erosion, as well as cleaning and reshaping of ditches. Stabilization of ditches reduces the amount of sediment that enters the local stream and waterways.
- *Closed system drainage* - Work performed on the components themselves, including general maintenance or replacement. This includes tasks such as drainage pipe repair, catch basin/manhole repair and maintenance, and general maintenance on stormwater detention ponds.
- *Ponding problems* - Draining water off the roadways. This is usually the result of calls from citizens after a rain event.

F. Roadside Vegetation Management

All herbicide applications that are applied to DelDOT rights-of-way by contract applicators are reviewed prior to the award to the lowest bidder to insure that selected herbicides are labeled for the intended use, and that when feasible, a herbicide is selected that can be applied at a low-use rate. This review frequently reduces the total load of herbicide applied to DelDOT's rights-of-way.

DelDOT does not routinely fertilize its roadsides. The only nutrients applied to DelDOT's rights-of-way come as a result of leaving grass clippings on the ground after mowing. Degradation of this vegetative material results in the slow release of organic constituents, which are mineralized to plant nutrients by microorganisms and made available to turf grasses. This natural process results in minimal leaching of nutrients. Also this practice results in minimal surface runoff of nutrients from ground with a slope of 3 horizontal to 1 vertical or less.

Fertilizers are used in establishing turf grasses from seed on freshly prepared bareground. This is generally done under contract with a firm using a hydroseeder. DelDOT's specifications require that 50% of the nitrogen product be a slow release form of ureaformaldehyde. The amount of nitrogen applied is 78 kg/ha. Phosphorous pentoxide is applied at 47 kg/ha of available P that is the sum of water soluble and citrate-soluble phosphate. Potassium oxide is applied at 31kg/ha of water soluble potash. In all cases areas that are seeded are covered with a recommended mulch.

Pesticides applied on DelDOT's rights-of-way are done according to label recommendations that are on the product and filed with EPA at the time of product registration. Pesticides applied on DelDOT's rights-of-way are done by contractors that are certified Delaware pesticide applicators. DelDOT employees that apply pesticides to DelDOT's rights-of-way are certified Delaware pesticide applicators or work under the supervision of a DelDOT employee that is a certified Delaware pesticide applicator. Typically, the only pesticides applied by DelDOT fall under the category of herbicides. DelDOT, however, may use other pesticides such as insecticides under certain circumstances.

DelDOT employees take required training courses that serve as credit toward renewal of their Delaware pesticide applicators license. Roadside Environmental Specialists attend conferences and working sessions on pest control technologies that are open to all DOT employees. Opportunities to use reduced amount of pesticides by using new low rate pesticides, adjuvants or surfactants that can enhance efficacy of pesticides and thus reduce rate, or alternatives to chemicals that are cost effective and efficacious are often topics of various sessions these specialists attend.

We began implementing several programmatic initiatives as part of the NPDES pesticide reduction strategy:

- *Guardrail Inventory* – DelDOT has the responsibility of maintaining a 4' clear zone around the guardrail for both public safety and structural integrity via mowing, hand trimming and herbicides. We executed an agreement with Wallace Montgomery & Associates, LLP in May 2008 to inventory all guardrails statewide. The project was completed in June 2009 and inventoried 310 guardrail miles. Attributes collected included material under guardrail, guardrail type, surrounding environmental features and identification of sensitive/no spray zones. We will monitor new construction contracts that modify or add new guardrail sections.

When we reach a mileage threshold, we will develop a new task order for consultant services to inventory. The inventory and attributes collected will be used in development of a pesticide reduction strategy to limit the use of herbicides, particularly around environmental sensitive areas (e.g. streams, wetlands, drinking supply, etc.).

- *Guardrail Vegetation Management pilot study* – DelDOT and the University of Delaware developed a controlled research study to test the effectiveness of treatment types under guardrail for weed control. Two types of weed block material, asphalt, low-grow fescue and natural growth with periodic trimming will be monitored against a control. The results of this study will determine if these materials are effective at reducing herbicide application and can be used in specific locations such as environmental sensitive areas and drinking water supply reservoirs. The study will continue at least through 2010.

- *"Establishment and Maintenance" manual* – DelDOT contracted with The University of Delaware to develop an "Establishment and Management" manual to manage vegetation along Delaware's highways. One goal of the manual is developing pesticide reductions strategies that follow Integrated Roadside Vegetation Management (IRVM) objectives. The manual was completed in March 2009. A copy of the E&M manual can be viewed on our website at: http://deldot.gov/information/pubs_forms/manuals/edh/index_em.shtml.
  University of Delaware extension service staff conducted two training workshops on the E&M manual for District staff statewide.

- *Contract language* – Since DelDOT outsources most of the herbicide spraying, DelDOT has strengthened its herbicide contract language to reduce the environmental impact of herbicide treatment. We now require contractors to:

  a. Use an EPA-approved drift control agent as part of the mix

  b. Use only formulations of glyphosate with a full aquatic label.

  c. Be aware of the locations of "Sensitive" or "No spray" zones and avoid applications within the limits of these areas. These zones will be identified through the guardrail inventory and made available to the contractor.

- *Training* – In addition to the required training for pesticide license renewal, DelDOT holds periodic training to further educate staff. In April 2009, 5 DelDOT staff attended an "Invasive Species and Vegetation Management" webinar.

- *Record keeping and pesticide usage* – Contractors and DelDOT applicators are required to submit records of spraying activities to DelDOT's Environmental Roadside Section. The NPDES Program has begun tracking herbicide quantities to establish baseline herbicide usage. By tracking herbicide quantities we will be able to identify the cause of spikes or declines in usage and use the data to assess pesticide reduction programs we have implemented.

G. Spill Prevention and Response on Roadways

DelDOT's Transportation Management Center (TMC) coordinates operations and shares information among its own personnel as well as various other transportation and public safety-related agencies, serving as the transportation interface among all such agencies in the state. They operate 24-hours per day/7 days per week. The TMC serves as the central communication point for DelDOT during major incidents, special events, and emergencies, and coordinates transportation management activities with other agencies. The TMC has special instrumentation that has been used to develop incident management capability.

The type of incident detected or called in has a direct effect on the notification process and steps that must be taken in order to be able to respond, assist, and document the incident in an expeditious manner. Incidents have been classified into one of seven categories, and then into sub-categories that further specify the type of incident that has occurred. These categories are listed below:

Category A: Accidents (Emergency)
Category B: Vehicle Fire (Emergency)
Category C: Disable Vehicles (Emergency)
Category D: Police Activity (Emergency)
Category E: Traffic Hazards (Emergency)
Category F: Roadway and Signal Operations (Traffic)
Category G: Delay or Congestion (Traffic)

In June 2001, the TMC developed a manual of Standard Operating Procedures (SOP) that acts as a guideline for handling incidents and systems problems; as a training tool/resource for new employees and as a reference guide for the operations staff. *Category E: Traffic Hazards (Emergency)*, of the SOP describes the notification and documentation procedure involving fuel, oil or other HAZMAT spills on or near the roadway.

In the event of a spill such as fuel, oil, or HAZ-MAT, the TMC is required to notify the respective police agency since they are responsible for arranging for the particular traffic hazard to be removed. Generally, the police will contact the following agencies: Fire Board, DNREC (Department of Natural Resources and Environmental Control), tow company, and all other agencies that are required to attend such incidents.

In the event of a non-hazardous materials spill DelDOT mobilizes, responds and directs the clean up effort to prevent the material from entering the storm drain system or receiving waters. If the spill is of questionable material, DelDOT uses procedures as describe for HAZ-MAT spills. Most DelDOT maintenance vehicles have been supplied with spill kits, and maintenance staff are regularly trained on their use.

In addition to the TMC's Standard Operating Procedures, the NPDES Program has completed the Spill Prevention Control and Countermeasures Plans for DelDOT facilities that met the above ground storage tank minimums. These are described in section H below.

H. Pollution Prevention at the Maintenance Facilities

<u>Pollution Prevention Plans</u>

DelDOT's NPDES Program continues to manage a Stormwater Pollution Prevention Program (SWPPP) at each of the 16 DelDOT maintenance facilities. Development, implementation, and maintenance of the SWPPP provides the maintenance yards with tools to reduce pollutants contained in stormwater discharges and comply with the

requirements of Delaware's "Regulations Governing Storm Water Discharges Associated with Industrial Activity." The program includes a written plan, timeline for plan implementation, inspection schedules, training and monitoring requirements, and proper storage and housekeeping measures. Each SWPPP has a pollution prevention team with designated responsibilities to carry out the plan.

Facility Inspections

Team members of the Pollution Prevention Plans for each maintenance yard are required to conduct quarterly inspections during dry and wet weather events to look for evidence of stormwater contamination. The inspection reports are submitted to the DelDOT NPDES Program and also filed with the SWPPP binders at each facility. Quarterly inspections continued during the 2009 calendar year. At least once per year, a member of the DelDOT NPDES Program staff also conducts a full inspection of each yard.

Spill Prevention Control and Countermeasures (SPCC)

DelDOT hired BrightFields, Inc. to assist the Department in complying with EPA's Oil Pollution Prevention regulations (40 CFR 112) contained within the Clean Water Act. An SPCC Plan discusses how the maintenance facility conforms to oil spill prevention and containment procedures. Each SPCC Plan is unique to the facility. BrightFields, completed a full investigation and developed site-specific plans for maintenance facilities that met the above ground storage minimums requiring a SPCC plan. All plans were completed and distributed in 2007. Because of the addition of new above ground storage tanks at Harrington and Cheswold maintenance facilities, Brightfields recently also prepared SPCC plans for these areas, and they were implemented in 2008.

Training

In 2007, the NPDES Program executed an agreement with the Center for Safety & Emergency Response Training (CSERT) to develop three training videos for our maintenance staff. Videos were completed and delivered to each maintenance facility. The videos are used to train DelDOT personnel annually on:

- The regulatory requirements of the Spill Prevention Control and Countermeasures (SPCC) plans developed for each maintenance yard
- Spill response and emergency procedures
- The proper procedures for responding to facility and non-facility (roadway) based emergency events.

The training videos on Facility and Vehicle Maintenance, Stormwater Contamination and Spill Prevention, and Vegetation Control and Pollution Prevention on Public Roads and Highways, developed by CSERT in 2003, also continue to be used to train DelDOT personnel and new hires.

Monitoring

The Pollution Prevention Plans currently require wet weather stormwater monitoring at four maintenance facilities. These facilities were chosen as representative of the 16 facilities located throughout the state. The four yards are: Kiamensi, Bear, Cheswold, and Harrington. As noted in our 2008 Annual Report, the pond at Georgetown yard was removed that year from the monitoring requirement.

Monitoring was conducted during 2009 at each of the other four pond outfalls. Sampling techniques were performed in accordance with the Environmental Protection

Agency (EPA) *Stormwater Sampling Guidance Document*, EPA 833-B-92-001 (July 1992). Semi-annual samples were collected once in each of the following six-month periods: January through June, and July through December.

The wet weather monitoring protocol includes 72 hours of antecedently dry conditions, minimum predicted rainfall depth of 0.10 inches, and two full days of standard maintenance yard operations since the last rainfall event. A first flush sample was collected within 30 minutes from the first noticeable flow, and delivered to the laboratory for analysis of total suspended solids, surfactants, chloride, pH, and total petroleum hydrocarbons: gasoline and diesel range organics. Measurements of flow, air temperature, water temperature, pH and turbidity were recorded on-site at the time of sample collection.

Table 6-1 displays the first flush concentrations measured during 2009 for all parameters at each of the four sites.

The total suspended solids (TSS) levels measured in the September 2009 samples collected at Cheswold yard (171 mg/L) and Harrington yard (161 mg/L) exceeded the benchmark value of 100 mg/L. Operations at both yards were investigated shortly after the test results were received in order to determine the source(s) of the excess sediment discharges. At Cheswold, the excess sediment load was attributed to intensive ditch cleaning activities that took place during that week. Higher than normal amounts of mud were washed from dump trucks at the yard. The yard crews cleaned up as much of the sediment from the wash pad as possible before it entered the pond. An inspection of the yard by NPDES staff in October also noted repairs that were needed in the wash pad's sediment screen and the swale into which it discharges. No explanation for the high TSS level at Bear yard could be found. TSS levels measured at that both sites later in January 2010 were well below the benchmark.

Vehicle Wash Water Plan

In July of 2005, DelDOT submitted a report entitled *Statewide Vehicle Wash Water Practices for DelDOT Maintenance Yards* to DNREC (see Annual Report 2005). This report outlined the Department's proposal for treating vehicle wash water on-site at our sixteen (16) maintenance facilities. Our goal was to develop options to treat vehicle wash water and stormwater to acceptable levels before it exits our site and enters receiving waters. To meet this objective we developed a stormwater "treatment train" at each maintenance facility. This method incorporates multiple Best Management Practices (BMPs) to treat wash water to the maximum extent practicable. In several cases, existing practices, together with proposed policy changes and employee training, were sufficient to treat the vehicle wash water. In other cases, there is a need to design and construct retrofits at the facilities.

In the 2008 Annual Report we detailed the two Maintenance Yard stormwater retrofits that had been completed. One was at the Bear Maintenance Yard and the other was at the Cheswold Maintenance Yard. In 2009 construction was completed at our Middletown Maintenance Yard and the Retrofit Design for our Harrington Maintenance Yard was completed with construction scheduled to begin in Spring 2010. Improvements include replacing the existing dry pond with a wet pond including a forebay, creating bioswales and a concrete wash pad with sediment screen.

The Middletown Maintenance Yard Retrofit was completed in September 2009. A vehicle wash pad with a sediment screen was constructed. The runoff from the wash pad drains to a forebay which in turn drains to a bioretention area. Prior to leaving the site, the water from the bioretention area flows into the wet pond. (The existing Dry pond was converted to a wet pond to provide added water quality benefits.) In addition to the vehicle wash area, a 350 foot long bioswale with a seven foot wide flat bottom was constructed downstream of the stockpile storage area in order to capture sediment and other pollutants.

The Talley Maintenance Yard Improvements Project also was completed in December 2009. The objective of this project was to improve operational effectiveness at the facility. Facility upgrades included replacing the existing salt barn, upgrading the fueling stations, installing 3 truck shed buildings which will house 29 trucks, building a new crew operations building and a concrete wash pad equipped with a Baysaver for treating the wash water.

I. Employee Training Program

The following is a list of training workshops and conferences attended by DelDOT staff and training material produced in calendar year 2009:

- All maintenance staff is required to view the following videos as part of Pollution Prevention Plans: Stormwater Contamination & Spill Prevention, Vegetative Control & Pollution Prevention, and Facility & Vehicle Maintenance.
- All maintenance staff is required to view videos as part of the Spill Prevention Control and Countermeasures Plans. The three topics include: SPCC regulatory requirements, spill response and emergency procedures and roadside events.
- NPDES staff are members of the Nonpoint Source Advisory Committee and attend the annual workshop.
- Stormwater design workshop: DOTS stormwater section gave presentation to DelDOT designers regarding their requirements under the Inland Bays PCS and pending NPDES requirements regarding TMDL's.
- Establishment & Management Manual training – The Establishment and Management Manual is primarily designed as a tool for DelDOT roadside vegetation managers and agents employed by DelDOT. A training workshop March 17 and 18 for 55 employees. The focus of the manual is to put into place procedures and processes that are cost efficient, will ease maintenance, and be attractive for the travelers on the State's highways.
- Webcasts viewed by NPDES staff:
    - Webcast: April 29, 2009 – Invasive Species and Vegetation Management webinar; 5 DelDOT employees.
    - EPA webcast: September 10, 2009 – "Introduction to water quality standards" webcast - Webcast highlighted the three major components of state and tribal water quality standards e.g., designated uses, water quality criteria, antidegradation.

- EPA Webcast: September 30, 2009 – Illicit Discharge Detection and Elimination IDDE 301 - Finding and Fixing Illicit Discharges and Connections.

- ArcGIS training August 11-12, 2009; DelDOT's NPDES Program Manager and Environmental Scientist.
- The Roadside Environmental Section staff attended various courses and workshops for re-certification, pesticide credits, and ISA (International Society of Arboriculture) credits including:
  - DE Horticulture Industry Expo and Annual Pesticide Conference, Dover, January 2009.
  - Summer Turf Expo, August 2009.
  - 2009 Delaware Ornamental & Turf Workshop, November 2009.

Table 6-1. 2009 wet weather monitoring results from DelDOT maintenance facility BMP outfalls. The samples were collected once in each of the following six-month periods: January through June, and July through December. All results are reported in mg/L.

PARAMETER	KIAMENSI		BEAR		CHESWOLD		HARRINGTON	
	04/03/09	08/28/09	04/03/09	08/28/09	04/03/11	09/11/09	04/03/09	09/11/09
Total Suspended Solids	28	7	51	8	33	171*	21	161*
Surfactants, MBAs	0.23	0.28	0.25	0.18	0.25	0.15	0.20	0.22
Chloride	977.0	713.0	965.0	28.5	603.0	50.5	644.0	51.0
TPH-Gasoline Range Organics	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
TPH-Diesel Range Organics	0.30	0.20	0.16	0.13	0.23	0.18	0.11	0.23
pH	7.08	7.36	7.16	7.29	7.43	7.33	7.34	7.17

*Exceeds benchmark value.