Princeton Plasma Physics Laboratory

Storm Water Pollution Prevention Plan

August 31, 2015

Revision 4

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August 31, 2015

Revision 4

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Introduction

The purpose of this Storm Water Pollution Prevention Plan is to enable the management of the storm water runoff that exits Princeton Plasma Physics Laboratory's (PPPL) site in a manner that minimizes negative impacts to nearby surface waters. In addition to PPPL's commitment to comply with environmental regulations, PPPL management is committed to sustainable environmental practices and fully recognizes the importance of minimizing impacts to human health, safety, and the environment.

This Storm Water Pollution Prevention (SWPP) Plan was prepared to implement the recommendations and best practices identified in a site-wide Storm Water Management Plan (Study) prepared by Smith Environmental (March 1996) and subsequently, on PPPL's Management Safety Walk-Through inspections. The format was adopted from the New Jersey Department of Environmental Protection's (NJDEP's) guidance on storm water pollution prevention plans. This plan is not required by permit or regulation, but is being implemented by PPPL as a best management practice.

Storm water runoff from D-site and the eastern half of C-site flow to the retention basin, which is lined with an oil/gas resistant geomembrane liner was installed in 1995. The retention basin is regulated by the New Jersey Pollutant Discharge Elimination System (NJPDES) General permit for the lined surface impoundment (LSI). Environmental Services Division (ESD) is responsible for inspecting the basin and associated pollution control equipment on a weekly basis. Oil sensors and a permanently-mounted oil boom are located in the basin; the oil sensors are connected to the building automation system (BAS) and alarmed if >1mm of oil is detected on the water surface. If oil is detected, the gate valve automatically closes, isolating the oil in the basin. Emergency Services Unit (ESU) notifies Facilities and ESD about the alarm and visually checks the basin for signs of oil and, if practical, attempts to trace the oil back to its source. In addition to the oil sensors located in the basin, oil sensors were installed in Neutral Beam transformer yard sumps in 2010-2011. Transformers contain large quantities of mineral oil, and if a transformer was to leak oil, oil is contained within the concrete-lined transformer yard. If oil is detected, the sump pumps are shut off,

preventing oil from being discharged, and an alarm is activated at PPPL's Emergency Services Communications Center. Additional oil sensors are located throughout the Laboratory campus at locations, such as hydraulic elevator systems, with the potential for significant oil releases which could discharge to the basin or on-site storm sewer system.

The western half of C-site drains to a perimeter swale adjacent to the C-site roadway that flows into the wetlands south of PPPL *via* an intermittent stream that eventually joins Bee Brook, a tributary of Devil's Brook and the Millstone River. This area receives runoff from the Upper and Lower employee parking lots and the Site Protection/Emergency Services building parking area. If visible oil sheens are observed from parking lot runoff or in the roadway, ESD and ESU personnel use Simple Green or similar biodegradable surfactants to break-up the oil and oil absorbent pads if the oil amount warrants their use. Fence posts are installed at several locations along the C-site drainage swale to facilitate the placement of oil sorbents and/or booms in the event of a large-scale spill. PPPL has three rain gardens in areas of the site where storm water drainage needed improvements to reduce walkway flooding, increase ground water recharge, and/or prevent of sediments/soil erosion. Drainage swales throughout the site are maintained to accomplish the same purposes.

This Plan is to be reviewed every three years and revised as necessary.

References:

PPPL Beneficial Landscaping Plan.

PPPL Spill Prevention Control and Countermeasure Plan (SPCC), 2011.

PPPL Engineering Standard ES-MECH-013, Rev.0 Excavation Soil Erosion and Sediment Control Guide, 2014.

PPPL Storm Water Management Plan, Smith Environmental, 1996.

Standards for Soil Erosion and Sediment Control in New Jersey, January 2014

List of Exhibits

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Exhibit1. SWPP Plan Participants

William Gervasi **Responsibilities:** Facilities housekeeping, grounds maintenance, facilities operations	**Title:** Manager, Maintenance & Operations **Phone #:** 3592 **Cell:** 609-306-6183
Margaret King **Responsibilities:** Grounds management	**Title:** Manager, Grounds **Phone #:** 3652 **Cell:** 609-947-1426
Mounir Awad **Responsibilities:** Motor Generator Section	**Title:** Head, MG Section **Phone #:** 2345 **Pager %:** 402
John Lacenere **Responsibilities:** AC Power	**Title:** Head, AC Power **Phone #:** 3308 **Pager %:** 090
Virginia Finley **Responsibilities:** Environmental compliance	**Title:** Manager, Environmental Compliance **Phone #:** 2746 **Cell :** 609-218-9757
Frances Cargill **Responsibilities:** Material Services	**Title:** Manager, Warehouse Operations **Phone #:** 3396 **Cell:** 609-613-3366
Responsibilities: Oversight of PPPL's Storm Water Management Plan	**Title:** Project Manager, Facilities **Phone #:** **Pager %:**
Maria Pueyo **Responsibilities:** Oversight of PPPL's SPCC, management of hazardous waste, spill response coordination.	**Title:** ESD Waste Manager **Phone #:** 2213 **Cell :** 609-638-2213
Fran White **Responsibilities:** Site Protection/Emergency Services	**Title:** Manager, Site Protection Division **Phone #:** 2899 **Cell:** 609-751-8475
Keith Rule **Responsibilities:** Sustainable Landscape Program (supporting Facilities & Site Services)	**Title:** Project Engineer-Environmental **Phone #:** 2329 **Cell:** 609-937-0558

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Exhibit 2. Coordination of Storm Water Pollution Prevention (SWPP) with Other Existing Environmental Management Plans

The *PPPL Storm Water Management Plan* (March 1996) provides the hydrological study of stormwater flow on the then 72-acre site. In 1997, PPPL added 16.5 acres of forested uplands/wetlands along the southwestern boundary to include the Former Annex Building Area where hazardous wastes were once stored. This area drains to the Bee Brook wetlands and will remain undeveloped. In the Management Plan, proposed site improvements and storm water management facilities were discussed. Originally, the Management Plan was a part of PPPL's Site Development Plan, which was the overall planning document for facility development and management. This Management Plan remains the reference for storm water at PPPL.

The current version of *Spill Control and Countermeasure Plan* (SPCC) includes provisions for training, inspections, spill response and clean-up, and the identification of recommended actions to prevent and respond to oil spills.

The *Non-Emergency Environmental Release Notifications and Reporting* is a laboratory-wide procedure, ES&H-013. This procedure provides guidance for spill release reporting to the New Jersey Department of Environmental Protection and/or to the U.S. Environmental Protection Agency.

PPPL's Leadership in Energy and Environmental Design (LEED) program incorporated the SWPP Plan as one of the prerequisite requirements.

PPPL's Excavation, Soil Erosion and Sediment Control Standards (ES-MECH-013) provides methods and measures for the prevention of soil erosion and improvement of storm water quality and/or quantity for any project* that disturbs soil and vegetation. Permits for the Freehold Soil Conservation District are required for all projects that disturb 5,000 sq. ft. or greater.

*****Project defined as a public facility construction, structure demolition, parking lot construction, clearing or grading of any land except for agriculture or horticultural purposes, *i.e.*, any activity that has the potential to cause soil erosion. (*Standards for Soil Erosion and Sediment Control in New Jersey*, January 2014)

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Exhibit 3. Inventory of Materials Processed or Stored

Materials	Use (Location on Site Map Exhibit #5)	Quantity (gallons)	Storage Method	Handling/ Process Method
E-85 Ethanol	Refuel vehicles **(A)**	1,000	AST-3	See SPCC
Diesel #2	Refuel vehicles and equipment **(A)**	500	AST-4	See SPCC
Diesel #1	Fuel for C site stand-by (emergency) diesel generator **(B)**	1,000	AST-5	See SPCC
Diesel #1	Mobile generators **(C)**	150	Tank	
Diesel #1	Mobile tanker trucks (**O**)	5,000	Tanker	
Diesel #1	Fuel for D site stand-by (emergency) diesel generator **(D)**	15,000	AST-8	See SPCC
B-20 (biodiesel)	Fuel for biodiesel vehicles **(A)**	500	AST-15	See SPCC
Gasoline	Fuel for vehicles **(A)**	500	AST-16	See SPCC
#2 Fuel Oil	Fuel for boiler units 2, 3,4,&5 **(E)**	25,000	AST-1	See SPCC
Bearing Oil	D-site emergency tank **(F)**	8,000	AST-9 (normally empty)	See SPCC
Oils (non-PCB)	Transformer oil, Capacitor oil **(H)**	264,654	Total amount of all transformers, capacitors	See SPCC
Various chemicals	Chemical cabinets and storage sheds (outdoors) **(I)**	~100	Hazardous material cabinets	
Waste/ Recyclables/ Compostable	Disposable trash, Recyclable cans, paper, cardboard, metals/ compostable waste	Variable	Dumpsters **(S)**	
Equipment	Materials kept by various groups (protected from elements)	Liquids - little to none	Storage box trailers **(T)**	
Equipment	Materials kept by various groups (unprotected from elements)	Liquids - little to none	Open air storage yards: unpaved **(X)** paved **(Y)**	
Sand & salt Magic salt	Icy pavements and sidewalks	None	Covered pile **(Z)**	

Notes:
AST = aboveground storage tank
SPCC = Spill Prevention Control and Countermeasure Plan

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Exhibit 4. Non-Storm Water Discharges and Monitored Parameters

Type of Discharge = (domestic/process waste water, or non-contact cooling)	**NJPDES – DSN001 unless noted otherwise**	**Labeled on Site Map**	**Identify Potential Chemicals**	**Parameters Analyzed**
Ground water for foundation sumps: D-site air shaft D site MG basement LSB basement CS basement C site MG basement	NJ0023922	**J** **K** **L** **M** **N**	Ground water	Tritium Total P PCE
Boiler blowdown Units 2 & 3	NJ0023922	**P**	Boiler treatment chemicals	COD, Tot P, TSS, pH, WCR
Boiler blowdown Units 4 & 5	Sanitary	**P**	Boiler treatment chemicals	None
Liquid Effluent Collection Tanks (LECTs)	Sanitary		D-site floor drains, HVAC drain	Temperature pH, Tritium
Sand filter for cooling tower blowdown	NJ0023922	**Q**	Solids from D&R Canal	TSS
Cooling tower blowdown	NJ0023922	**Q**	Cooling tower treatment chemicals	pH, COD, CPO, Tot P, WCR
Heat exchanger non-contact cooling water	NJ0023922	**R**	D&R Canal water	TSS, CPO

Notes:
COD = Chemical oxygen demand
CPO = Chlorine-produced oxidants
CS = C Stellarator
D&R Canal = Delaware & Raritan Canal, source of non-potable water
MG = Motor Generator
NJPDES = New Jersey Pollutant Discharge Elimination System
LSB = Lyman Spitzer Building
PCE = Tetrachloroethylene or perchloroethylene
Total P = Total phosphorus
TSS = Total suspended solids
VOCs = Volatile organic compounds
WCR = Waste Characteristic Report parameters

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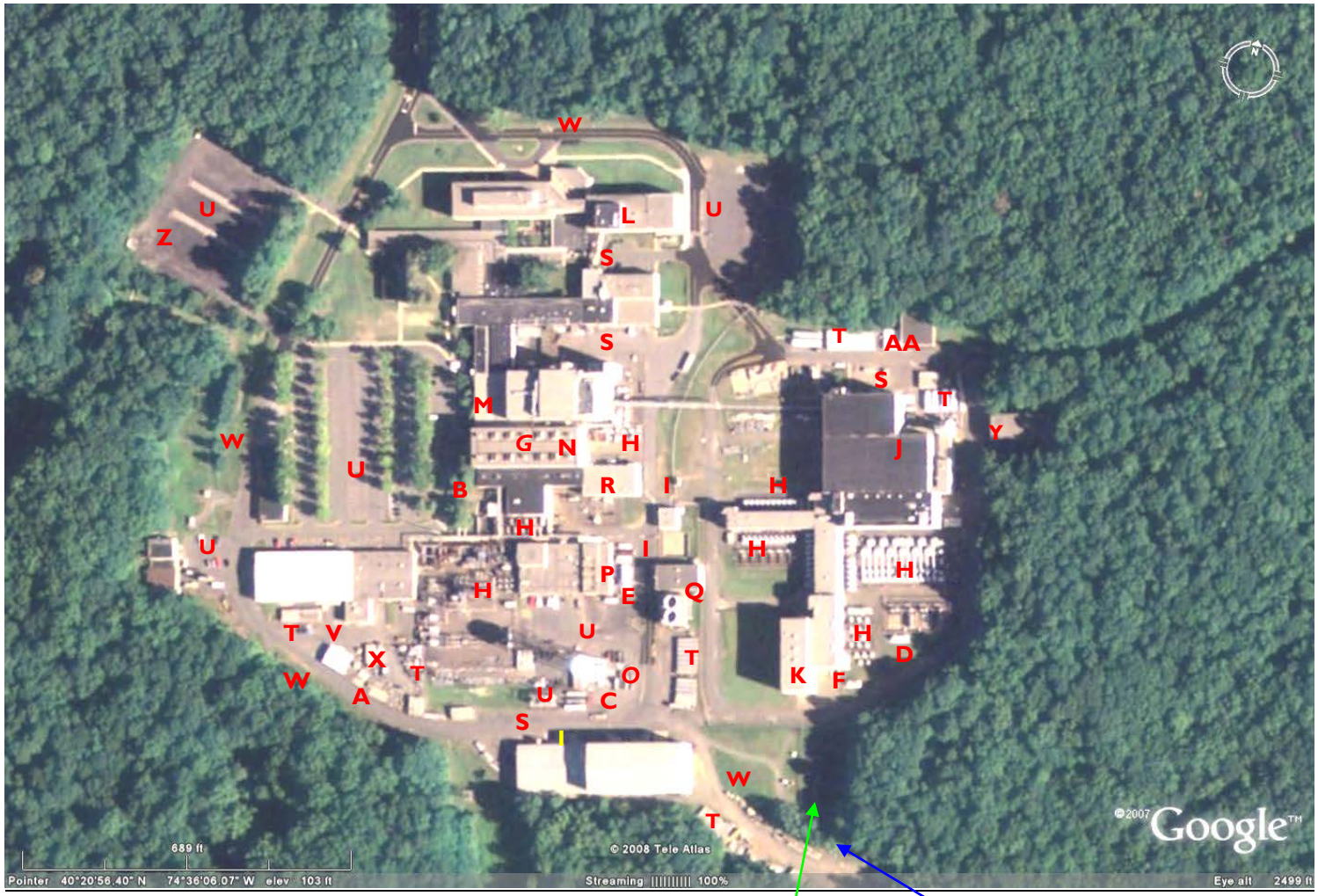
Exhibit 5. PPPL Site Map



Retention Basin and Basin discharge – DSN001

KEY: *multiple locations

A	Refueling tanks (gasoline/diesel/ E-85)
B	C –site diesel generator tank
C	Mobile emergency generators
D	D-site emergency diesel generator tank
E	Diesel tank for boilers
F	D-site emergency holding tank
G	Lubrication oil tanks for MG sets (removed)
H	Transformer/capacitor oil *
I	Chemical storage cabinets*
J	Foundation sump air shaft basement
K	Foundation sump D-site MG basement
L	Foundation sump :LSB basement
M	Foundation sump CS basement
N	Foundation sump MG basement
O	Mobile tank truck parking
P	Boilers 2 – 5
Q	Cooling tower
R	Heat exchange non-contact cooling water
S	Dumpsters*
T	Trailers for storage*
U	Parking (paved)*
V	Loading/unloading areas
W	Swale (vegetation)*
X	Storage yards - unpaved
Y	Storage yards - paved
Z	Sand & salt storage
AA	Liquid effluent collection tanks

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Exhibit 6. Narrative Description of Existing Conditions

Location & Method of Material Transport, Loading & Unloading:

PPPL receives most materials at the Warehouse (also known as Receiving #3) **(R).** Vehicle fuel (diesel, B20, and E-85) are delivered directly to AST-4, AST-15, and AST-16. AST-1 receives #2 Fuel oil. Fuel delivery is attended at all times to prevent the accidental spillage of materials outside the tank or delivery truck. Tanks AST-5 and AST-8 (diesel #1) are filled by PPPL staff from the 5,000-gallon tanker. AST-9 does not receive deliveries.

Existing Storm Water Pollution Prevention Management Practices Designed to Minimize contact with Storm Water:

1. A catch basin outside the Warehouse has a valve, which may be closed when a truck is unloading or loading in order to prevent any spillage from leaving the immediate area.
2. A similar system at the Hazardous Materials Storage Facility collects any spillage on the pavement and contains it in a closed catch basin.
3. Adjacent to the aboveground storage tank (AST-1), there is a concrete containment for trucks delivering fuel to the tank. Also, PPPL uses the containment for parking tank trucks containing fuel. There is a drain, which is closed in order to prevent oil from reaching the storm drains and the basin.
4. Secondary containment is also provided for fuel delivery trucks servicing PPPL's fleet refueling station (AST-3, AST-4, AST-15 and AST-16).
5. All ASTs are located within the retention basin drainage area or are provided with secondary containment. The retention basin is designed as general secondary containment and is compatible with the materials stored.
6. The sand/salt pile is covered with shelter to protect it from rain.
7. PPPL contracts ground's maintenance and requires the removal of leaves from the sidewalks and roadways in order to prevent storm drains from clogging.

Existing Structural & Non-Structural Storm Water Pollution Prevention Practices Designed to Reduce Pollutants in Storm Water (*i.e.* retention basins, *etc.*)

Almost all of D site and approximately half of C site storm water runoff drain to PPPL's on-site retention basin. There are two inflows: Inflow 1 is from C site sources and Inflow 2 is from D site. The retention basin is lined with a synthetic membrane liner and equipped with oil spill detection and control equipment to prevent the discharge of oil.

Existing Practices Employed to Direct Storm Water to Specific Areas On or Off-Site:

Storm drains direct the storm water runoff from the roadways and buildings to either the retention basin (2/3 of the site) or to the swale **(S)** located adjacent to the roadway on the west and southwest portion of the site.

Any Treatment the Storm Water Already Receives:

No treatment of storm water presently occurs.

Any Non-Storm Water Discharges**:**

See information on Exhibit #4.

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Exhibit 7. PPPL Storm Water Drawing

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Exhibit 8. Best Management Practices (BMPs) Schedule and Responsibility

Best Management Practices	Brief Description of Activities	Schedule Completion Date(s) for Action	Division Responsible for Action
Remove Impervious Surfaces or Cover with Pervious Surface	• Return areas previously impermeable to permeable, low-maintenance cover (trees, meadow grass, flowers). • Use silt barriers during soil moving and/or removal activities. • Follow PPPL's Engineering Standard ES-MECH-013, "Excavation Soil Erosion and Sediment Control Guidance" prior to, during and after soil disturbance.	As needed As needed As needed	FAC
Good Housekeeping	• Maintain good drainage by removing leaves and debris for roadways/ sidewalks. • Maintain covers over loose soil or sand/salt piles. • Protect sand/salt piles from elements.	Annually At all times At all times	FAC
Preventative Maintenance	• Maintain basin in good operating condition: minimize biological growth and man-made materials and keep oil detection and control operational. • Test oil sensor alarms (except Semi-annually for AST-9 only). • Maintain aboveground tanks' secondary containment in good condition, free of corrosion/cracks. • Routinely test tank alarms and maintain operational equipment. • Maintain landscaping to minimize soil erosion.	At all times Quarterly Quarterly Quarterly At all times	ESD FAC FAC & AC MG FAC & AC FAC
Visual Inspections	• Inspection of retention basin. • Inspection of entire site. • Scheduled regular inspections of ASTs and secondary containment.	Weekly Twice annually By Procedure	ESD Mgt. Safety Group FAC,AC,ESD,MG
Parking	• Employees are prohibited from parking on gravel and/or permeable surfaces. • Certain parking areas for government vehicles have been paved to prevent soil contamination from potential leaks.	Daily Daily	SPD
Site Coverage	• Limit impermeable site coverage to less than 60 percent of total developable acreage. • Improve drainage swales and bank stabilization in conjunction with beneficial landscaping program.	Annually At a minimum every 3 years	FAC & ESD FAC & ESD
Storm drains	• Paint catch basin drain covers indicating goes to waterway. • Inspect and clean catch basins and storm drain lines when needed.	Initially by end of 2015 Annually	FAC
Training	• SWPP Plan Participants to provide training to employees in their section when Plan is revised (every 3 years).	Initial training by end of 2015	FAC, AC,ESD, & MG

AC= AC Power Branch ESD = Environmental Services Division FAC = Facilities & Site Services MG =Motor Generator SPD = Site Protection Division

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Exhibit 9. Records of Spills, Leaks, or Other Reportable Incidents

Date	NJDEP Case #	Description of Incident	Corrective Actions
Mar. 7, 2008	08-03-07-0925-14	Oil in retention basin (possibly from C-site MG basement) clean-up conducted by PPPL M&ES personnel.	Removed oily sheen and other debris. No clear source determined.
July 5, 2011	11-07-05-1122-55	John Deere backhoe leaked about 1 gallon of hydraulic fluid on ground near HAZMAT building.	Removed oily soil; repaired hydraulic line leak.
Aug. 3, 2012	12-08-03-1322-49	Hydraulic fluid on gravel from subcontractor's manlift.	Removed oily soil; repaired hydraulic line leak.
Sept. 13, 2012	12-09-13-1047-32	Refrigerant oil from D-site AC unit spilled on gravel	Unit taken out of service and replaced with a new non-freon containing unit.

Exhibit 10. Photos of Storm Water Management Projects & Improvements

PPPL Improvements from 2008 to 2015

Swale south of Receiving 3 - Warehouse (Early 2008)

"DO NOT CUT GRASS" sign (2012)

Properly maintained swale (2015)

Rain garden next to D-site entrance (2015)

Before rain garden planting (2011)

Well-maintained rain garden (2015)

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Exhibit 10. Photos of Storm Water Management Projects & Improvements

Basin Swale – poor drainage (2007)

Basin swale reconstructed – good drainage (2015)

D-site parking lot – gravel with no vegetation (2008)

Two rain gardens and meadow grasses (2012)

Rain garden that needs to be maintained (2015)