



The Port Authority of NY & NJ

Two Gateway Center • 14th Floor • Newark, NJ 07102

John F. Kennedy International Airport Best Management Practices Plan

July 2009

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1 Introduction

This document represents the operational Best Management Practices Plan ('BMPP') for the John F. Kennedy International Airport ('JFK'). It has been compiled to facilitate JFK's compliance with the requirements of the State Pollutant Discharge Elimination System ('SPDES') program. This BMPP is intended for use by The Port Authority of New York and New Jersey (the 'PANYNJ') and JFK tenants to provide consistent and effective management of stormwater runoff quality. The BMPP presents a description of the facility and a discussion of potential pollutant sources resulting from practices and activities at the JFK airport. This BMPP also identifies existing stormwater management controls and Best Management Practices ('BMPs') at the facility and identifies BMPs that reduce or eliminate pollutants entering the stormwater drainage system.

Tenants shall employ all practicable BMPs and always comply with applicable local, state, and federal regulations and conform to the PANYNJ Airport Rules and Regulations as well as the requirements of all applicable agreements pertaining to contractor, occupant, and tenant activities. Furthermore, this guidance document does not constitute legal advice. Accordingly, tenants should consult legal counsel as to advice regarding their obligations.

JFK currently holds an individual industrial SPDES Permit (Permit No. NY 0008109). The BMPP was prepared as a guidance document for airport tenants and PANYNJ employees to adhere to the JFK's individual SPDES Permit. A copy of the individual SPDES Permit is included in Appendix A.

1.1 **Best Management Practices Plan Organization**

This BMPP includes the following sections:

- Section 1 -** Introduction. Presents federal and state regulatory background and requirements, and discusses PANYNJ Environmental Services Unit.
- Section 2 -** Facility Description. Describes the general activities at JFK, including details on the stormwater drainage system.
- Section 3 -** Identification of Potential Pollutant Sources. Describes the potential pollution sources identified through questionnaires and site visits.
- Section 4 -** Stormwater Management Controls. Presents the BMPs to eliminate or reduce pollutants in stormwater runoff.
- Section 5 -** Comprehensive Site Compliance Evaluation – Provides the frequency of facility inspections and provides a basis for evaluating the overall effectiveness of the BMPP.

1.2 **Regulatory Background**

This section presents an overview of the regulatory history of the stormwater pollution control program at the federal and state levels.

1.2.1 **Federal Requirements**

The Federal Aviation Administration ('FAA') imposed more stringent requirements on deicing activities to increase the margin of safety for aircraft operating during snow and ice conditions. These new protocols are grounded in the "clean aircraft concept", which requires that aircraft surfaces must be free of snow and ice before departure and imposes time limits (holdover time) between the application of deicing fluids and aircraft departure. These revised FAA protocols (FAA, 1992) have increased the quantities of deicing fluids used by U.S. airlines and airports. This increase in deicing activity, along with increased air traffic, has resulted in greater quantities of deicing fluid being entrained in airport runoff. Consequently, each year large quantities of propylene glycol based aircraft deicing fluids are used to de-ice aircraft.

In 1972, the Federal Water Pollution Control Act, also known as the Clean Water Act ('CWA'), was enacted to require that the discharge of pollutants to waters of the United States from any point source be covered by a National Pollutant Discharge Elimination System ('NPDES') permit. In 1987, amendments to the CWA added Section 402(p), establishing a framework for regulating municipal and industrial discharges of stormwater under the NPDES program. The NPDES program is administered by the United States Environmental Protection Agency ('EPA').

The NPDES regulations require operators of specific types of industrial activities that discharge stormwater to obtain NPDES permits. Stormwater associated with industrial activities is defined as stormwater runoff that exits any conveyance that is used for collecting and conveying stormwater that is directly related to manufacturing, processing, material storage, and waste material disposal areas and similar areas where stormwater can contact industrial pollutants related to the industrial activity at an industrial facility. Airports standard industrial classification ('SIC') code of 4581 was included as a regulated industry and therefore is required to obtain NPDES permits.

1.2.2 **State Requirements**

The federal regulations also allow states to implement the NPDES program and issue NPDES permits to regulate stormwater discharges associated with industrial activities. The New York State Department of Environmental Conservation ('NYSDEC') has been delegated authority by the EPA to implement the NPDES program under the SPDES program. Effective October 1, 2007, the NYSDEC modified JFK's individual stormwater permit (Permit No. NY 0008109). This permit will expire on May 31, 2011. The individual SPDES Permit covers discharges from stormwater associated with JFK industrial activities to receiving waters of the State of New York.

1.3 **SPDES Permit NY 0008109**

The NYSDEC issued a SPDES Permit for JFK Airport in 1987 and modified the permit in 1993 and 1994, and administratively renewed the SPDES Permit in 1996, 2001, and 2006. As a result of the 2006 review, the NYSDEC determined that the SPDES Permit needed to be modified and issued a notice of complete application on June 2, 2006. The Draft modified SPDES Permit was made available for public comment. In response to the Draft SPDES Permit, the PANYNJ, as well as the Natural Resources Defense Council ('NRDC') and a number of other organizations and individuals, submitted comments requesting changes to some of the proposed modifications. Thereafter, the NYSDEC staff drafted a response to comments as well as a revised Draft SPDES Permit modification, both dated October 12, 2006. The NYSDEC subsequently issued the PA a Request for Information ('RFI') on November 29, 2006 for stormwater sampling at JFK Airport. The NYSDEC RFI requested that the PANYNJ provide additional information regarding the concentrations of pollutants in the stormwater runoff from the permitted outfalls and requested completion of a mixing zone analysis for estuarine marine waters for each outfall to support the issuance of a Draft SPDES Permit.

In accordance with the November 2006 RFI, a sampling program was conducted to collect stormwater samples from each of the discharge outfalls during or immediately following deicing events at JFK Airport between January 2007 and March 2007. Results of sampling efforts conducted by the PANYNJ were submitted to NYSDEC to support the review of the Draft SPDES Permit.

In accordance with the November 2006 RFI, a mixing zone analysis for estuarine marine waters for each outfall was prepared and submitted in April 2007 to NYSDEC to support the issuance of a Draft SPDES Permit. The mixing zone analysis estimated the contributory areas and runoff coefficients for all drainage and sub drainage areas for the existing outfalls and summarized the contributory area, estimated runoff coefficient, calculated hourly maximum flow rate and provided a physical description for each of the outfalls. In support of the Draft SPDES Permit, the mixing zone analysis was used by NYSDEC to calculate water quality based effluent limits for discharges from the permitted outfalls.

NYSDEC issued the SPDES Permit on September 27, 2007 which authorizes discharge from JFK Airport and requires the monitoring of outfall numbers 002, 004, 005C, 007A, 010 (KP-1, KP-2, KP-3, KP-4, and KP-5 discharge through outfall number 010), 016, and 022. The monitoring of these outfalls will be conducted by the PANYNJ. The outfalls will be monitored for parameters of interest based on the anticipated discharges from various activities at JFK Airport. Of the 7 outfalls which require monitoring, 4 require monitoring for glycols and carbonaceous biological oxygen demand ('CBOD₅') associated with the airlines' deicing activities. The 4 outfalls are outfall number 002 located on the western portion of the JFK Airport which discharges to

Bergen Basin, outfall number 010 located on the southwestern portion of JFK Airport which discharges to Jamaica Bay, outfall number 016 located on the southern portion of JFK Airport that discharges to Jamaica Bay, and outfall number 022 located on the eastern portion of JFK Airport that discharges into Thurston Bay.

Special Condition 1, Page 17 of 31 of the SPDES Permit requires a onetime modeling study, augmented with ambient data in the receiving waters (Bergen Basin, Jamaica Bay, and Thurston Bay), including samples of each outfall (at the JFK airport), coinciding with the deicing discharge event(s) for calibrating and verifying the water quality model.

JFK has a separate storm sewer system that consists of 26 outfalls (002, 003, 004, 004A, 004B, 005, 005A, 005B, 006, 007, 008, 009, 010, 011, 012, 013, 014, 015, 016, 017, 017A, 017B, 019, 020, 021, 022) as well as seven monitoring points (outfall number 005C which discharges through outfall 005, 007A which discharges through outfall 007, and KP1, KP2, KP3, KP4, and KP5 which discharge through outfall 010). Eight outfalls discharge to Bergen Basin (Class I); three outfalls discharge to Thurston Basin (Class I); and fifteen outfalls discharge to Jamaica Bay (Class SB). In general, stormwater runoff and some industrial discharges are captured in catch basins at the airport and conveyed into the outfalls via the storm drainage system. Controlled non-stormwater discharges to the storm drainage system also exist at JFK. These include outflows 003, 004A, 004B, 005, 005A, 005B, 006, 007, 008, and 009.

Based on the existing permit, the PANYNJ has authorization for outfalls 004, and 010 to receive discharges from stormwater as well as effluent from the wastewater treatment plants ('WWTPs') at the Bulk Fuel Farm ('BFF') and the Satellite Fuel Farm ('SFF'). The PANYNJ also has authorization for outfalls 005C, 007A, and outfall 010 to receive treated groundwater from three remediation plants. Two remediation plants are located on east and west ends of the BFF and one remediation plant is located in the SFF.

The airport is currently operating under a New York SPDES individual permit. Compliance with the permit requires minimal impacts to stormwater from airport activities. Special Condition – Best Management Practices, Page 24 of 31 of the SPDES Permit requires the PANYNJ to develop, maintain, and implement a BMPP to prevent releases of significant amount of pollutants, including deicing/anti-icing chemicals, to the waters of the State through plant site runoff; spillage and leaks; sludge or waste disposal; and stormwater discharges including, but not limited to, drainage from raw material storage. Tenants and/or other entities that apply or otherwise use deicing and/or anti-icing materials at the JFK airport shall participate in the development of the BMPP. This BMPP will discuss the current activities performed at JFK and provide guidance BMPs developed for areas occupied by tenants of the JFK airport to help minimize activity-based impacts to stormwater.

The PANYNJ will be required to implement and maintain a JFK BMPP. The BMPP will be amended whenever there is a change in design, construction, operation, or maintenance which has a significant effect on the potential for pollutants to be discharged

to the waters of the State, or if the BMPP is ineffective in controlling the discharge of pollutants. Airport tenants discharging stormwater associated with an industrial activity shall be required to implement a BMP specific to their respective operation of their leasehold and operational area, or operate under the provisions established in the JFK airport BMPP. All discharges from JFK airport tenants are covered under the SPDES Permit and it will be the tenant's responsibility to inform the PANYNJ of any changes to industrial activities that are discharging to stormwater or any changes to the BMPs being implemented.

In addition to stormwater discharge monitoring, the individual permit requires the PANYNJ to track and report any anticipated (e.g. planned releases) or unanticipated (e.g., spills or leaks) non-compliance with the permit. The individual permit requires that any non-compliance with permit conditions be reported to NYSDEC.

Anticipated non-compliance is defined as any planned releases and unanticipated non-compliance events include unanticipated bypass, any upset which violates any effluent limitation in the permit, violation of maximum daily discharge limitation, and spills or leaks.

Reports for anticipated noncompliance should be filed with NYSDEC prior to the discharge. Occurrences of unanticipated non-compliance require oral communication to NYSDEC within 24 hours, and submission of written communication within five days of when the PANYNJ becomes aware of the non-compliance.

1.4 JFK SPDES Special Conditions – Best Management Practices

The activities conducted at JFK involve multiple tenants performing many varied tasks associated with routine airport operations. Examples of the activities performed at the airport with the potential to cause pollution of stormwater discharges include aircraft, vehicle and equipment fueling and maintenance, building and grounds maintenance, chemical and fuel storage, and deicing/anti-icing of aircraft, taxiways, and runways. The PANYNJ has developed a comprehensive approach to managing stormwater discharges associated with activities at JFK, including identifying potential pollutants through conducting of audits and development of plans to minimize and/or reduce potential pollutant discharges to receiving waters of the State.

1.4.1 Special Condition – Number 1 General

Special Condition – Best Management Practices Number 1 on Page 24 of 31 of the SPDES Permit requires the PANYNJ to develop, maintain, and implement a BMPP to prevent releases of significant amounts of pollutants, including deicing/anti-icing chemicals, to the waters of the State through plant site runoff; spillage and leaks; sludge or waste disposal; and stormwater discharges including, but not limited to, drainage from raw material storage. Tenants and/or other entities which apply or otherwise use deicing and/or anti-icing materials at the facility shall participate in the development of this plan. BMPs shall be developed for areas of the facility occupied by tenants of the airport and

shall be integrated with the plan for the entire airport. The BMPP shall include all appropriate components of a Storm Water Pollution Prevention Plan ('SWPPP'). USEPA guidance for development of the stormwater elements of the BMPP is available in the September 1992 Manual Storm Water Management for Industrial Activities, EPA 832-R-92-006.

The BMPP shall be documented in narrative form and shall include the 13 minimum BMPs and any necessary plot plans, drawings, or maps. Other documents already prepared for the facility such as a Safety Manual or a Spill Prevention, Control and Countermeasure ('SPCC') plan may be used as part of the plan and may be incorporated by reference. A copy of the current BMPP shall be submitted to the Department as required in item (2.) below and a copy must be maintained at the facility and shall be available to authorized Department representatives upon request. The BMPs applicable to each area of the facility occupied by a particular tenant shall be consistent with an overall BMPP for the entire airport. The permittee shall maintain, update and assure the proper implementation of the overall BMPP.

In accordance with Special Condition– Best Management Practices Number 1, the PANYNJ compiled this BMPP for JFK Airport. The BMPP is intended for use by the PANYNJ and JFK tenants to provide consistent and effective management of storm water runoff quality. The BMPP presents a description of the various facilities at JFK Airport and a discussion of potential pollutant sources resulting from practices and activities at the JFK airport. The BMPP also identifies existing storm water management controls and BMPs at the various facilities at JFK and identifies BMPs that reduce or eliminate pollutants entering the storm water drainage system. The JFK BMPP identifies 19 BMPs to eliminate or reduce pollutants in storm water runoff:

- BMP 1: Aircraft Deicing/Anti-icing
- BMP 2: Aircraft, Vehicle, and Equipment Fueling
- BMP 3: Aircraft, Vehicle, and Equipment Maintenance
- BMP 4: Aircraft, Vehicle and Equipment Washing
- BMP 5: Building Cleaning and Maintenance
- BMP 6: Chemical and Petroleum Storage and Handling
- BMP 7: Elimination of Non-Storm water Discharges to Storm Drains
- BMP 8: Spills Management
- BMP 9: Lavatory Service Operations
- BMP 10: Oil/Water Separators
- BMP 11: Outdoor Handling of Material
- BMP 12: Outdoor Material and Equipment Storage
- BMP 13: Waste Management
- BMP 14: Fire Fighting Foam Discharge
- BMP 15: Storm water Pollution Prevention Education
- BMP 16: Street Sweeping & Storm water Facility Maintenance
- BMP 17: Security
- BMP 18: Rubber Removal
- BMP 19: Runway and Taxiway Anti-icing

The JFK BMPP has been provided to the tenants for review and implementation. Several of the tenants at JFK have been provided with a questionnaire to confirm industrial activities conducted at each of the tenant facilities. In addition, the PANYNJ has interviewed tenants and conducted site visits to clarify the information provided in the questionnaires; confirm the routine operations of some of the tenants; and fill data gaps regarding the nature of ongoing operations and the current use of BMPs by some of the tenants. The majority of tenants at JFK have been provided with the questionnaire presented in Appendix C of the June 2009 BMPP. A copy of the questionnaire and the March 2009 BMPP were distributed to tenants for review and to gather outstanding tenant questionnaires. The PANYNJ has presented the information gathered from tenants to date in the BMPP and Tables 1 and 2.

1.4.2 Special Condition – Number 3 Facility Review

Special Condition – Best Management Practices Number 3 on Page 24 of 31 of the SPDES Permit requires “the permittee to review and inspect all facility components or systems (including but not limited to material storage areas; in-plant transfer, process, and material handling areas; loading and unloading operations; storm water, erosion, and sediment control measures; process emergency control systems; and sludge and waste disposal areas) where material or pollutants are used, manufactured, stored or handled to evaluate the potential for the release of pollutants to the waters of the State. Tenants and/or other entities who apply or otherwise use deicing and/or anti-icing materials at the facility shall participate in this facility review and inspection. Tenants and/or other entities who apply or otherwise use deicing and/or anti-icing materials shall also provide all necessary information to the permittee for the permittee to complete its evaluation. In performing such an evaluation, the permittee shall consider such factors as the probability of equipment failure or improper operation, cross-contamination of storm water by process materials, settlement of facility air emissions, the effects of natural phenomena such as freezing temperatures and precipitation, fires, and the facility’s history of spills and leaks. The relative toxicity of the pollutant shall be considered in determining the significance of potential releases. The review and inspection shall evaluate whether measures to reduce pollutant loadings identified in the BMP Plan are adequate and properly implemented in accordance with the terms of this permit or whether additional control measures are needed.”

In accordance with Special Condition – Number 3, the PANYNJ prepared a Facility Review and Inspection Report summarizing the facility components and systems inspections that have been conducted for all PANYNJ entities and tenants at JFK Airport. The 2008 Facility Review and Site Inspection Report consisted of a series of inspections, results, and review of all PANYNJ and tenant facility components and systems including; fueling stations, waste storage areas, above ground and underground storage tanks (e.g. petroleum, glycol and chemical storage), spills management and oil/water separators, PANYNJ groundwater remediation systems and wastewater treatment plants, loading areas, material handling area, deicing/anti-icing; which have the potential to discharge to one or more of the 26 JFK Airport outfalls listed in the SPDES Permit, covering 15

drainage areas (A through P). The Annual Facility Review and Inspection Report will provide a basis for evaluating the overall effectiveness of the BMPP and measure the BMPP performance. The Annual Facility Review and Inspection Report will document the date, time, inspection methodology, inspectors, BMP conformance evaluation results, and the overall effectiveness of the BMPP. Any proposed modifications to the inspection procedures and approach for BMP implementations will also be included with this report. A Facility Review and Inspection Report summarizing the facility components and systems inspections that have been conducted for all PANYNJ entities and tenants at JFK Airport will be completed for 2009.

1.4.3 Special Condition – Number 4.A 13 Minimum BMPs

Special Condition – Best Management Practices, Number 4.A on Page 25 of 31 of the SPDES Permit requires development of 13 minimum BMPs to prevent or minimize the potential release of pollutants to the waters of the State. In March 1998, the PANYNJ developed activity-specific Good Environmental Practices (‘GEPs’) for JFK and updated them as BMPs in this BMPP dated June 2009. Good housekeeping practices that address housekeeping, operational, structural and contingency considerations that can be taken to help achieve environmental compliance are utilized at the JFK facility. Section 4 of the JFK BMPP discusses the 13 minimum BMPs that were developed using the September 1992 manual for *Storm Water Management for Industrial Activities*, EPA 832-R-92-006 as reference. Activity specific BMPs that are applicable to JFK activities are provided in Appendix D.

1.4.4 Special Condition – Number 4.B SWPPP for Construction Activity

Special Condition – Best Management Practices, Number 4.B on Page 25 of 31 of the SPDES Permit requires development of a Stormwater Pollution Prevention Plans (‘SWPPP’) prior to the initiation of any site disturbance of one acre or more of uncontaminated areas. Construction activity that disturbs more than one acre at the JFK airport requires that the tenant prepare a SWPPP that confirms to the *New York Standards and Specifications for Erosion and Sediment Control and New York State Stormwater Management Design Manual*.

1.4.5 Special Condition – Number 6 Petroleum and/or Chemical Bulk Storage Areas

Special Condition – Best Management Practices, Number 6 on Page 26 of 31 of the SPDES Permit requires that facilities with petroleum and/or chemical bulk storage areas must comply with all applicable regulations including those involving releases, registration, handling, and storage of petroleum and/or chemicals; stormwater discharges from handling and storage areas should be eliminated where practical. The PANYNJ currently has a Spill Prevention Control and Counter measure (‘SPCC’) Plan for JFK airport. The plan was prepared by Lawler, Matusky & Skelly Engineers in October 2004 for the PANYNJ, which has reviewed the plan and verified that the plan contains the

appropriate spill prevention and clean up measures. Tenants that stored petroleum must also comply with all applicable regulations and prepare and maintain a SPCC Plan.

1.4.6 Special Condition – Number 7.A.i Site Map

Special Condition – Best Management Practices, Number 7.A.i on Page 27 of 31 of the SPDES Permit requires a site map that will identify where any of the following activities may be exposed to precipitation/surface runoff: aircraft and runway deicing/anti-icing operations; fueling stations; aircraft, ground vehicle, and equipment maintenance/cleaning areas; and storage areas for aircraft, ground vehicles and equipment awaiting maintenance. A site map identifying these activities is provided in Appendix G. Section 3 identifies and describes all activities at JFK airport.

1.4.7 Special Condition – Number 7.A.ii Potential Pollutant Sources

Special Condition – Best Management Practices, Number 7.A.ii on Page 27 of 31 of the SPDES Permit requires a narrative description of the potential pollutants sources from the following activities: aircraft, runway, ground vehicle and equipment maintenance and cleaning; aircraft and runway deicing/anti-icing operations (including apron and centralized aircraft deicing/anti-icing stations, runways, taxiways, and ramps). Facilities which conduct deicing/anti-icing operations shall maintain a record of the types (including the Material Safety Data Sheets ('MSDS')) and monthly quantities of deicing/anti-icing chemicals used, either as measures amounts, or in the absence of metering, as estimated amounts. This includes all deicing/anti-icing chemicals. Tenants and fixed-base operators who conduct deicing/anti-icing operations provide the above information to the PANYNJ which is included in the JFK BMPP. Tenants provide the JFK facility with monthly quantities of deicing/anti-icing chemicals used, the number of aircraft deiced during the event, and the date of deicing and/or anti-icing, in addition, tenants maintain MSDS sheets. Section 3 identifies and describes all activities and potential sources of stormwater pollution at JFK airport.

1.4.8 Special Condition – Number 7.B.i Good Housekeeping

Special Condition – Best Management Practices, Number 7.B.i on Page 27 and 28 of 31 of the SPDES Permit requires a description and practices measures that prevent or minimize the contamination of stormwater runoff from various airport activities. Section 4 discusses recommended BMPs that are applicable to JFK activities.

1.4.9 Special Condition – Number 7.B.ii Source Reduction

Special Condition – Best Management Practices, Number 7.B.ii on Page 28 of 31 of the SPDES Permit suggests alternatives to the use of glycol based deicing/anti-icing chemical. Section 4 discusses some alternatives to the use of glycol based deicing/anti-icing chemical that are practiced that can reduce the aggregate amount of deicing/anti-icing chemicals used and/or lessen the environmental impact.

1.4.10 Special Condition – Number 7.B.iii Management of Runoff

Special Condition – Best Management Practices, Number 7.B.iii on Page 28 and 29 of 31 of the SPDES Permit indicates that the PANYNJ shall describe and implement a program to control to manage contaminated runoff to reduce the amount of pollutants being discharges from the JFK airport. The stormwater management program shall describe the primary issues that are currently driving decisions regarding the types of deicing runoff for collection systems, recovery systems, and conveyance systems. Section 4 discusses stormwater management to control and manage contaminated runoff to reduce the amount of pollutants being discharges from the JFK airport.

1.4.11 Special Condition – Number 7.B.iv Routine Facility Inspections

Special Condition – Best Management Practices, Number 7.B.iv on Page 29 of 31 of the SPDES Permit indicates that routine facility inspections shall be specified in the JFK BMPP. Section 5 discusses a recommended schedule, a list of the pollution prevention team personnel, employee training requirements, facility inspection protocol, monitoring requirements, recordkeeping and reporting procedures, BMPP updates, and comprehensive site compliance evaluation.

1.4.12 Special Condition – Number 7.B.v Comprehensive Site Compliance Evaluation

Special Condition – Best Management Practices, Number 7.B.v on Page 29 of 31 of the SPDES Permit indicates that an annual site compliance evaluation shall be conducted by qualified facility personnel during periods of actual deicing operations, if possible. Section 5 discusses the facility inspection protocol and comprehensive site compliance evaluation that will be conducted.

1.5 Environmental Services Unit and Management

The PANYNJ has an Environmental Services Unit at JFK Airport to measure and monitor the success of the BMPP and evaluate the effectiveness of BMP implementation and performance. The manager Environmental Services Unit contact is:

**Ms. Denise A. Branch
Manager, Environmental Services
The Port Authority of NY & NJ
JFK International Airport
Building 14, 3rd Floor
Jamaica, NY 11430
718-244-3568
dbranch@panynj.gov**

The Environmental Services Unit performs a variety of inspections of facilities owned and operated by the PANYNJ and tenants. As required by the SPDES Permit, the PANYNJ inspections are conducted by staff of the Environmental Services Unit for all facility components or systems as specified in Special Condition No. 3 – Best Management Practices, on Page 24 of 31 of the SPDES Permit. Inspections are conducted in an organized and consistent manner to ensure PANYNJ and tenant compliance with the JFK SPDES Permit. PANYNJ inspections do not preclude tenants from conducting inspections. Tenants are responsible for addressing all non-compliance issues at their respective facilities in accordance with Federal, State, and local environmental regulations as per their lease agreements.

2 Facility Description

This section describes the location of the JFK airport, current airport land uses, and the airport stormwater drainage system. In addition, a comprehensive list of the facilities and tenant activities has been included.

2.1 General

JFK is located in the southwestern section of Jamaica, Queens County, New York. JFK has been operated by the PANYNJ under a lease with the City of New York since June 1, 1947. The airport is bordered by Rockaway Boulevard to the north, Bergen Basin to the west, Jamaica Bay to the south, Head of Bay to the southeast and Thurston Basin to the east of JFK as shown on Figure 1 located in Appendix G.

In 2007, JFK served approximately 47 million passengers traveling on over 443,004 domestic and international flights. Over 1.7 million tons of cargo and 83,000 tons of mail were transported through the airport.

The JFK runway system consists of two pairs of parallel runways: 4L-22R, 4R-22L, 13L-31R, and 13R-31L aligned at right angles. The total runway length is nearly nine miles. JFK also has over 25 miles of taxiways to move aircraft in and around the airfield. In addition, there are seven helipads.

JFK operates an Airtrain service connecting all airport terminals with the subways, commuter trains, and airport parking lots. During de-icing months, the Airtrain rails are heated using a heat tracing element to prevent build-up of ice on the rails. No de-icing fluid is used to prevent ice from building up on the rails. JFK's maintenance program and Spill Prevention Control and Countermeasure Plan are in place to reduce the potential for pollutant sources from entering the stormwater system.

The airport covers approximately 4,590 acres, including 880 acres in the Central Terminal Area ('CTA'). The airport has more than 30 miles of roadway. There are over 125 gates associated with commercial and passenger movement. An average of 957 aircraft arrives and departs each day. An airport layout plan, including building numbers, is provided as Figure 2 located in Appendix G. Table 1 located in Appendix F lists the facility identification number, facility description, and the drainage areas in which their facilities are located.

The PANYNJ, a bi-state agency of the States of New York and New Jersey, maintains and operates JFK. Under the long-term written agreement with the City of New York, the PANYNJ leases most of the airport facilities to various airlines and aviation support-related tenants.

JFK is dedicated primarily to industrial and commercial use. Airport leaseholds are used predominantly for general aviation-related purposes. Aviation-related facilities consist of fuel farms; facilities providing aircraft services and air charter services; PANYNJ Police and main rescue services; a crash, fire, and rescue training facility; fixed-base operations relating to aircraft and ground vehicle maintenance and repair; and offices. Other airport leaseholds include medical, educational, and lodging facilities, as well as a commercial vehicle fueling station.

2.2 **Land Use**

Approximately 86 percent of JFK is covered by impervious surfaces, such as buildings, runways, taxiways, and parking lots. The pervious surfaces, including grass and un-vegetated soils that principally lie near the west end of JFK, between runways, taxiways, and to the east of runways 4L-22R and 4R-22L, account for approximately 14 percent of the facility's area. The airport is surrounded on three sides by surface waters (Bergen Basin, Jamaica Bay, Head of Bay, and Thurston Basin); the remaining area, primarily north of JFK is densely populated with residential, commercial, and industrial land uses.

2.3 **Drainage System**

The stormwater drainage network at JFK consists of 16 drainage areas which includes approximately 6,000 catch basins, each with a capacity between 200 to 400 gallons, which discharge directly into 26 outfalls as shown on Figure 3 located in Appendix G. Except for the Bulk Fuel Farm ('BFF') and the Satellite Fuel Farm ('SFF') facilities, there is no collection or treatment for the majority of surface water discharged at JFK. The following is a description of the 16 drainage areas (A through P) within JFK's stormwater drainage network as well as the associated outfalls:

Drainage Area A

Drainage Area A covers approximately 3 percent (160 acres) of the airport drainage area. It is located in the northwest section of JFK and includes the Long Term Parking Lots 8 and 9 and the JFK Airtrain which connects all airport terminals with the subways, commuter trains, and airport parking lots. The Airtrain operates at buildings 400-403 located in Drainage Area A. Outfalls 004A (4-foot x 5-foot box), outfall 004B (54-inch diameter pipe), outfall 005A (6-foot x 4-foot box, that diverts into two pipes, a 30-inch diameter and a 36-inch diameter) and outfall 005B (36-inch diameter), all discharge from this area to Hawtree Basin. Multiple large New York City Department of Environmental Protection (NYCDEP) discharge lines from a wastewater treatment plant cross under this drainage area and discharge into the Bergen Basin. Two outfalls, 005C and 007A, are not part of drainage area A, but discharge groundwater associated with the groundwater remediation systems to the Bergen Basin. 005C discharges to outfall 005 and 007A discharges to Outfall 007, not in drainage area A – See Area D.

Drainage Area B

Drainage Area B covers approximately 1 percent (36.5 acres) of the northern section of the airport and includes the Ramada Hotel, a vacant FAA facility, and the Vanwyck substation. Outfall 001, although not on JFK's SPDES permit, is covered under the NYCDEP Permit Number NY0026115 and discharges to Bergen Basin. Outfall 001 is approximately 19-feet x 19-feet and is protected by a permanent Slickbar containment boom.

Drainage Area C

Drainage Area C covers approximately 2 percent (95 acres) of the airport drainage area, is located in the western section of the airport. This area is not paved and consists primarily of pervious tidal wetland vegetation. This area drains into Bergen Basin and does not contain any outfalls.

Drainage Area D

Drainage Area D is located in the western section of the airport and covers approximately 6 percent (281 acres) of the airport. This area includes discharges of surface water treated at the BFF by a wastewater treatment plant through outfall 004. Two groundwater remediation treatment systems, one located at the west end of the BFF and the other at the east end, discharge through outfalls 005 and 007, respectively. There are a total of five outfalls located in Drainage Area D. These include outfalls 003 (24-inch diameter), outfall 004 (24-inch diameter), outfall 005 (48-inch diameter), outfall 006 (66-inch diameter), and outfall 007 (double-barrel, each 60-inch diameter) which all discharge to Bergen Basin. In addition, each outfall is equipped with its own permanent Slickbar containment boom.

Drainage Area E

Drainage Area E is located in the southwestern section of the airport and covers approximately 5 percent (215 acres) of JFK. This area drains a number of cargo buildings, hangars, and a parking that discharges to outfall 008 (72-inch diameter). This area also drains a number of runways and taxiways to outfall 009 (51-inch diameter). Both outfalls discharge directly into Jamaica Bay.

Drainage Area F

Drainage Area F covers approximately 6 percent (293 acres) of JFK. This area includes numerous hangars and multi-tenanted cargo buildings. All storm drains in Drainage Area F are connected to the New York City combined system.

Drainage Area G

Drainage Area G covers approximately 3 percent (150 acres) of JFK. This area includes hangars, a multi-tenant building, and two vacant buildings. All surface water

drainage from this area discharges through outfall 002 (14-feet x 6-feet) to Bergen Basin. A permanent Slickbar containment boom also protects this outfall.

Drainage Area H

Drainage Area H covers approximately 19 percent (873 acres) of the airport. This area includes Terminals 2 (Delta Airlines), 7 (British Airways), 8 (American Airlines), and 9 (American Airlines), Building 49 (KIAC Cogeneration Plant), hangars, SFF, several cargo buildings, in addition, to aeronautical roadways. Drainage Area H discharges through the airport's Triple Barrel Sewer to outfall 010 (13-feet x 7-feet in size) into Jamaica Bay. This is the largest stormwater discharge area at JFK. It is equipped with a permanent Slickbar containment boom, which has a capacity of capturing approximately 5,000 gallons of liquid.

Drainage Area I

Drainage Area I covers approximately 6 percent (300 acres) of JFK. This area services a northern section of the airport that includes primarily hangars and cargo buildings as well as the U. S. Post Office. This area drains through four sewer barrels to outfall 023 (17-feet x 9-feet) and discharges into Thurston Basin.

Drainage Area J

Drainage Area J covers approximately 13 percent (606 acres) of JFK. This area includes aeronautical runways and taxiways, which discharge through outfall 017A (72-inch diameter) and Terminals 5 and 6 (JetBlue Airways) that discharge through outfall 022. Outfall 022 is a double barrel and is equipped with a permanent Slickbar containment boom. One barrel of this outfall is used by NYCDEP and is included on their current NYSDEC SPDES permit. This area discharges into the Thurston Basin.

Drainage Area K

Drainage Area K covers approximately 10 percent (484 acres) of JFK. This area includes terminals as well as aeronautical taxiways. Terminal 4W (International Arrivals Building), Terminal 2 (Delta Airlines), and Terminal 3 (Delta Airlines) discharge through outfall 012 (9-foot 6-inch by 7-foot 6-inch). Terminal 4E and the Terminal 4 Hard Stands Ramp discharge through outfall 013 (72-inch diameter) which is equipped with a permanent Slickbar containment boom. Taxiways discharge through outfall 014 (54-inch diameter). All outfalls from Drainage Area K discharge into Jamaica Bay.

Drainage Area L

Drainage Area L covers approximately 5 percent (229 acres) of the airport. This area includes aeronautical runways which discharge through outfalls 015 (54-inch diameter), outfall 016 (48-inch diameter), and outfall 017 (30-inch diameter) to Jamaica Bay.

Drainage Area M

Drainage Area M covers approximately 2 percent (100 acres) of JFK and includes Terminal 1 (Terminal One Management, Inc. Multi-tenant airlines). This area discharges through outfall 011 (72-inch diameter), which is equipped with a permanent Slickbar containment boom, and discharges to Jamaica Bay.

Drainage Area N

Drainage Area N covers approximately 7 percent (286 acres) of JFK. This area includes aeronautical runways and discharges through outfall 021 (48-inch diameter) into Thurston Basin. This drainage area is mostly unpaved. Stormwater also infiltrates into the ground and flows to Thurston Basin via overland flow.

Drainage Area O

Drainage Area O covers approximately 6 percent (256 acres) of JFK. This area includes aeronautical runways and taxiways that discharge through outfall 020 (48-inch diameter) into Head of Bay. This drainage area is mostly unpaved. Stormwater also infiltrates into the ground and flows to Head of Bay via overland flow.

Drainage Area P

Drainage Area P covers approximately 5 percent (225 acres) of JFK. This area includes aeronautical runways and taxiways that discharge through outfalls 017B (72 inch diameter) into Jamaica Bay and outfall 019 (60-inch diameter) into Head of Bay.

Table 2 located in Appendix F lists the tenants and the drainage areas in which their facilities are located.

2.4 Historical Stormwater Monitoring

JFK has a separate storm sewer system that consists of 26 outfalls (002, 003, 004, 004A, 004B, 005, 005A, 005B, 006, 007, 008, 009, 010, 011, 012, 013, 014, 015, 016, 017, 017A, 017B, 019, 020, 021, and 022) as well as seven monitoring points (outfall number 005C which discharges through outfall 005, 007A which discharges through outfall 007, and KP1, KP2, KP3, KP4, and KP5 which discharge through outfall 010). Eight outfalls discharge to Bergen Basin; three outfalls discharge to Thurston Basin; and fifteen outfalls discharge to Jamaica Bay. In general, stormwater runoff and some industrial discharges are captured in catch basins at the airport and conveyed into the outfalls via the storm drainage system. Controlled non-stormwater discharges to the storm drainage system also exist at JFK. These include industrial discharges associated with the airport's cogeneration facility, Building 49, as well as activity-based discharges such as aircraft deicing operations.

Based on the existing permit, the PANYNJ has authorization for outfalls 004, and 010 to receive discharges of stormwater as well as effluent for the Waste Water

Treatment Plants ('WWTPs') at the BFF and SFF. The PANYNJ also has authorization for outfalls 005C, 007A, and outfall 010 to receive treated groundwater from three remediation plants. Two remediation plants are located on east and west ends of the BFF and one remediation plant is located in the SFF.

In addition to stormwater discharge monitoring, the individual permit requires JFK to track and report any anticipated (e.g. planned releases) or unanticipated (e.g., spills or leaks) non-compliance with the permit. The individual permit requires that any non-compliance with permit conditions be reported to NYSDEC.

Monthly and quarterly monitoring of stormwater discharges from seven specified outfalls is currently required by the individual permit. The NYSDEC SPDES Permit authorizes discharge from JFK Airport and requires the monitoring of outfall numbers 002, 004, 005C (discharges through outfall 005), 007A (discharges through outfall 007), 010 (KP-1, KP-2, KP-3, KP-4, and KP-5 discharge through outfall number 010), 016, and 022. The outfalls will be monitored for parameters of interest based on the anticipated discharges from various activities at JFK airport. Of the seven outfalls which require monitoring, four require monitoring for all glycol based deicing/anti-icing chemicals and 5 day CBOD₅ associated with the airlines' deicing activities. The four outfalls are outfall number 002 located on the western portion of the JFK airport which discharges to Bergen Basin, outfall number 010 located on the southwestern portion of JFK airport which discharges to Jamaica Bay, outfall number 016 located on the southern portion of JFK airport that discharges to Jamaica Bay, and outfall number 022 located on the eastern portion of JFK airport that discharges into Thurston Basin. The previous permit had required monitoring of only outfall numbers 003, 004, and 010 that were associated with the BFF and SFF.

Historical monitoring results indicate that oil & grease, benzene, toluene, ethylbenzene and xylene ('BTEX') were present at detectable concentrations after treatment. Total suspended solids ranged from 3 to 26 mg/L and pH was variable between 6.6 and 8.1 standard units. A summary of the historical monitoring results is presented in Appendix B.

2.5 **Tenant and Target Industrial Activities**

JFK's tenants conduct a variety of activities supporting the airport's operation with the potential to affect the quality of stormwater runoff from JFK airport. Site inspections, questionnaires, interviews, and past environmental audit reports were used to help to determine the most current information concerning activities at tenant facilities. Based on this information, the following activities that occur at JFK pose a potential for stormwater pollutant sources:

- Aircraft Deicing/Anti-icing (AD)
- Aircraft Fueling (AF)
- Aircraft Maintenance (AM)
- Aircraft Painting/Stripping (AP)
- Aircraft Rental/Sales (AR)
- Aircraft Sanitary Service (AS)
- Aircraft Washing (AW)
- Cargo Handling (CH)
- Chemical Storage (CS)
- Equipment Degreasing/Washing (ED)
- Equipment Fueling (EF)
- Equipment Maintenance (EM)
- Equipment Storage (ES)
- Firefighting Foam Testing (FT)
- Food Handling (FH)
- Fuel Storage (FS)
- Floor Washdown (FW)
- Lavatory Service (LS)
- Manufacturing (MF)
- Outdoor Apron Washdown (OA)
- Outdoor Storage Areas (OS)
- Pesticide/Herbicide Application (PH)
- Rubber Removal (RR)
- Runway Maintenance (RM)
- Runway/Taxiway Deicing (R-TD)
- Vehicle Maintenance (VM)
- Vehicle Washing (VW)
- Vehicle Fueling (VF)

For purposes of this BMPP, the term “vehicles” includes mobile equipment powered by petroleum-based fuels (e.g., trucks, luggage tugs, etc.) while “equipment” is used to describe other non-mobile equipment (e.g. generators). A more specific discussion of tenant activities and the potential pollution sources related to the activities is presented in Section 3.

3 Identification of Potential Pollution Sources

This section identifies and describes all activities and potential sources of stormwater pollution at JFK. Specifically, potential stormwater pollutants, areas of potential pollutant contact with stormwater, activity-based non-stormwater discharges, potential hard-piped non-stormwater discharges, and historic spills and leaks were explored through the BMPP questionnaire, onsite interviews of the tenants, and a thorough visual site reconnaissance.

Historical data and environmental audits were used to facilitate interviews with tenants. The tenants were asked to provide the following information:

- General description of operations conducted at each of the tenant's locations;
- Facility stormwater drainage patterns;
- Specific target activities conducted at the facility, and whether they are performed indoors or outdoors;
- Inventory of chemicals at each location and chemical storage practices;
- Identification of potential pollution sources;
- Identification of any existing best management practices;
- Identification of non-stormwater discharges and possible illicit connections to the stormwater drainage system;
- Description of deicing operations; and
- Identification of historic leaks and spills.

Several tenant interviews and site reconnaissance visits have been conducted and will continue to be performed to clarify information provided in the questionnaires, observe tenants during routine operations, gain insight into the current condition of each tenant facility and obtain additional information not previously reported in the questionnaire provided in Appendix C.

3.1 Non-Stormwater Discharges

Several sources of non-stormwater discharges are possible at JFK. Non-stormwater discharges include small spills from aircraft, equipment, vehicle fueling and washing, and Fire Fighting Foam (FFF). Aircraft deicing during dry weather can also lead to non-stormwater discharges. Frost can occur on airplane wings during dry weather when surrounding air temperatures reach the "frost point" where water vapor in the air

sublimates directly to ice and coats the wing. Cargo tenants that load and unload cargo have short turnaround time. Deicing has never occurred at JFK airport during non-deicing months and therefore is not a source of stormwater discharge. However, if deicing were required or if deicing were to occur during the non-deicing months, the deicing entity would be responsible for preventing discharges to the stormwater systems. FFF testing is performed at Police Buildings 254 and 269 and is in accordance with Federal Aviation Regulations (FAR) 139 Airport Certification Requirements and for FAA certification. The FFF testing is performed in locations designated by the PANYNJ, and is contained, collected and disposed at permitted facilities. Fire fighting foam can be a potential pollutant during emergency situations where uncontrolled discharge could migrate to the stormwater drainage system. Considering the small number of emergencies where uncontrolled fire fighting foam discharge is required, this activity presents a limited potential for pollutant contact with stormwater.

3.2 **Activity Specific Potential Pollution Sources**

A brief description of the activities with the greatest potential to be discharged into the stormwater drainage system and the areas in which they are performed is provided below. The locations where target tenant industrial activities are performed have been identified on Figure 4 located in Appendix G.

3.2.1 Aircraft, Vehicle, and Equipment Maintenance

Chemicals such as lubricating oils, hydraulic oils, fuels, degreasers, and other cleaning products are routinely used in airport maintenance activities. Small leaks and spills are not uncommon during maintenance activities; therefore, the potential for pollutant contact with stormwater is greatly increased when these activities are performed outdoors. This potential is further increased if these outdoor activities are performed in close proximity to stormwater drains. Generally, indoor areas only present a potential for pollutant contact with stormwater if floor drains discharge to the stormwater drainage system.

Major aircraft maintenance (such as engine overhauls and repair) is not performed at JFK. The larger tenants at JFK (i.e., American Airlines, JetBlue United Airlines, US Airways, and Delta Airlines, Federal Express, Terminal One Management Group (TOG), Mach 2 Maintenance, and British Airlines) perform some limited aircraft maintenance. A number of smaller tenants also perform minor maintenance in their buildings. Most of this maintenance activity occurs in hangars and some light maintenance is conducted at ramps (including adding oil and changing oil, tires, and lights). Tenants are required to use drip pans when performing maintenance such as adding oil or changing oil at the ramps. Tenants are informed on the potential impacts and risks of pollutants entering the drainage system as a result of maintenance activities. The small spills of chemicals and petroleum hydrocarbons that occur during these limited aircraft maintenance operations are typically cleaned up using granular absorbent materials. There is a potential that residuals from small spills in these areas can become entrained in the overland flow of stormwater runoff and thus drained to catch basins through a Reinforced Concrete Pipe

(‘RCP’) lateral varying in size from 6-inch to 24-inch. These laterals connect to the main RCP which then increases in size up to 42-inch. Once the main RCP leaves the terminal area the RCP may increase in size up to 72-inch as it enters one of JFK’s 26 outfalls.

Major vehicle and equipment maintenance is not performed at JFK however some minor maintenance activity to vehicles and equipment does occur at a number of tenant locations.

Based on the extent to which these activities are performed, they present a low potential for pollutant contact with stormwater.

3.2.2 Aircraft, Vehicle, and Equipment Fueling

Aircraft and vehicle fueling is performed at various locations throughout the airport property. Aircraft fueling is performed outdoors at the ramp locations at all nine terminals located within the CTA. The greatest concern with aircraft and vehicle fueling is the potential for minor spills, which usually originate from topping-off or overfilling of aircraft and vehicles. The major constituents of aircraft and vehicle fuels are petroleum hydrocarbons. These minor spills can be entrained in the overland flow of stormwater runoff and transported into the stormwater drainage system.

Tenants and contractors shall report any discharge of petroleum greater than 5 gallons to NYSDEC within 2 hours of discovery, and notify NYSDEC and/or the National Response Center for releases of a reportable quantity of a hazardous substance. Tenants and contractors are required to notify PANYNJ Police of any spill events; spills should be reported to the Manager, Environmental Services and PANYNJ Police. Tenants and contractors shall complete a PANYNJ Spill Report Form and submit to the PANYNJ within one business day identifying the event date/time, location, type of spill, response, gallons spilled, cause/reason for spill or leak, and recommended remedial action.

JFK tenants routinely perform aircraft fueling at ramps and no aircraft fueling occurs indoors. All vehicle fueling occurs outdoors at fueling stations at locations shown on Figure 4 located in Appendix G.

Considering the large volume of aircraft and vehicle fueling performed outdoors at JFK, these activities present significant potential for pollutant contact with stormwater.

3.2.3 Aircraft, Vehicle, and Equipment Washing

Aircraft washing in outdoor areas is discouraged at JFK. Washing operations which occur in outdoor areas are performed by third party entities that cover storm drains prior to the commencement of the washing cycle. All wastewater is captured and taken off site for disposal. No vehicle wash water from third party operations enters either the sanitary sewer or the storm drains. None of the tenants at JFK report outdoor aircraft washing at the airport.

No vehicle washing discharges into the storm sewers. Vehicle washing that is typically associated with the car rental areas occurs within a designated area on the leasehold and discharges directly to the sanitary sewer. Additional vehicle washing areas used by Hertz and Avis rental car agencies, Delta Airlines, American Airlines, Federal Express, JetBlue, and the PANYNJ are indoors. Information gathered from completed tenant questionnaires indicates that some additional tenants perform indoor vehicle washing at their facilities. Vehicle Washing is performed at Allied Aviation Building 90 in an outdoor area by Fleet Washing, Inc. and at DHL Building 263 by Ultimate Aircraft Appearance. No vehicle wash water from either DHL or Allied Aviation enters the sanitary sewer or storm drain.

Considering that these operations are either performed indoors and that all waters are collected for disposal via the sanitary sewer system, or is collected and disposed of off-site when performed in outdoor areas, these activities present a low potential for pollutant contact to stormwater.

3.2.4 Aircraft Sanitary Service

Aircraft sanitary service operations involve connecting a hose from the tank on a lavatory truck to the aircraft's lavatory facilities and emptying the contents into the truck. The contents are drained into triturates that grind the material prior to discharge to the sanitary sewer system. Minor spills, which occur during the connection and disconnection of the hose on to and off of the aircraft, were observed on the ramps and aprons during the site reconnaissance. Personnel are instructed to position a "Waste Catch Bucket" under the lavatory service panel. There is a potential that biocides, bacteria, and other pollutants from these minor spills can become entrained in the overland flow of stormwater runoff and be transported to the stormwater drainage system.

Due to the volume of aircraft sanitary services performed on JFK airport property and the observation of routine minor spills, this activity presents a moderate potential for pollutant contact.

3.2.5 Aircraft Deicing/Anti-Icing

Deicing/anti-icing operations protect runways, taxiways, and aircraft from accidents, which can result from ice and snow build-up on runways, taxiways, and aircraft during inclement weather. Deicing is performed as necessary at JFK during the winter season, (November through March). The deicing/anti-icing season may fluctuate based on local weather conditions and other weather conditions around the country. Aircraft, runways, taxiways, aprons are deiced or anti-iced at JFK airport.

Aircraft deicing removes snow, ice or frost from the aircraft via the use of propylene glycol or a blend of propylene glycol with water (ethylene glycol is strictly prohibited). Aircraft deicing/anti-icing activities are performed by tenants. Deicing agent is sprayed onto the aircraft from a tank truck. The ratio of propylene glycol to

water in Type I deicing fluid varies from tenant to tenant. Type IV anti-icing fluid is usually applied without dilution. Application ratios vary depending on use and weather conditions.

Ice and snow are typically removed from aircraft using a heated mixture of Type I deicing fluid and hot water applied under pressure. Undiluted Type I fluids must contain a minimum of 80 percent propylene glycol by weight, with the balance composed of water, buffers, wetting agents, and oxidation inhibitors. Deicing chemicals used in aircraft deicing must also be non-corrosive to prevent damage to aircraft aluminum and sensitive electronic systems. Type I deicing fluid is applied at gate areas or at designated/centralized deicing facilities. During intense snow and/or freezing rain events at airports where at gate deicing is practiced, aircraft may be deiced again near the end of a runway immediately prior to departure (secondary deicing).

Aircraft anti-icing may follow deicing as a means to prevent the further accumulation of snow or ice on the deiced surfaces either while aircraft are waiting for take-off during especially severe weather, or during overnight parking. Anti-icing is accomplished by applying Type IV anti-icing fluid to clean (i.e., ice free) aircraft surfaces. Type IV anti-icing fluids are also composed of propylene glycol, along with thickeners that allow the fluid to cling to the aircraft and provide prolonged protection and longer holdover times. This increased viscosity is lost when Type IV anti-icing fluid undergoes shear stresses, such as those experienced during takeoff. The unique characteristics of Type IV anti-icing fluid require that special low-shear applicator nozzles be used. In addition, because Type IV fluid adheres to the aircraft until an air speed of approximately 85 knots is reached, it is widely dispersed through sloughing during taxiing and takeoff. Also because of this property, Type IV fluid is only used on larger aircraft that reach a rotational speed of more than 85 knots during takeoff. Anti-icing is conducted at the same locations as deicing, with the exception of secondary deicing locations, where anti-icing is not typically conducted.

Propylene glycol (Type I or Type IV) is stored in either Aboveground Storage Tanks ('ASTs'), Underground Storage Tanks ('USTs'), or mobile tankers. The deicing vehicles fill up at the storage area and then the aircraft deicing usually occurs at the gates, apron areas, or remote deicing locations near the terminals or hangars. Primary deicing occurs within one hour of takeoff.

Overspray of deicing/anti-icing fluids and drip and shear of deicing/anti-icing fluids during takeoff and landings have the potential to impact stormwater runoff. Deicing material that falls off the aircraft during deicing is collected in catch basins and transported through the airport's storm drain system. Deicer that remains on the aircraft after application either drips off while taxiing to a runway or shears off the aircraft during takeoff. Deicer that shears off the aircraft either falls onto the runway or infield, or is dispersed as small droplets into the air.

All tenants are required to use propylene glycol for deicing. The use of ethylene glycol and urea is strictly prohibited. Potential pollutants from deicing/anti-icing

activities include propylene glycol, potassium acetate, 5-day biochemical oxygen demand ('BOD₅'), Chemical oxygen demand ('COD'), total organic carbon ('TOC'), and Total Kjeldahl Nitrogen ('TKN'). JFK airport is required to maintain a record of the types (including the MSDS) and monthly quantities of deicing/anti-icing chemical used. Tenants who conduct deicing/anti-icing operations shall provide the above information to the JFK facility for inclusion in the JFK BMP for the entire facility. MSDSs for deicing/anti-icing chemicals used at JFK airport and the monthly usage of these chemicals are provided to the PANYNJ.

Deicing chemicals have the potential to substantially increase the CBOD₅ in receiving waters and the use of deicing chemicals presents a high potential for contamination of stormwater during winter months. Figure 5 located in Appendix G shows locations of deicing activities at JFK.

Considering the large volume of aircraft and amount of runways and taxiways at JFK and that the deicing activities are performed outdoors prior to or during precipitation events these activities present significant potential for contact with stormwater.

3.2.6 Runway and Taxiway Deicing/Anti-Icing

Runway and taxiway deicing is the responsibility of the PANYNJ airport personnel. The purpose of pavement deicing/anti-icing is to break the bond holding ice and snow to the surfaces of runways and taxiways, facilitating mechanical ice and snow removal to maintain adequate friction between aircraft tires and the runway as identified in BMP 19. Residual deicing materials on the pavement provide anti-icing protection. JFK International Airport uses both solid and liquid FAA-approved pavement deicing materials. Liquid pavement deicing materials are primarily applied in anticipation of deicing events. The liquid deicer used at JFK is Octamelt, a mixture of propylene glycol and potassium acetate. Solid pavement deicing materials are primarily applied to existing ice and snow. The solid deicer used at JFK is Cryotech NAAC (sodium acetate). It should be noted that the PANYNJ has not used urea for deicing/anti-icing since the late 1990's as a means to be more protective of the surrounding water bodies. In addition, sand is used at JFK to improve traction at the terminal roadway system, pedestrian traffic areas, and parking areas when necessary. Some of the sand applied in the terminal area is collected by sweepers once the pavement has dried, and some of it may end up in the storm drain system. In general, sand applied to the terminal roadway system collects at the edge of the pavement, is trapped by the soils and vegetation of the infield areas, or may travel to the storm drain system.

The PANYNJ has highly experienced operations and maintenance staff, who consistently monitor pavement conditions during snow events. They use a host of tools to assess real-time conditions to maintain safe surfaces. At JFK, which has four runways, a total of 28 runway in-pavement surface condition sensors are utilized. Information from these sensors is sent back to staff managing the snow operations via radio. The PA also utilizes a Saab that is specially equipped to take real-time readings on friction values on runways.

Additionally, pilots will transmit information on runway take off and landing conditions back to the PA. As discussed in Section 4.4.2.5 of this document, all this pavement condition information is shared between the airlines, the FAA Air Traffic Control Tower staff, and the PANYNJ through the web-based IROPSnet.

3.2.7 Fuel Storage

Sixty-two ASTs, which contain aircraft Jet-A fuel, are located at the facility's BFF. Forty-six of the tanks are equipped with a floating roof and sixteen have fixed roofs. The PANYNJ is in the process of covering the remaining forty-six aboveground storage tanks with fixed geodesic domes. None of AST's are manifolded or connected by common open piping that would allow uncontrolled movement of product between tanks.

Fifty of the AST's have a maximum capacity of over 495,000 gallons, with a standard maximum operating capacity of approximately 420,000 gallons and a standard average operating capacity of between 200,000 and 250,000 gallons. The remaining twelve ASTs have a maximum operating capacity of approximately 180,000 gallons and a standard average operating capacity of between 90,000 and 120,000 gallons. Each tank is cathodically protected and equipped with high fluid level monitoring systems. This high level monitoring system activates alarms and shutdown procedures to prevent tank overfilling.

Concrete, steel or concrete/asphalt dikes either surround the BFF ASTs with jet fuel, with 110 percent containment capacity. This 110 percent containment can hold the contents of a single largest tank plus sufficient freeboard to allow for precipitation. The entire tank dike area throughout the facility is sufficiently impervious. The secondary containment areas for the BFF are composed of a bentonite geo-composite liner (Bentomat) on the floor and poured concrete walls, steel walls or concrete Fabrafoam mats over the earthen dikes.

Forty ASTs that contain aircraft Jet-A fuel are located at the SFF. The ASTs are constructed of welded steel, are coated with a rust inhibiting paint, and have floating roofs with a fix covered PVC coated polyester fabric roofs.

The ASTs have a maximum capacity of 100,000 gallons, with a standard maximum operating capacity of approximately 95,000 gallons and a standard average operating capacity of between 60,000 and 85,000 gallons. Each tank is cathodically protected and equipped with high fluid level monitoring systems. This high level monitoring system activates alarms and shut-down procedures to prevent tank overfilling.

All of the SFF ASTs are surrounded by secondary containment systems which have been designed to contain 100 percent of the capacity of the tanks, with sufficient freeboard for precipitation. Secondary containment consists of concrete dikes with 12-inch thick walls and floors with sub-diking between the tanks. Dikes are equipped with

drain valves. Any size spill would be contained within the secondary containment systems unless the secondary containment system failed.

The dikes at both the BFF and SFF are equipped with drain valves. Stormwater collected in the diked area is drained into stormwater retention chambers located at each facility. These retention chambers each have a pump to scavenge floating oil with a skimmer and store it in adjacent 2,000 gallon ASTs. The effluent from the stormwater retention chambers is treated by PANYNJ WWTPs operated by an outside contractor. The effluent from the WWTPs discharges to storm sewers with outfalls on Jamaica Bay and Bergen Basin. The retention chambers are equipped with a high oil level switch that activates an audible alarm. Both the chambers and WWTPs are designed to treat the “first-flush” or 1/2 inch storm.

Any discharge of contained stormwater must comply with Special Condition – Best Management Practices, Number 6 on Page 26 and 27 of 31 of the SPDES Permit. A copy of the SPDES permit is provided in Appendix A.

Allied Aviation Services currently has a SPCC Plan that contains the appropriate spill prevention and clean up measures. A PANYNJ consultant has reviewed the plan and verified that the plan contains the appropriate spill prevention and clean up measures.

3.2.8 Chemical Storage

JFK airport stores paints and thinners in stockrooms, parts cleaning fluids at its automotive garages, and anti-icing and deicing propylene glycol at PANYNJ and tenant areas. Chemicals stored outdoors at the JFK airport include propylene glycol; all other chemicals are located indoors (ethylene glycol is strictly prohibited). Chemicals are stored in double walled tanks located on concrete slabs with absorbent material available to facilitate cleanup or in secondary containment to capture any spills.

3.2.9 Building and Grounds Maintenance

Most of the building and grounds maintenance at JFK is performed by the PANYNJ. Several tenants subcontract building maintenance services to outside professionals. Pesticides and herbicides are used to maintain aprons, runways, and building green spaces. During rainfall events, accumulated residues from pesticide and herbicide usage can come into contact with stormwater and be transported into the stormwater drainage system.

The PANYNJ contracts with a licensed pesticide and herbicide applicator to service all of the interior and exterior areas however, licensed maintenance staffs also serve as applicators of JFK. Several tenants’ report that they also contract with a licensed applicator, which augments the service provided the PANYNJ.

Due to the limited areas of pervious surfaces at on the Airport property this activity presents a moderate potential for pollutant contact.

3.2.10 Outdoor Storage Activities

Raw materials, by-products, leaking equipment and vehicles, and containers exposed to stormwater at outdoor storage areas can adversely impact stormwater runoff.

There are numerous vehicle and equipment storage areas throughout JFK airport. Several tenants store gasoline and/or diesel fuel on airport property. Most of this storage is located outdoors and is primarily comprised of ASTs, drums, and stationary tanker trucks. Materials stored outdoors at JFK airport include jet fuel, gasoline, diesel, waste oil, lubricating oil, propylene glycol, potassium acetate, and aircraft and vehicle detergents. Ground support equipment and vehicles are also parked or stored outdoors at various locations throughout JFK airport. Fluids (e.g. fuel oil, antifreeze, hydraulic fluid, chemical toilet water, and deicing fluids) leaking from vehicles can adversely impact stormwater runoff. Potential pollutants from outdoor storage activities include oil and grease, petroleum hydrocarbons, metals, volatile organic compounds, fecal coliform, BOD₅, TOC, COD, TSS, pH, propylene glycol, and potassium acetate.

Fifty-five gallon storage drums are used at JFK airport to store virgin and waste material. Many of these drums are located in interior maintenance areas and as such they are not being exposed to stormwater. The floor drains from many of the indoor storage areas directly discharge into the sanitary sewer system.

Considering the high number of aircraft and ground vehicle fueling and fuel truck staging areas and the frequency with which minor spills occur, this activity presents a significant potential for pollutant contact.

3.3 Potential Pollution Sources and Pollutant of Concern

Many of JFK's tenants perform activities in areas that present the potential for stormwater pollutants to be discharged into the stormwater system. The tenants and their associated activities are summarized in Table 2 located in Appendix F. The tenant activities with the greatest potential to contribute to stormwater pollution and some of the contaminants of concern for each activity are listed below:

Aircraft Deicing/Anti-icing (AD)

- Propylene Glycol
- Sodium acetate
- Potassium acetate

Aircraft, Vehicle, and Equipment Maintenance (AM, GM, EM)

- Oil and grease
- Petroleum hydrocarbons
- Propylene Glycol
- Halogenated Solvents

- Non-halogenated Solvents
- Aircraft, Vehicle, and Equipment Fueling (AF, VF, EF)
- Petroleum hydrocarbons
 - Fuel Vapors
- Aircraft Sanitary Service (AS)
- Biocides
 - Bacteria
- Building and Grounds Maintenance (BGM)
- Pesticides
 - Herbicides
 - Oils and grease
 - Petroleum Hydrocarbons
- Chemical Storage (CS) and Fuel Storage (FS)
- Petroleum hydrocarbons
 - Lubricants
 - Paints
 - Battery Acid
 - Solvents
- Food Handling Operations (FH)
- Oil and grease
 - Bacteria
- Firefighting Foam Testing (FT)
- Volatile organic compounds
- Runway and Taxiway Deicing/Anti-icing (R-TD)
- Propylene Glycol
 - Sodium acetate
 - Potassium acetate
- Lavatory Service Operations
- Lavatory Chemicals
 - Lavatory Waste
 - Lavatory Truck Wash Water

Table 2 located in Appendix F lists specific pollutants that may be discharged into the stormwater drainage system from each tenant location based on the activities conducted by the tenant. The pollutants consist primarily of petroleum products (such as fuels, oils, and greases), halogenated and non-halogenated solvents, and deicing fluids (propylene glycol). Oils, greases, petroleum hydrocarbons, solvents, and propylene glycol from aircraft, equipment, and vehicle fueling, maintenance, and washing activities are potential pollutants because the activities are generally performed outdoors in

proximity to storm drains. Pollutants from these activities potentially can be transported to the stormwater drainage system either as direct spills (dry weather flow) or from rainfall runoff that mobilizes residual contaminants (wet weather flow).

3.4 **Hard-Piped Non-Stormwater Discharge Identification**

Beginning in the late 1970's, the PANYNJ implemented a program to identify and eliminate all hard-piped non-stormwater discharges. As such, PANYNJ staff is not aware of any existing hard-piped, non-stormwater discharges. Further, in the event new or suspected hard-piped, non-stormwater discharges are discovered, they will be dye/smoke tested for confirmation and sealed as needed.

Hard-piped illicit connections are defined as equipment that discharges directly to the stormwater drainage system. These could include oil/water separators, interior floor and trench drains, utility sinks, and chiller and boiler overflow/blow down lines.

3.5 **Runoff and Erosion Management**

There is little potential for erosion problems at JFK since most of the airport is impervious. The stormwater drainage system is a nearly completely closed conduit ("RCP") that discharges directly into Bergen Basin, Thurston Basin, and Jamaica Bay. The principal potential source for erosion at JFK can occur during construction activities. Construction projects of any size should be reviewed before the project begins to determine if adequate soil and erosion control procedures will be implemented.

In addition, any construction project that involves soil disturbance of one or more acres, must follow the SPDES Permit "Special Conditions–Best Management Practices", Item 4, Part B "Stormwater Pollution Prevention Plans (SWPPs) Required for Discharges of Stormwater From Construction Activities to Surface Waters," which requires the preparation and submittal of a Notice of Intent (NOI) and SWPPP (see Appendix D, BMP 7).

3.6 **Spill Reporting and Leaks**

A list of reportable quantity spills and leaks of toxic or hazardous pollutants that have occurred during the past three years at areas that are exposed to precipitation or that otherwise drain to a stormwater conveyance at JFK airport are recorded. Each act of non-compliance shall include a short description of the non-compliance, a description of any actions and mitigation taken or proposed by the PANYNJ or tenant entity to limit environmental impact associated with the non-compliance. The PANYNJ or tenant shall provide an estimate of the date when the corrective or mitigation action will be completed.

Tenants and contractors shall report any discharge of petroleum greater than 5 gallons to NYSDEC within 2 hours of discovery, and notify NYSDEC and/or the National Response Center for releases of a reportable quantity of a hazardous substance. Tenants and contractors are required to notify PANYNJ Police of any spill events; spills

should be reported to the Manager, Environmental Services and PANYNJ Police. Tenants and contractors shall complete a PANYNJ Spill Report Form and submit to the PANYNJ within one business day identifying the event date/time, location, type of spill, response, gallons spilled, cause/reason for spill or leak, and recommended remedial action.

3.7 **Stormwater Monitoring and Sampling**

Stormwater monitoring and sampling data provides information on the quality of stormwater runoff from JFK airport. The stormwater analytical data is used to identify the types and sources of pollutants and to provide a means for evaluating the environmental risk for stormwater runoff. JFK airport is subject to various stormwater monitoring and sampling as required by Special Condition 1, Page 17 of 31 of the SPDES Permit.

3.8 **Snow Melters**

Mobile snow melters are strategically placed proximate to each of the terminals to assist the snow removal operations. Snow or slush, which may be mixed with deicing material, is plowed by trucks from the terminal area to the snow melters, and discharged directly into the stormwater drainage system.

4 Stormwater Management Controls

A stormwater BMP is defined as any program, technology, process, siting criteria, operating method, measure or device that controls, removes, or reduces pollution. The permit requires the development and implementation of BMPs to address pollutants originating from industrial sources. Appropriate BMPs for industrial facilities were selected based on a site reconnaissance, tenant interviews, and information obtained from tenant questionnaires. Areas of actual or potential pollutant contact are evaluated and applicable BMPs are recommended or implemented to eliminate or minimize the potential for discharge of stormwater pollutants. BMPs can be classified into categories based on whether the intended stormwater control objective is quality control or quantity control.

Quality control BMPs are designed to limit the types and concentrations of pollutants found in stormwater runoff, and are subdivided into source control BMPs and treatment control BMPs. Source control BMPs are operational practices intended to prevent pollutants from entering surface waters by altering performance of activities to eliminate or minimize pollution produced as a result of the activity. Source control BMPs generally involve eliminating a target activity's exposure to stormwater and typically include the following:

- Moving an outdoor operation indoors;
- Covering an outdoor activity or storage area with either a roof or a lean-to;
- Placing chemical or petroleum storage containers in a shed or under a lean-to;
- Storing hazardous materials/wastes in covered, contained areas.

A properly designed and implemented spill response program can also be an effective method for protecting stormwater quality. Spill response programs rely upon employee awareness and training to be effective.

Treatment Control BMPs are a type of quality control BMP that treats the stormwater to remove pollutants. Examples of treatment BMPs include:

- Oil/water separators;
- Grass swales;
- Retention basins;
- Infiltration; and
- Filtration.

Quantity control BMPs are intended to control the runoff volume or peak discharge rate. The use of stormwater detention basins is one example of a quantity control BMP. A properly designed and maintained detention basin can also decrease the amount of pollutants entering surface waters, thereby improving receiving water quality.

Section 2.5 described industrial activities typically performed by JFK tenants. A more detailed discussion of potential pollution sources is described in Section 3. Activities performed indoors have less potential to affect runoff water quality, although practices such as hosing down indoor floor space to outdoor areas after performing industrial activities contradict the potential water quality benefits of performing industrial activities under cover.

JFK tenants perform industrial activities directly related to aviation, such as aircraft operation, maintenance, and cargo handling, as well as general industrial activities such as vehicle maintenance, equipment storage, and facility maintenance. Many of the JFK tenants have already implemented a variety of acceptable BMPs to minimize the effects of these activities on stormwater quality. The following sections supplement and enhance current BMP implementation and provide for consistent airport-wide application.

4.1 **Good Housekeeping Practices**

In March 1998, the PANYNJ developed activity-specific Good Environmental Practices ('GEPs') for JFK airport. Good housekeeping practices that address housekeeping, operational, structural and contingency considerations that can be taken to help achieve environmental compliance are utilized at the JFK facility. The purpose and intent of good housekeeping is to minimize the exposure of pollutants to rainfall and runoff. The following practices are the basis of a good housekeeping program and are the minimum acceptable at JFK airport:

- Walkways, aisles, roadways, and exits are to be kept clear at all times.
- Small spills are to be cleaned up immediately and disposed of in an approved manner.
- All refuse is to be placed in an appropriate container.
- Material and products are stored in a neat and orderly fashion with particular attention not to block walkways or access routes.
- Chemical containers are to be stored in enclosed or covered areas whenever possible to minimize contact with stormwater.
- All chemical storage containers are to be properly labeled.
- Empty drums are to be placed only in their designated area.
- Chemical containers and/or drums are to be kept closed at all times when not in use.

- Inside floors are to be kept clear of debris and spills and are to be swept or mopped regularly.
- Tools and equipment are to be kept clean and neatly stored when not in use.

4.2 **Minimum Best Management Practices**

The maximum benefit of a stormwater pollution prevention program can be achieved only if tenants implement the BMPs that correspond to the target industrial activities performed at their facilities. Special Condition – Best Management Practices, Number 4.A on Page 25 of 31 of the SPDES Permit requires development of 13 minimum BMPs to prevent or minimize the potential release of pollutants to the waters of the State.

4.2.1 **Pollution Prevention Team**

The Environmental Services Unit performs a variety of inspections of facilities owned and operated by the PANYNJ and tenants. Individual tenants will be required to have designated personnel responsible for implementing the BMPP at corresponding tenant sites. Table 3 located in Appendix F lists the members of the Pollution Prevention Team ('PPT') for all facilities covered under the JFK BMPP. This list will be updated when a change to the personnel occurs. It is the responsibility of each facility to notify the Environmental Services Unit when there are personnel changes. Other PPT member responsibilities include ensuring implementation of appropriate BMPs, retaining a copy of the implemented BMPP onsite, and providing feedback to the Environmental Services Unit regarding BMPP compliance.

4.2.2 **Reporting of BMP Incidents**

All spills that occur on JFK Airport property are to be reported to and logged by the Environmental Services Unit. These spills will be added to the spill history and kept with the BMPP. The PPT member or designated representative will document the chemical spilled, location of spill, quantity spilled, date and time, corrective action taken and whether the spill resulted in a non-stormwater discharge. Tenants and contractors shall report any discharge of petroleum greater than 5 gallons to NYSDEC within 2 hours of discovery, and notify NYSDEC and/or the National Response Center for releases of a reportable quantity of a hazardous substance. Tenants and contractors are required to notify PANYNJ Police of any spill events; spills should be reported to the Manager, Environmental Services Unit and PANYNJ Police. Tenants and contractors shall complete a PANYNJ Spill Reporting Form and submit to the PANYNJ within one business day identifying the event date/time, location, type of spill, response, gallons spilled, cause/reason for spill or leak, and recommended remedial action.

4.2.3 Risk Identification & Assessment

The PANYNJ requested that all tenants complete a questionnaire to determine the potential pollutant sources from each tenant and their leasehold. Results of the questionnaire provided the PANYNJ with information, at a minimum, with respect to the type of activities performed at their site, the type of materials stored which potentially can contribute pollution to stormwater runoff from JFK. Based on this information the most appropriate BMPs were selected to prevent or control pollutants from these areas. A majority of tenants at JFK have been provided with the questionnaire presented in Appendix C of the June 2009 BMPP. The PANYNJ has presented the information gathered from tenants completed questionnaires to date in the BMPP and Tables 1 and 2.

4.2.4 Employee Training

The PANYNJ shall conduct an annual BMPP implementation training seminar for all PPT members and designated tenant representatives and facility personnel. These members in turn are to train their own staff. Training will cover items such as prohibited discharges, inspections, spill response, good housekeeping, and implementation of BMPs, deicing activities, and record keeping procedures. Training will be provided on an annual basis and as a required provision for new tenant occupancy. The training program implementation, including tenant participation, shall be thoroughly documented throughout the permit period.

4.2.5 Inspections and Records

As part of the comprehensive site compliance evaluation, qualified facility personnel will inspect designated equipment and areas of the airport on an annual basis to assess the effectiveness of BMP implementation and the overall BMPP. All inspection records discussed in Section 5 should be kept for at least three years.

4.2.6 Security and Site Access

Proper security measures need to be taken to prevent unauthorized access to secure areas at JFK Airport. The PANYNJ shall train security personnel to be aware of potential illicit discharges to state waters. Training shall include lighting and access control.

4.2.7 Preventative Maintenance

A preventative maintenance program involves routine inspection and maintenance of structural BMPs (i.e. cleaning oil/water separators, catch basins) as well as inspecting and testing facility equipment and systems to identify and correct conditions that could cause breakdowns or failures, which could potentially result in the discharge of pollutants to the stormwater drainage system. This includes identifying equipment and areas to inspect and development of a schedule for routine inspections. The prompt repair or replacement of defective equipment found during inspections and testing should be

performed and documented. Include a suitable records system for scheduling tests and documenting inspections in the preventative maintenance program.

4.2.8 Good Housekeeping

Good housekeeping requires routine maintenance of equipment and chemical storage areas in a clean and orderly manner to reduce the likelihood of contaminating stormwater runoff. Basic operation and maintenance BMPs incorporated into a Good Housekeeping program include maintenance conducted on the terminal apron and in dedicated hangars. The following practices are part of the Good Housekeeping program:

- Performing maintenance activities indoors;
- Maintaining an organized inventory of material used in the maintenance areas;
- Draining all parts of fluids prior to disposal;
- Preventing the practice of hosing down the apron or hangar floor;
- Using dry cleanup methods, and
- Collecting stormwater runoff from the maintenance area and providing treatment or recycling.

4.2.9 Materials/Waste Handling, Storage, and Compatibility

Employees should be trained in which materials are hazardous, where they are stored, how they are labeled, and in their proper use. A program has been established to identify material, promote waste reduction and recycling. Establish designated storage areas and segregate waste. Communicate recycling requirements and instructions.

4.2.10 Spill Prevention and Response

A Spill Prevention and Response (SPR) Plan should be evaluated to identify and characterize potential spills, to eliminate or reduce spill potential, and how to respond when a spill occurs. The SPR should include, at a minimum, a copy of the NYSDEC registration application and certificate issued under 6 NYCRR 596.2, a detailed site plan that locates and identifies tanks, transfer stations, and connecting piping, a plan for spill response at the facility which includes a prediction of the flow or dispersion of a spill, a map showing areas that could be impacted by a spill including sewers, wells, ditches, etc., spill reporting procedures, plans for drills, summary of releases occurring in the last five years including reports associated with these releases, identification and assessment of causes of spills, leaks, releases at the Facility, status report on compliance with 6 NYCRR, and the names and phone numbers for emergency contacts, coordinators, and clean-up contractors.

4.2.11 Erosion and Sediment Control

Due to the nature of the site, the principal potential source for erosion at JFK can occur during construction activity. All construction projects of any size should be reviewed before the project begins to determine if adequate soil and erosion control procedures will be implemented. In addition, any construction project that involves soil disturbance of one or more acres, must follow the SPDES Permit “Special Conditions – Best Management Practices”, Item 4, Part B “Stormwater Pollution Prevention Plans (SWPPs) Required for Discharges of Stormwater From Construction Activities to Surface Waters,” which requires the preparation and submittal of a Notice of Intent (NOI) and SWPPP (see Appendix D, BMP 7).

4.2.12 Management of Runoff

The BMPs in Appendix D have been proven to be effective at reducing the discharge of pollutants to the stormwater drainage system at aviation facilities.

4.2.13 Street Sweeping

Sweeping can remove small quantities of solids from areas that are exposed to precipitation or stormwater runoff. Sweeping areas that include dust can take place before rainfall or contact with stormwater runoff.

4.3 Activity Specific BMPs

Table 4 located in Appendix F identifies recommended BMPs that are applicable to JFK activities. Each tenant is required to implement at least one BMP for each activity, although the particular BMP implemented is determined by the tenant. The table focuses on low cost source control BMPs, but identifies treatment control BMPs such as oil/water separators, where applicable.

In March 1998, the PANYNJ developed activity-specific GEPs’ for JFK and updated them as BMPs in March 2008. These activity-specific BMPs are attached in Appendix D and apply to the following activities:

- BMP 1: Aircraft Deicing/Anti-icing
- BMP 2: Aircraft, Vehicle, and Equipment Fueling
- BMP 3: Aircraft, Vehicle, and Equipment Maintenance
- BMP 4: Aircraft, Vehicle, and Equipment Washing
- BMP 5: Building Cleaning and Maintenance
- BMP 6: Chemical and Petroleum Storage and Handling
- BMP 7: Elimination of Non-Storm water Discharges to Storm Drains
- BMP 8: Spills Management
- BMP 9: Lavatory Service Operations
- BMP 10: Oil/Water Separators
- BMP 11: Outdoor Handling of Material
- BMP 12: Outdoor Material and Equipment Storage

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|---------|--|
| BMP 13: | Waste Management |
| BMP 14: | Fire Fighting Foam Discharge |
| BMP 15: | Storm water Pollution Prevention Education |
| BMP 16: | Street Sweeping & Storm water Facility Maintenance |
| BMP 17: | Security |
| BMP 18: | Rubber Removal |
| BMP 19: | Runway and Taxiway Anti-icing |

4.4 **Source Reduction**

To the maximum extent possible all tenants are required to reduce, reuse, and recycle pollutants generated at JFK. JFK tenants are expectant to consider substitute chemicals, segregate activities, and promote recycling. Special Condition – Best Management Practices, Number 7.B.ii (a) and (b) on Page 28 of 31 of the SPDES Permit suggests alternatives to the use of glycol based deicing/anti-icing chemical, evaluate present application rates to ensure against excessive over application by analyzing application rates and adjusting as necessary, consistent with consideration of flight safety, and require that tenants and/or other entities who apply or otherwise use deicing and/or anti-icing materials to determine whether excessive application of deicing/anti-icing chemicals occurs, and adjust as necessary, consistent with consideration of flight safety. The following are some alternatives to the use of glycol based deicing/anti-icing chemical that are being used at the JFK airport that can reduce the aggregate amount of deicing/anti-icing chemicals used and/or lessen the environmental impact.

4.4.1 Runway Deicing Operations

The PANYNJ has highly experienced operations and maintenance staff, who consistently monitor pavement conditions during snow events. They use a host of tools to assess real-time conditions to maintain safe surfaces. At JFK, which has four runways, a total of 28 runway in-pavement surface condition sensors are utilized. Information from these sensors is sent back to staff managing the snow operations via radio. The PANYNJ also utilizes a Saab that is specially equipped to take real-time readings on friction values on runways. Additionally, pilots will transmit information on runway take off and landing conditions back to the PANYNJ. These techniques are utilized to efficiently determine the concentrations and amount of deicing chemical to be applied to maintain traction, adjusting as necessary, consistent with flight safety.

4.4.2 Aircraft Deicing/Anti-icing Operations

4.4.2.1 Forced-Air Deicing Systems/Hot Air Blast Deicing

Hot air blast deicing systems use heated compressed air to blow snow and ice off of aircraft wings. Air blast deicing may be followed by conventional deicing/anti-icing or accompanied by a fine spray of propylene glycol to prevent new ice formation. A self-contained, truck mounted unit which removes snow and ice from aircraft surfaces

by a high pressure air jet combined with a fine spray of propylene glycol can be used to prevent new ice formation.

Some of the tenants use this hot air blast deicing system with newer trucks and as tenants are obtaining new trucks the PANYNJ shall encourage that they are equipped with this feature.

4.4.2.2 Infra-Red Technology/Infra-Red Heaters

Infra-red deicing systems have been developed to deice small aircraft. This system uses a natural-gas-fired radiant heater located inside a drive-through hangar. Reportedly the system has a lower cost per treatment, one-tenth the cost of chemical deicing. However, the technology requires a drive-through building large enough to contain the aircraft and must be located adjacent to active runways. Follow-up chemical anti-icing is usually required to provide anti-icing protection and prevent the re-freezing of water in the aircraft's moving parts.

JFK airport currently uses an Infra-Red Radiant Deicing ('IR') facility. IR deicing eliminates the use of the primary deicing with propylene glycol. However, a minimal amount of Type IV propylene glycol is applied post the IR, which presents a low potential for contamination of stormwater.

4.4.2.3 Optimized Fluid Mixtures

The FAA mixture requirements for "clean aircraft concept" are based on the difference in temperature between the outside air temperature and the freeze point temperature of the deicing mixture. This is known as the "buffer". For example, a typical 50/50 mixture of a standard Type I deicing fluid and water has a freeze point of -18°F and, therefore, can be used when the outside air temperature is as low as 0°F, allowing for the 18°F buffer.

Airlines typically use a 50/50 mixture of Type I deicing fluid and water for deicing purposes. However, the blend of undiluted deicing fluid and water required to achieve the necessary buffer is dependent on ambient temperature, with the ratio ranging between 60 percent deicing fluid to 40 percent water for temperatures below as 0°F, and 20 percent deicing fluid to 80 percent water for temperatures above ~25°F. Hot water alone can be effective at temperatures above 28°F. This fact allows significantly more dilute deicing fluid solutions to remain effective when used at airports located in regions where the temperature rarely falls below as 20°F.

At the JFK airport some tenants perform regular monitoring of air temperature allows the use of deicing mixtures with less than the typical 50 percent concentration of propylene glycol, thereby reducing the overall amount of deicing fluid applied. This technique provides for a direct reduction in the total amount of deicing fluid used with minimal impact on airlines operations. In addition, the use of urea and ethylene glycol are strictly prohibited and its use has been discontinued.

4.4.2.4 Hybrid Deicing Systems

An innovative aircraft deicing system utilizing forced hot air in combination with a low-flow deicing fluid nozzle has been developed. The system is configured similarly to a conventional deicing truck with an operator bucket mounted on a boom and dual tanks for Type I and Type IV deicing and anti-icing fluids. In addition, the unit has a turbine compressor that provides a high velocity air stream. The heart of the system is an applicator turret mounted on the bucket. The applicator head has a ring-shaped nozzle for the air stream and dual (9 and 16 gallons per minute (gpm)) nozzles in the center of the ring for deicing fluid conventional deicing nozzles flow at 45 gpm). Separate controls are provided for each of the nozzles. The applicator head has an operating range of about 10 feet at the 9 gpm flow, and 15-20 feet at 18 gpm. The system can be operated in either deicing or anti-icing modes.

Overall, the hybrid deicing unit can result in a reduction in deicing fluid usage by tenants at JFK airport. Reductions in BOD loads from glycol can be greater because variable fluid mixtures can be used to suit ambient temperatures, rather than using a single mixture (e.g., 50/50 mix of glycol and water).

Some of the tenants use this system with newer trucks and as tenants are obtaining new trucks the PANYNJ shall encourage that they are equipped with this feature.

4.4.2.5 Irregular Operations Network

JFK airport uses an Irregular Operations Network ('IROPSnet') during winter weather events. The IROPSnet is a communication tool used to more effectively schedule aircraft departures to eliminate or greatly reduce the need for secondary application of deicing. Departure slots are allocated with coordination between the PANYNJ, the FAA, and the airlines operating through JetBlue. The system is designed to minimize cancellations and delays, and allows for aircraft to take off immediately after the application of deicing material.

4.4.2.6 Physical/Mechanical Methods

Brooms and ropes have historically been used to remove large accumulations of snow from aircraft, and are still used by some airlines prior to deicing to reduce the quantity of deicing fluid necessary to clean the aircraft.

4.5 **Management of Runoff**

In an effort to address the recent environmental concerns associated with wintertime aircraft operations, significant effort has been focused on developing solutions for the management of deicing chemical runoff. These included the development of alternative aircraft and runway deicers that are more environmentally friendly, innovative deicing fluid application methods, and alternative collection and treatment methods. Although significant progress has been made toward developing solutions for the

management of deicing wastes, additional effort is needed to further understand the problems and cost effective solutions associated with control of deicing chemical runoff.

Special Condition – Best Management Practices, Number 7.B.iii on Page 28 and 29 of 31 of the SPDES Permit indicates that the PANYNJ shall describe and implement a program to control to manage contaminated runoff to reduce the amount of pollutants being discharged from JFK airport. The stormwater management program shall describe the primary issues that are currently driving decisions regarding the types of deicing runoff for collection systems, recovery systems, and conveyance systems.

The PANYNJ has completed an evaluation of the components of a program for the management of runoff from deicing/anti-icing operations. The Best Management Plan Report submitted in September 2008 evaluated all alternative BMPs available to reduce the discharge of deicing and anti-icing materials, prioritized those practices, estimated the cost to implement the practices, and provided a reasonable schedule for implementing the practical alternatives. The report subsequently evaluated alternative deicing or anti-icing BMPs either not currently in use or in limited implementation at JFK, and assessed their efficacy as potential enhancements to the airport's existing program for managing the discharge of deicing runoff.

The PANYNJ is also, pursuant to Special Condition Number on Page 17 of 31 of the SPDES Permit, performing a water quality assessment for Jamaica Bay to determine the impacts of the current deicing/anti-icing operations at JFK airport. Once the study is completed, the PANYNJ will assess the results and evaluate the need to implement the various components of a deicing/anti-icing runoff management program at the site.

5 Comprehensive Site Compliance Evaluation

5.1 BMP Implementation Program

Special Condition – Best Management Practices, Number 7.B.iv and 7.B.v on Page 29 of 31 of the SPDES Permit indicates that the PANYNJ shall describe and implement a BMP implementation program that will specify the routine facility inspections and discuss the comprehensive site compliance evaluations. The implementation program described below is designed to facilitate the proper and timely installation and maintenance of existing and proposed BMPs for JFK tenants. The implementation program includes a recommended schedule, a list of the PPT personnel, employee training requirements, facility inspection protocol, monitoring requirements, recordkeeping and reporting procedures, BMPP updates, and comprehensive site compliance evaluation.

5.1.1 Schedule for BMPP Implementation

The BMPs identified in this BMPP shall be implemented by November 6, 2009 as indicated by NYSDEC to comply with the SPDES Permit.

5.1.2 BMPP Training

Tenant training will be provided on an annual basis and as a required provision for new tenant occupancy. The PANYNJ Environmental Services Unit shall conduct an annual BMPP implementation training seminar for all PPT members. These members in turn are to train their own staff. Training will cover items such as prohibited discharges, inspections, spill response, good housekeeping, and implementation of BMPs, deicing activities, and record keeping procedures. The training program implementation, including tenant participation, shall be thoroughly documented throughout the permit period.

5.1.3 PANYNJ Routine Facility Inspections

As required by the SPDES Permit, the PANYNJ Environmental Services Unit inspections are conducted to identify environmental infractions and/or deficiencies for all facility components or systems including:

- material storage areas
- in-plant transfer, process, and material handling areas
- loading and unloading operations
- storm water, erosion, and sediment control measures

- process emergency systems, and sludge waste disposal areas
- deicing and/or anti-icing materials storage and handling areas.

The facility components and systems the PANYNJ currently inspects include:

- Refueling Stations
- Fuel Hydrant Pits
- Catch Basins
- Outfalls
- Wastewater Treatment Plants
- Underground/Aboveground Storage Tanks

Specific facility components and systems for each operation are inspected by the PANYNJ. Tenant and PANYNJ entities are generally inspected for appropriate housekeeping practices such as insufficient signage, lighting, electrical equipment, fuel dispensers, latching devices, vapor recovery on nozzles, pump operations, or fill boxes. Each inspection summary includes a comments/recommendation section to highlight areas of improvement and/or non-compliance not specifically identified on the inspection sheet. The user (tenant or PANYNJ entity if applicable) has primary responsibility for their own areas and facilities to maintain compliance with good housekeeping and applicable environmental regulations set forth in the SPDES Permit. Each inspection is performed to adhere to specific BMPs identified in the BMP Plan required by the SPDES Permit.

5.1.4 Environmental Infractions

The PANYNJ Environmental Services Unit issues an Environmental Infraction when a regulatory offense or a violation of the JFK BMPP has occurred during an inspection. Environmental Infractions can be identified in the Inspection Sheets and can range from unacceptable housekeeping to outdated Petroleum Bulk Storage registration. In addition to conducting the inspection and completing the Inspection Sheet the Environmental Services Unit will also interview the tenant supervisor. The Inspection Report documents the results of the inspection and is provided to the tenant supervisor to determine if any environmental infractions were noted. The following corrective action should take place if an environmental infraction is identified during the inspection.

- The Environmental Services Unit will notify the tenant representative that an environmental infraction has occurred and depending on the type of infraction requests corrective action.
- The Environmental Services Unit will requests assessment of the infraction to determine if immediate corrective action can be taken to rectify the issue or if additional measures are required to correct the infraction.

- The tenant will be required to inform the Environmental Services Unit when the corrective action will be accomplished.
- The Environmental Services Unit informs the tenant representative that a follow up inspection will be conducted within a set period.
- The Environmental Services Unit documents the infraction on the individual Inspection Report.
- The Environmental Services Unit reports all infractions requiring immediate attention (e.g. spills).
- The Environmental Services Unit will issue an Environmental Infraction Notice to the tenant informing them that an infraction has occurred and that corrective action is required.
- The Environmental Services Unit will review the results of the previously conducted inspection to confirm whether additional action is required prior to conducting the next inspection.

Many tenants operating at JFK Airport also perform self inspections, environmental compliance audits, and periodic reports intended to assess and make sure their facilities are in compliance. Tenants are responsible for addressing all non-compliance issues at their respective facilities in accordance with Federal, State, and local environmental regulations as per their lease agreements. Tenants must provide compliance supporting documentation, photographs of compliant corrective measures taken, and current registration certificates if required from previous infractions.

Follow-up inspections are performed to identify if the environmental infraction has been corrected. Follow-up photos are used to document corrective actions. If no corrective action has been taken in response to previous environmental infraction notice and direction, the Environmental Services Unit may take formal steps under the tenant's lease agreement and/or report the infraction to the NYSDEC Police for enforcement.

5.1.5 Annual Facility Review and Site Inspection Reporting

The results of the inspections are presented in an Annual Facility Review and Site Inspection Report for JFK Airport including a detailed description of the inspections performed, frequency, reports generated as a result of the inspection, and target BMP compliance activities. A report documenting the annual facility review and site inspection evaluation shall document the date, time, inspection methodology, inspectors, BMP conformance evaluation results, and the overall effectiveness of the stormwater pollution prevention program. The report consists of a series of inspections, results, and review of all PANYNJ and tenant facility components and systems including; fueling stations, waste storage areas, above ground and underground storage tanks (e.g. petroleum, propylene glycol and chemical storage), spills management and oil/water separators, Port Authority groundwater remediation systems and wastewater treatment plants, loading areas, material handling area, deicing/anti-icing; which have the potential

to discharge to one or more of the 26 JFK Airport outfalls listed in the SPDES Permit, covering 15 drainage areas (A through P). The results of monitoring efforts conducted throughout the year will also be included with this report. A summary of the reporting requirements, frequency, and required forms to facilitate development of the Annual Facility Review and Site Inspection Report are provided in the table below.

Reporting forms have been developed and will be used to properly document all inspections and gather the necessary information for record keeping and annual reporting. The 2009 Facility Review and Site Inspection Report will identify, report, and evaluate the following.

5.1.5.1 Spill Reporting

Tenants and contractors shall report any discharge of petroleum greater than 5 gallons to NYSDEC within 2 hours of discovery, and notify NYSDEC and/or the National Response Center for releases of a reportable quantity of a hazardous substance. Tenants and contractors are required to notify PANYNJ Police of any spill events; spills should be reported to the Manager, Environmental Services and PANYNJ Police.

Tenants and contractors shall complete a PANYNJ Spill Report Form and submit to the PANYNJ within one business day identifying the event date/time, location, type of spill, response, gallons spilled, cause/reason for spill or leak, and recommended remedial action.

5.1.5.2 Deicing/Anti-icing Reporting

Tenants at JFK airport are required to maintain a record of the types (including the MSDS) and monthly quantities of deicing/anti-icing chemical used. Tenants who conduct deicing/anti-icing operations shall provide the above information to the JFK facility for inclusion in the JFK BMPP for the entire facility. MSDSs for deicing/anti-icing chemicals used at JFK airport and the monthly usage of these chemicals are currently provided to the PANYNJ by tenants.

5.1.5.3 BMP Implementation

The following procedures shall be conducted to evaluate and ensure successful implementation of the BMPP for JFK Airport:

- Effective training for tenant and PANYNJ employees working in all facilities.
- Regular inspections facilities, tenant and PANYNJ operations, and management controls.
- Periodic monitoring of BMP performance consistent with SPDES Permit requirements semi-annually and at least once during deicing season.

- Follow-up action to correct environmental infractions in BMP implementation noted during inspections.
- Accurate record keeping, tracking, training, inspections, monitoring, and BMP maintenance.

Tenants and contractors shall complete a PANYNJ BMP Implementation Form and submit to the PANYNJ semi-annually and at least once during deicing season. The BMP Inspection Form including procedures and protocols for inspection to be performed to adhere to specific BMPs identified in the BMPP required by the SPDES Permit. The BMP Inspection Form will be used to assess BMPP implementation effectiveness and the results of the BMP inspections will be presented in the Annual Facility Review and Site Inspection Report for JFK Airport.

Any necessary revisions to the BMPP, based on the facility inspections, will be documented and incorporated into a revised BMPP. The BMPP will also be amended if there are changes in construction, operation, or maintenance that may affect the discharge of pollutants to surface water, groundwater, or the storm water drainage system. The BMPP will also be modified if certain BMPs are shown to be ineffective in achieving the general objective of controlling pollutants in storm water.

| BMPP Reporting Requirements | | |
|--|--------------------------------|---|
| Reporting Requirement | PANYNJ Forms | Frequency |
| Spill Report | Spill Reporting Form | Within one day of incident |
| Deicing/Anti-icing Reporting | Deicing/Anti-icing Report Form | Monthly |
| BMP Implementation | BMP Performance Form | Semi-annually and at least once during deicing season |
| Environmental Infraction Corrective Action | Inspection Report | Upon occurrence |

5.1.5.4 Monthly and Quarterly Monitoring

The SPDES Permit requires monthly and quarterly monitoring for the following parameters at outfall numbers 004, 005C, 007A, 010, 016, and 022 as shown on Table 5. Monitoring must be conducted in accordance with test procedures approved under 40 CFR Part 136 and monitoring documentation must contain the following information:

- The date, exact place, and time of sampling and measurements;

- The initials or name(s) of the individuals who performed the sampling or measurements;
- The date(s) on which analyses were performed;
- The time(s) analyses were initiated;
- The initials or name(s) of the individual(s) who performed the analyses;
- References and written procedures, when available, for the analytical techniques or methods used; and
- The results of such analyses, including bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

The PANYNJ is required to submit the monitoring results in a Discharge Monitoring Report (DMR) to the NYSDEC on a monthly basis. All monitoring reports, sample data, applications, and other records pertaining to monitoring efforts should be retained for at least 5 years from the date of the record. A Notice of Non Compliance Report is completed by the PANYNJ when an exceedance is presented in the DMR. The PANYNJ then proceeds to conduct an inspection of the facility in an attempt to determine the source which resulted in the exceedance by checking equipment, conducting inspections at tenant areas, as well as check and monitor facility locations. In addition a re-sampling of the outfall may also be warranted to determine the source of the pollutant that caused the exceedance.

5.1.6 BMPP Content Review

BMPP elements will be reviewed annually. Any necessary revisions to the BMPP, based on the facility inspections, will be documented and incorporated. The BMPP will also be amended if there are changes in construction, operation, or maintenance that may affect the discharge of pollutants to surface water, groundwater, or the stormwater drainage system. Individual tenants are required to notify the Environmental Services Unit as early as feasible when contemplating any such changes. The BMPP will also be modified if certain BMPs are shown to be ineffective in achieving the general objective of controlling pollutants in stormwater.

5.1.7 Comprehensive Site Compliance Evaluation

Annual inspections by JFK personnel (accompanied by the designated tenant representative) will be conducted to verify that all BMPP elements are properly implemented at the facility. During the year, the PANYNJ will continue to implement the activities listed above as part of its implementation of the draft JFK Airport BMPP and undertake other activities, as necessary.

The site evaluation will include visual inspections of activities potentially impacting stormwater, the need for additional BMPs, and evidence of pollutants entering

the drainage system. Tenants shall conduct semi-annual inspections of their own facilities with at least one inspection during deicing season and maintain records of these inspections to ensure that BMPs have been and continue to be properly implemented.

The tenant personnel designated and trained to implement the BMPP will perform the joint annual inspection and provide the JFK BMPP coordinator or their representative with complete and accurate information. All inspections will be carefully documented, and required changes will be incorporated into the BMPP. These records will be retained until three years after the coverage from the current industrial permit is terminated.

Any necessary revisions to the BMPP, based on the facility inspections, will be documented and incorporated into a revised BMPP. The BMPP will also be amended if there are changes in construction, operation, or maintenance that may affect the discharge of pollutants to surface water, groundwater, or the storm water drainage system. The BMPP will also be modified if certain BMPs are shown to be ineffective in achieving the general objective of controlling pollutants in storm water.