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## Environmental Protection Agency

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40 CFR Parts 9 and 449

Effluent Limitations Guidelines and New Source Performance Standards for the Airport Deicing Category; Final Rule

**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Parts 9 and 449**

[EPA-HQ-OW-2004-0038. FRL-9667-6]

RIN 2040-AE69

**Effluent Limitations Guidelines and New Source Performance Standards for the Airport Deicing Category**

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Final rule.

**SUMMARY:** EPA is promulgating technology-based effluent limitations guidelines (ELGs) and new source performance standards (NSPS) under the Clean Water Act (CWA) for discharges from airport deicing operations. The requirements generally apply to wastewater associated with the deicing of airfield pavement at primary airports. The rule requires all such airports to comply with requirements based on substitution of less toxic pavement deicers that do not contain

urea. The rule also establishes NSPS for wastewater discharges associated with aircraft deicing for a subset of new airports. These airports must also meet requirements based on collection of deicing fluid and treatment of the collected fluid. The ELGs and NSPS will be incorporated into National Pollutant Discharge Elimination System (NPDES) permits issued by the permitting authority. EPA expects compliance with this regulation to reduce the discharge of deicing-related pollutants by 16 million pounds per year. EPA estimates the annual cost of the rule at \$3.5 million.

**DATES:** This final rule is effective on June 15, 2012.

**ADDRESSES:** EPA has established a docket for this action under Docket ID No. EPA-HQ-OW-2004-0038. All documents in the docket are listed on the Web site at <http://www.regulations.gov>. Although listed in the index, some information is not publicly available, e.g., Confidential Business Information (CBI) or other information whose disclosure is

restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either through the docket Web site or in hard copy at the Office of Water Docket, EPA West Building Room 3334, 1301 Constitution Ave. NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is 202-566-1744, and the telephone number for the Office of Water Docket is 202-566-1752.

**FOR FURTHER INFORMATION CONTACT:** For further information, contact Eric Strassler, Engineering and Analysis Division, telephone: 202-566-1026; email: [strassler.eric@epa.gov](mailto:strassler.eric@epa.gov).

**SUPPLEMENTARY INFORMATION:**

**Regulated Entities**

Entities regulated by this action may include:

Category	Example of regulated entity	North American Industry Classification System code
Industry .....	Primary airports ..... Airlines .....	481, 4881 4811

This section is not intended to be exhaustive, but rather provides a guide for readers regarding entities that are likely to be regulated by this action. Other types of entities that do not meet the above criteria could also be regulated. To determine whether your facility is regulated by this action, you should carefully examine the applicability criteria listed in § 449.1 and the definitions in § 449.2 of the rule and detailed further in Section V of this preamble. If you still have questions regarding the applicability of this action to a particular entity, consult one of the persons listed for technical information in the preceding **FOR FURTHER INFORMATION CONTACT** section.

**Supporting Documentation**

Today's final rule is supported by a number of documents, including:

- Technical Development Document for Final Effluent Limitation Guidelines and Standards for the Airport Deicing Category (TDD), Document No. EPA-821-R-12-005.
- Economic Analysis for Final Effluent Limitation Guidelines and Standards for the Airport Deicing Category (EA), Document No. EPA-821-R-12-004.

- Environmental Impact and Benefit Assessment for Final Effluent Limitation Guidelines and Standards for the Airport Deicing Category (EIB), Document No. EPA-821-R-12-003.

These documents are available in the public record for this rule and on EPA's Web site at <http://epa.gov/guide/airport>.

**Overview**

The preamble describes the terms, acronyms, and abbreviations used in this notice; the background documents that support the regulations; the legal authority of these rules; a summary of the final rule; background information; and the technical and economic methodologies used by the Agency to develop these regulations.

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### I. Legal Authority

EPA is promulgating this regulation under the authorities of sections 101, 301, 304, 306, 308, 402, and 501 of the CWA, 33 United States Code (U.S.C.) 1251, 1311, 1314, 1316, 1318, 1342, and 1361 and pursuant to the Pollution Prevention Act of 1990, 42 U.S.C. 13101 et seq.

### II. Purpose and Summary of the Final Rule

Commercial airports and air carriers conduct deicing operations as required by the Federal Aviation Administration (FAA). Airport discharges from deicing operations may affect water quality in surrounding communities, including reductions in dissolved oxygen, fish kills, reduced organism abundance and species diversity, contamination of drinking water sources (both surface and groundwater), creation of noxious odors and discolored water in residential areas and parkland, and other effects.

Today, EPA is promulgating effluent limitations guidelines (ELGs) and new source performance standards (NSPS) for the Airport Deicing Point Source Category. The regulations address

control of the wastewater discharges from deicing operations based on product substitution, wastewater collection practices used by airports, and treatment practices for the collected wastewater. New source airports within the scope of this rule are required to collect spent aircraft deicing fluid (ADF) and meet numerical discharge limits. Those airports and certain existing airports performing airfield pavement deicing are to use non-urea-containing deicers, or alternatively, meet a numeric effluent limitation for ammonia. The requirements are implemented in CWA discharge permits.

The rule requirements and the technologies that serve as the basis for the ELGs and standards are explained in Sections IV, V, and VI of this preamble.

### III. Background

#### A. Clean Water Act

Congress passed the Federal Water Pollution Control Act Amendments of 1972, also known as the CWA, to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.” (33 U.S.C. 1251(a)). The CWA establishes a comprehensive program for protecting our nation’s waters. Among its core provisions, the CWA prohibits the discharge of pollutants from a point source to waters of the United States, except as authorized under the CWA. Under section 402 of the CWA, EPA and delegated state permitting authorities authorize discharges by a NPDES permit. The CWA also authorizes EPA to establish national technology-based effluent limitation guidelines and standards (effluent guidelines or ELGs) for discharges from different categories of point sources, such as industrial, commercial, and public sources.

In addition, the CWA authorizes EPA to promulgate nationally applicable pretreatment standards that restrict pollutant discharges from facilities that discharge wastewater indirectly through sewers flowing to publicly owned treatment works (POTWs), as outlined in section 307(b) and (c), 33 U.S.C. 1317(b) and (c). EPA establishes national pretreatment standards for those pollutants in wastewater from indirect dischargers that may pass through, interfere with, or are otherwise incompatible with POTW operations. Generally, pretreatment standards are designed to ensure that wastewaters from direct and indirect industrial dischargers are subject to similar levels of treatment. In addition, POTWs are required to implement local treatment limits applicable to their industrial

indirect dischargers to satisfy any local requirements. See 40 CFR 403.5.

Direct dischargers must comply with effluent limitations in NPDES permits. Indirect dischargers, who discharge through POTWs, must comply with pretreatment standards. Technology-based effluent limitations in NPDES permits are derived from effluent limitations guidelines (CWA sections 301 and 304, 33 U.S.C. 1311 and 1314) and new source performance standards (section 306) promulgated by EPA, or based on best professional judgment where EPA has not promulgated an applicable effluent guideline or new source performance standard (CWA section 402(a)(1)(B), 33 U.S.C. 1342(a)(1)(B)). Additional limitations based on water quality standards (CWA section 301(b)(1)(C), 33 U.S.C. 1311(b)(1)(C)) are also required to be included in the permit in certain circumstances. The ELGs are established by regulation for categories of industrial dischargers and are based on the degree of control that can be achieved using various levels of pollution control technology.

EPA promulgates national ELGs and standards of performance for major industrial categories for three classes of pollutants: (1) Conventional pollutants (*i.e.*, total suspended solids, oil and grease, BOD<sub>5</sub>, fecal coliform, and pH), as outlined in section 304(a)(4) and 40 CFR 401.16; (2) toxic pollutants (*e.g.*, toxic metals such as chromium, lead, nickel, and zinc; toxic organic pollutants such as benzene, benzo-a-pyrene, phenol, and naphthalene), as outlined in section 307(a) of the Act, 40 CFR 401.15 and 40 CFR part 423 appendix A; and (3) non-conventional pollutants, and (3) non-conventional pollutants, pollutants that are neither conventional nor toxic (*e.g.*, ammonia-N, formaldehyde, and phosphorus).

#### B. NPDES Permits

Section 402 of the CWA requires permits for point source discharges of pollutants to waters of the United States. In most states, the permits are issued by a state agency that has been authorized by EPA. Currently, 46 states and one U.S. territory are authorized to issue NPDES permits. In the other states and territories, EPA issues the permits.

Section 402(p) of the Act, added by the Water Quality Act of 1987 (Pub. L. 100-4, February 4, 1987), requires stormwater dischargers "associated with industrial activity" to be covered under an NPDES permit. In its initial stormwater permit regulations, called the "Phase I" stormwater regulations (55 FR 47990, November 16, 1990), EPA designated air transportation facilities, including both airlines and airports, that

have vehicle maintenance shops (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, or airport deicing operations as subject to NPDES stormwater permitting requirements. See 40 CFR 122.26(b)(14)(viii).

Airport stormwater discharges may be controlled under a general NPDES permit, which covers multiple facilities with similar types of operations and/or wastestreams, or by an individual permit. An airport may have additional NPDES permits for non-stormwater discharges, such as from equipment repair and maintenance facilities. The following discussion pertains only to airport stormwater permits.

#### 1. General Permits

Currently, most airport deicing discharges are covered by a general permit issued by either EPA or an NPDES-authorized state agency. In most areas where EPA is the permit authority, the Multi-Sector General Permit (MSGP) covers airport deicing discharges (73 FR 56572, September 29, 2008). Many NPDES-authorized state agencies have issued general permits in their respective jurisdictions with requirements similar to the MSGP. An airport seeking coverage under a general permit submits a Notice of Intent (NOI) to the permit authority rather than a detailed permit application. By submitting an NOI, the permittee is agreeing to comply with the conditions in the final general permit.

For airports, the major requirements of the current MSGP, include the following:

- Develop a stormwater pollution prevention plan, including a drainage area site map, documentation of measures used for management of deicing contaminated stormwater, an evaluation of runway and aircraft deicing operations, and implementation of a program to control or manage deicing contaminated stormwater, including consideration of various listed control practices.
- Implement deicing source reduction measures, including minimizing or eliminating the use of urea and glycol-containing deicing chemicals; minimizing contamination of deicing contaminated stormwater from runway and aircraft deicing operations; evaluating whether over-application of deicing chemicals occurs; and consider use of various listed source control measures.
- For airports using more than 100,000 gallons of glycol-based deicing chemicals and/or 100 tons or more of urea containing deicers annually,

monitor discharges quarterly for the first four quarters of the permit cycle, for the following pollutants: biochemical oxygen demand (BOD<sub>5</sub>), chemical oxygen demand (COD), ammonia, and pH.

- If the average of the four monitoring values for any parameter exceeds its benchmark, implement additional control measures where feasible, and continue monitoring.

- Conduct an annual site inspection during the deicing season, and during periods of actual deicing operations if possible, as well as routine facility inspections at least monthly during the deicing season.

EPA expects to modify the MSGP when the next permit is issued, to conform it to today's final Airport Deicing rule.

#### 2. Individual Permits

Some EPA and state NPDES-permitting authorities have required certain airports to obtain individual permits. In these situations, an airport must submit a detailed application and the permit authority develops specific requirements for the facility.

Some individual permits contain specialized requirements for monitoring and/or best management practices (BMPs). Some of these permits also contain numeric water quality-based effluent limitations. Information on water quality-based permitting is available on EPA's Web site at <http://cfpub.epa.gov/npdes/generalissues/watertechnology.cfm>.

#### C. Effluent Guidelines and Standards Program

Effluent guidelines and NSPS are technology-based regulations that are developed by EPA for a category of dischargers. These regulations are based on the performance of control and treatment technologies. The legislative history of CWA section 304(b), which is the heart of the effluent guidelines program, describes the need to press toward higher levels of control through research and development of new processes, modifications, replacement of obsolete plans and processes, and other improvements in technology, taking into account the cost of controls. Congress has also stated that EPA need not consider water quality impacts on individual water bodies as the guidelines are developed; see Statement of Senator Muskie (October 4, 1972), reprinted in Legislative History of the Water Pollution Control Act Amendments of 1972, at 170. (U.S. Senate, Committee on Public Works, Serial No. 93-1, January 1973.)

There are four types of standards applicable to direct dischargers (dischargers to surface waters), and two standards applicable to indirect dischargers (discharges to POTWs).

#### 1. Best Practicable Control Technology Currently Available (BPT)

Traditionally, EPA establishes BPT effluent limitations based on the average of the best performances of facilities within the industry, grouped to reflect various ages, sizes, processes, or other common characteristics. EPA may promulgate BPT effluent limits for conventional, toxic, and non-conventional pollutants. In specifying BPT, EPA looks at a number of factors. EPA first considers the cost of achieving effluent reductions in relation to the effluent reduction benefits. The Agency also considers the age of the equipment and facilities, the processes employed, engineering aspects of the control technologies, any required process changes, non-water quality environmental impacts (including energy requirements), and such other factors as the Administrator deems appropriate. See CWA section 304(b)(1)(B). If, however, existing performance is uniformly inadequate, EPA may establish limitations based on higher levels of control than what is currently in place in an industrial category, when based on an Agency determination that the technology is available in another category or subcategory, and can be practically applied.

#### 2. Best Conventional Pollutant Control Technology (BCT)

The 1977 amendments to the CWA required EPA to identify additional levels of effluent reduction for conventional pollutants associated with BCT technology for discharges from existing industrial point sources. In addition to other factors specified in section 304(b)(4)(B), the CWA requires that EPA establish BCT limitations after consideration of a two part "cost-reasonableness" test. EPA explained its methodology for the development of BCT limitations in July 1986 (51 FR 24974). Section 304(a)(4) designates the following as conventional pollutants: BOD<sub>5</sub> measured over five days, total suspended solids, fecal coliform, pH, and any additional pollutants defined by the Administrator as conventional. The Administrator designated oil and grease as an additional conventional pollutant on July 30, 1979 (44 FR 44501; 40 CFR 401.16).

#### 3. Best Available Technology Economically Achievable (BAT)

BAT represents the second level of stringency for controlling direct discharge of toxic and nonconventional pollutants. In general, BAT ELGs represent the best economically achievable performance of facilities in the industrial subcategory or category. The factors considered in assessing BAT include the cost of achieving BAT effluent reductions, the age of equipment and facilities involved, the process employed, potential process changes, and non-water quality environmental impacts, including energy requirements and such other factors as the Administrator deems appropriate. The Agency retains considerable discretion in assigning the weight to be accorded these factors. Economic achievability is an additional statutory factor considered in setting BAT. Generally, EPA determines economic achievability on the basis of total costs to the industry and the effect of compliance with BAT limitations on overall industry and subcategory financial conditions. As with BPT, where existing performance is uniformly inadequate, BAT may reflect a higher level of performance than is currently being achieved based on technology transferred from a different subcategory or category. BAT may be based upon process changes or internal controls, even when these technologies are not common industry practice.

#### 4. New Source Performance Standards (NSPS)

NSPS reflect effluent reductions that are achievable based on the best available demonstrated control technology (BADCT). Owners of new facilities have the opportunity to install the best and most efficient production processes and wastewater treatment technologies. As a result, NSPS should represent the most stringent controls attainable through the application of the BADCT for all pollutants (that is, conventional, nonconventional, and priority pollutants). In establishing NSPS, EPA is directed to take into consideration the cost of achieving the effluent reduction and any non-water quality environmental impacts and energy requirements.

#### 5. Pretreatment Standards for Existing Sources (PSES)

Section 307(b) calls for EPA to issue pretreatment standards for discharges of pollutants to POTWs. PSES are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the

operation of POTWs. Categorical pretreatment standards are technology-based and are analogous to BPT and BAT effluent limitation guidelines. See CWA sections 301(b)(1)(B) and 301(b)(2)(A), 33 U.S.C. 1311(b)(1)(B) and 1311(b)(2)(A). The General Pretreatment Regulations, which set forth the framework for the implementation of categorical pretreatment standards, are found at 40 CFR part 403. These regulations establish pretreatment standards that apply to all non-domestic dischargers. See 52 FR 1586 (January 14, 1987).

#### 6. Pretreatment Standards for New Sources (PSNS)

Section 307(c) of the Act calls for EPA to promulgate PSNS. Such pretreatment standards must prevent the discharge of any pollutant into a POTW that may interfere with, pass through, or may otherwise be incompatible with the POTW. EPA promulgates PSNS based on best available demonstrated technology for new sources. New indirect dischargers have the opportunity to incorporate into their facilities the best available demonstrated technologies. The Agency typically considers the same factors in promulgating PSNS as it considers in promulgating NSPS.

#### D. Proposed Rule

EPA published a proposed rule for the Airport Deicing Category on August 28, 2009 (74 FR 44676). The proposed rule covered primary commercial airports that conduct deicing operations and have 1,000 or more annual jet departures. An existing airport in the scope of the proposal would have been required to certify that it uses airfield pavement deicers that do not contain urea, or alternatively, meet an effluent limitation for ammonia. Additionally, in-scope airports with 10,000 or more annual departures would have been required to:

- Collect at least a specified proportion (either 20 or 60 percent, based on size) of available ADF after it is sprayed on aircraft; and
- Meet a specified numeric effluent limit for ADF wastewater collected and discharged directly.

As proposed, all in-scope new source dischargers had the same airfield pavement deicing requirements as existing sources and were required to collect 60 percent of available ADF and meet the specified numeric limit for direct discharges of the collected fluid. EPA estimated that the proposed rule would apply to 218 existing airports; 110 airports for both the pavement deicer and ADF collection and

discharge requirements, and another 108 airports for the pavement deicer requirement only. Of those 218 airports, the Agency estimated that 148 airports were already in compliance with the proposed requirements.

#### 1. ADF Collection

The proposed rule would have required all existing primary airports that have 10,000 or more annual departures to collect at least 20 percent of available ADF. The 20 percent collection requirement was based on the estimated performance of glycol collection vehicles (GCVs). Those primary airports that use 460,000 or more gallons of normalized ADF annually, which make up a small subset of this group, would have been required to collect at least 60 percent of all available ADF. (As defined in proposed § 449.2, normalized ADF is ADF less any water added by the manufacturer or customer before ADF application.) This collection requirement was based on the estimated performance of centralized deicing pads (CDPs). In-scope primary airports with less than 10,000 annual departures would not have been required to meet the national ELG requirements to collect their available deicing fluid or meet associated discharge limitations and would have continued to be subject to case-by-case Best Professional Judgment (BPJ) permitting requirements for ADF collection and treatment.

#### 2. Numeric Limit for Collected ADF

For airports discharging collected ADF directly to surface waters, the proposal would have required these airports to meet numeric effluent limitations for COD. The limits were based on an anaerobic fluidized bed (AFB) treatment technology.

#### 3. Airfield Pavement Deicers

EPA proposed BAT for direct dischargers associated with airfield pavement deicing based on product substitution. Specifically, EPA based BAT on the substitution of pavement deicers containing urea with alternative, less toxic products that are also effective and not harmful to aircraft.

#### 4. Other Technology Basis Considered

In the proposed rule, in addition to CDPs and GCVs, EPA described plug-and-pump technology with GCVs as a possible BAT basis for an ADF collection requirement, and calculated the cost of this technology. This technology, when used in combination with GCVs, is estimated to collect at least 40 percent of available ADF.

### IV. Scope and Applicability of Final Rule

This final rule applies to primary airports. Existing airports with greater than or equal to 1,000 annual departures by non propeller driven aircraft must meet BAT requirements at § 449.10, as applicable.

A new airport with deicing discharges and located in specified geographic locations (see section V.C.2), that is operating less than 1,000 non-propeller aircraft departures annually is not required to meet the NSPS provisions in § 449.11. However, if the number of departures later increases above that threshold, then the substantive requirements in § 449.11 apply. This means that a new airport that expects to eventually exceed the 1,000 departure threshold must plan to install and operate facilities that will comply with the requirements of that section once it reaches the threshold of 1,000 non-propeller departures annually.

#### A. Subcategorization

EPA may divide a point source category into groupings called “subcategories” to provide a method for addressing variations among products, processes, and other factors, which result in distinctly different effluent characteristics. See *Texas Oil & Gas Ass'n. v. US EPA*, 161 F.3d 923, 939–40 (5th Cir. 1998). Regulation of a category by subcategories provides that each subcategory has a uniform set of effluent limitations that takes into account technological achievability and economic impacts unique to that subcategory. In some cases, effluent limitations within a subcategory may be different based on consideration of these same factors, which are identified in CWA section 304(b)(2)(B). The CWA requires that EPA, in developing effluent guidelines, consider a number of different factors, which are also relevant for subcategorization. The CWA also authorizes EPA to take into account other factors that the Agency deems appropriate.

In developing today's rule, EPA considered whether subcategorizing the aviation industry was warranted. In addition to those factors specified in the CWA, EPA evaluated a number of factors and potential subcategorization approaches, including the presence of an onsite glycol reclamation facility, amount of ADF applied, number of departures, availability of land to install collection systems, and FAA airport classifications. EPA concluded that establishing formal subcategories is not necessary for the Airport Deicing category. EPA structured the

applicability and requirements of the final rule to account for the relevant factors (e.g., amount of ADF applied) and has established a set of requirements appropriate for the range of situations that an airport may encounter during deicing operations.

#### B. Industry Description

The Airport and Airway Improvement Act (AAIA), 49 U.S.C. Chapter 471, defines airports by categories of airport activities, including Commercial Service (Primary and Non-Primary), Cargo Service, and Reliever. These categories are not mutually exclusive; an airport may be classified in more than one of these categories. Another group of generally smaller airports, not specifically defined by AAIA, is commonly known as “general aviation” airports. EPA estimates that there are approximately 500 commercial service airports.

Commercial service airports are publicly owned airports that have at least 2,500 passenger boardings each calendar year and receive scheduled passenger service. Passenger boardings refer to revenue passenger boardings on an aircraft in service in air commerce, whether or not in scheduled service. The definition also includes passengers who continue on an aircraft in international flight that stops at an airport in any of the 50 states for a non-traffic purpose, such as refueling or aircraft maintenance rather than passenger activity. Passenger boardings at airports that receive scheduled passenger service are also referred to as “enplanements.”

Primary commercial service airports (primary airports) have more than 10,000 passenger boardings each year. Primary airports are further subdivided into Large Hub, Medium Hub, Small Hub and Non-Hub classifications, based on the percentage of total passenger boardings within the United States in the most recent calendar year ending before the start of the current fiscal year.

Early in the regulatory development process, EPA focused on deicing activities at primary airports, particularly those with extensive non-propeller traffic. Operators of general aviation aircraft, as well as smaller commercial non-jet aircraft, typically suspend flights during icing conditions, whereas commercial airlines operating at primary airports are much more likely to deice their jets in order to meet customer demands.

Based on the results of industry surveys that EPA conducted prior to the proposed rule, the Agency estimated that 320 primary airports conduct deicing operations. EPA reviewed the

relative sizes of various airports (based on annual departures), the levels of deicing activity, traffic characteristics (*i.e.*, passenger versus cargo operations), the extent of pollution controls and treatment in place, and the costs of various technologies for these airports. EPA further classified airports based on the number of annual non-propeller departures. EPA found that there were some primary airports, typically smaller airports, with high percentages of propeller aircraft, and therefore excluded airports with fewer than 1,000 annual non-propeller departures from the scope of the proposed rule. These airports have a higher proportion of propeller-aircraft flights, which are typically delayed or cancelled during icing conditions (*i.e.*, far less deicing takes place at these airports and far less deicing fluid is used, than at airports serving more jets).

### C. Wastewater Sources and Wastewater Characteristics

#### 1. Aircraft Deicing

Airlines apply most ADF to aircraft through pressurized spraying systems, mounted either on trucks that move around an aircraft, or on large fixed boom devices located at a pad dedicated to deicing.

Most of the ADF sprayed is Type I fluid, which is designed for minimal adhesion to aircraft surfaces. Consequently, the majority of Type I ADF is available for discharge due to dripping, over-spraying, tires rolling through or sprayed with fluid, and shearing during takeoff. Once the ADF has reached the ground, it will then mix with precipitation, as well as other chemicals found on airport surfaces; these chemicals typically include aircraft fuel, lubricants and solvents, and metals from aircraft, ground support and utility vehicles. Water containing these substances enters an airport's storm drain system. At many airports, the storm drains discharge directly to U.S. waters with no treatment.

Type IV fluid, an anti-icing chemical, is designed to adhere to the aircraft. Because of this adherence characteristic, EPA estimated that the majority of Type IV fluid is not available for collection.

For the purposes of this rule, the pollutant loadings are discussed in terms of applied ADF and how much of that ADF is expected to be discharged. A more detailed discussion of loadings estimates is presented in Section VI.B. Given the highly variable nature of storm events, it is difficult to estimate flows or concentrations of ADF-contaminated stormwater generated at an airport. Those factors are greatly

dependent on site-specific factors, such as the size of the storm event associated with the discharge, drainage characteristics, ADF collection systems (if present), and airport operations. Additionally, due to the design of drainage systems at some airports, discharges may occur well after a storm event has completed.

#### 2. Airfield Pavement Deicing

Most solid airfield deicing chemical products are composed of an active deicing ingredient (*e.g.*, potassium acetate, sodium acetate) and a small amount of additives (*e.g.*, corrosion inhibitors). Liquid airfield deicing chemical products are composed of an active ingredient (*e.g.*, potassium acetate, propylene glycol), water, and minimal additives. The airfield deicing products that include salts (*i.e.*, potassium acetate, sodium acetate, and sodium formate) will all ionize in water, creating positive salt ions ( $K^+$ ,  $Na^+$ ), BOD<sub>5</sub>, and COD load as the acetate or formate ion degrades into carbon dioxide (CO<sub>2</sub>) and water. Pavement deicers containing urea will degrade to ammonia, as well as generate BOD<sub>5</sub> and COD load.

Most of EPA's deicing characterization data does not reflect airfield pavement deicers. However, EPA collected samples from a few locations at Detroit Metro Airport that contain airfield deicing stormwater. Detroit Metro and Pittsburgh, both large hub airports, provided sampling data associated with stormwater contaminated by airfield pavement deicers. More information on these sampling activities is provided in the TDD. As with the aircraft deicers, the variability of storm events and drainage systems makes it difficult to estimate flows or concentrations of pavement deicing waste streams generated at an airport.

### D. Control and Treatment Technologies for the Aviation Industry

The ADF application process has presented a challenge for those airports attempting to manage their contaminated stormwater streams. The process of applying ADF to aircraft through high pressure spraying, combined with the typical practices of spraying the aircraft outdoors in multiple, large unconfined (but usually designated) spaces, results in pollutants being dispersed over a wide area and entering storm drains at multiple locations. This process contrasts sharply with many other industries where pollutants are generated in confined areas, managed through a piping system, and not commingled with precipitation.

EPA has identified several technologies that are available to collect and manage portions of the ADF wastestream. Some of these collection technologies are more effective than others. EPA has also identified several pollution prevention (P2) approaches that may be used to minimize the amount of ADF applied. However, no single technology or P2 approach is capable of collecting or eliminating all applied ADF, as a portion of the fluid is designed to adhere to the aircraft until after takeoff, in order to ensure safe operations. Furthermore, with few exceptions, tracking by aircraft tires, wind dispersion, and dripping during taxiing and takeoff ensures that some amount of sprayed ADF, even if performed in a contained area, will end up in the drainage system of the airport. For these reasons, EPA concludes that all airports that perform aircraft deicing operations are direct dischargers. There are limited instances where an airport in a warm climate that performs only defrosting and gets little to no precipitation may, in fact, not discharge any deicing materials.

Once the available ADF wastestream is collected, it can be treated, and this process is similar to many other industries that generate wastewater. In a similar manner, airfield deicing has presented a challenge for airports attempting to manage their contaminated stormwater streams. Airfield deicing is typically conducted over a large area, including areas with frequent aircraft traffic, such as runways, where active collection technologies (*i.e.*, GCVs) are impractical to implement. At this time, EPA has not identified any available economically achievable technologies for the collection of pavement deicing stormwater. As a result, EPA also examined P2 technologies, which can reduce or eliminate the use of ADF chemicals and urea containing deicers for pavement deicing in today's final rule.

The following section discusses the technologies EPA considered for ADF collection and treatment and for addressing airfield deicing.

#### 1. ADF Collection Technologies

##### a. GCV

A GCV is a truck that utilizes a vacuum mechanism to gather stormwater contaminated with ADF, resulting from deicing operations. GCVs are typically stationed near the ADF spraying trucks and are deployed either during aircraft deicing activities or after the aircraft deicing activity has been completed. The GCV then transports the

ADF-contaminated stormwater to an onsite storage and/or equalization facility, after which the material is either treated at the airport or sent offsite for treatment. EPA estimates that GCVs typically collect at least 20 percent of the available ADF when properly operated and maintained.

b. Plug and Pump

The plug and pump collection system utilizes an airport's existing stormwater collection system infrastructure to contain and collect ADF contaminated stormwater. Plug and pump systems also commonly utilize GCVs for ancillary ADF collection. Typical GCV deployment may include collecting ADF that has been sprayed beyond the plug and pump containment area or as an additional collection measure at the gate, ramp, and/or apron area after deicing operations and active plug and pump collection have ceased. The plug and pump system operates by placing either temporary inflatable balloons or storm sewer shutoff valves in the existing storm sewer system. During deicing events, the balloons are inflated and storm sewer shutoff valves are closed, trapping the ADF-contaminated stormwater in the collection system. Vacuum trucks pump the trapped contaminated stormwater from the storm sewer system and transport the liquid to onsite storage and/or equalization. In addition, catch basin inserts can be placed into manholes to collect ADF-contaminated stormwater.

c. CDPs

A CDP is a paved area on an airfield built specifically for aircraft deicing operations. It is typically located adjacent to a gate area, taxiway, or runway, and constructed with a drainage system separate from the airport's main storm drain system. A CDP is usually constructed of concrete with sealed joints to prevent the loss of sprayed ADF through the joints. The pad's collection system is typically connected to a wastewater storage facility, which then may send the wastewater to an onsite or offsite treatment facility.

Some airports use GCVs in combination with CDPs to collect ADF that lands outside the pad collection area in order to maximize collection and containment of ADF-contaminated stormwater. Airports typically locate the pads near the gate areas or at the threshold of a runway to minimize delays in aircraft takeoff and to enhance the effectiveness of the ADF applied by limiting time between application and takeoff.

CDPs reduce the volume of deicing wastewater by restricting deicing to small areas, and managing the collected wastewater through a dedicated drain system. EPA estimates that CDPs allow airports to collect at least 60 percent of the available ADF.

d. Summary of ADF Collection Technology Usage

EPA estimates the number of airports that use each of the above collection technologies in Table IV-1. Some airports use more than one technology, and some of the airports in the estimate use the technology for only a portion of their ADF-contaminated stormwater.

TABLE IV-1—ESTIMATED TOTALS OF ADF COLLECTION TECHNOLOGIES USED BY AIRPORTS

Collection technology	Number of airports
Glycol Collection Vehicle .....	53
Plug and Pump .....	29
Centralized Deicing Pad .....	66

See Section 8.2 of the TDD for further explanation of EPA's estimates of the ADF collection rates for the fluid collection technologies.

2. ADF-Contaminated Wastewater Treatment Technologies

In the proposed rule, EPA identified four technologies for treating ADF-contaminated wastewater: AFB, Ultrafiltration/Reverse Osmosis, Mechanical Vapor Recompression and Distillation, and Aerated Pond. The Agency selected AFB for further consideration and rejected the other technologies. See 74 FR 44687 and the TDD.

An AFB treatment system uses a vertical, cylindrical tank in which the ADF-contaminated stormwater is pumped upwards through a bed of granular activated carbon at a velocity sufficient to fluidize, or suspend, the media. A thin film of microorganisms grows on and coats each granular activated carbon particle, providing a vast surface area for biological growth. These microorganisms provide treatment of the ADF-contaminated stormwater. Byproducts from the AFB treatment system include methane, CO<sub>2</sub>, and new biomass (animal material, bacteria). The AFB treatment system includes storage as an initial step to equalize flows and pollutant concentrations that feed into the biological treatment unit.

Treating wastes using an anaerobic biological system as compared to an aerobic system offers several

advantages. The anaerobic system requires much less energy since aeration is not required and the anaerobic system produces less than 10 percent of the sludge of an aerobic process. In addition, because the biological process is contained in a sealed reactor, odors are eliminated. Based on EPA sampling results, the AFB treatment system successfully removes over 98 percent of BOD<sub>5</sub>, over 97 percent of COD, and over 99 percent of propylene glycol from deicing wastestreams. This treatment reduces the BOD<sub>5</sub> and COD loads discharged to receiving waters by over 98 and 97 percent, respectively. Two airports in the United States use the AFB technology: Albany International Airport in Albany, New York, and Akron-Canton Regional Airport, in Akron, Ohio. Additionally, Portland International Airport in Oregon recently installed an AFB system and T.F. Green Airport in Providence, Rhode Island is planning the installation of this technology.

3. Pollution Prevention Technologies

EPA has identified several technologies currently in use at airports across the United States that may reduce ADF usage. The following section describes the major P2 approaches EPA identified during this rulemaking. EPA notes that it did not identify these ADF P2 approaches as a technology basis for BAT or NSPS in today's final rule due to a lack of available quantitative data on the actual pollutant reductions that these technologies may achieve and, moreover, because of a lack of data correlating minimized ADF application with safe deicing practices. However, EPA is aware that many airports use these technologies successfully and EPA encourages additional use. Furthermore, EPA notes that the collection technologies evaluated for today's rule are only capable of collecting a portion of the applied ADF. Therefore, to the extent that P2 technologies are proven to be effective, they have the ability to considerably reduce or eliminate ADF discharges. The ability to reduce the amount of applied deicing chemicals will not only have a positive environmental effect, but may also be cost-effective, as the decreases in costs of purchased deicing chemicals may offset the cost of the technology itself.

EPA applauds all efforts to develop deicing chemicals and approaches that reduce or eliminate pollutant discharges. In order to ensure that this rule doesn't prevent such approaches as they become proven, feasible, and available, today's final rule includes a provision to apply a P2 credit against the standard ADF collection



requirement. See Section X.C., "Compliance with the NSPS Requirement," in this preamble.

In addition EPA notes that in discussions with the major airline and airport industry associations, ATA and ACI-NA, they stressed their commitment to pollution prevention approaches to reduce aircraft deicing discharges, while ensuring safety at all times, and the great strides they had made on pollution prevention approaches in addition to employing ADF collection technologies (see DCN AD01333). As a follow-up to these conversations, industry associations submitted a description of a voluntary pollution reduction program designed to further spur the industry towards safely reducing ADF discharges to the environment. Under the program, these associations intend to work together to:

- Conduct outreach and facilitate information exchange on the program and available pollution reduction technologies;
- Encourage the development, testing, and commercially appropriate deployment of pollution reduction technologies;
- Provide information characterizing the qualitative and quantitative performance and environmental benefits of appropriate pollution reduction technologies;
- Develop a quantitative goal for environmental benefits to be achieved through this program;
- Inventory pollution reduction technologies adopted during this program;
- Develop a comparison of the environmental benefits of pollution reduction technologies adopted during the program with the quantitative goal; and
- Report the results of the above components to EPA.

EPA supports this pollution prevention program and believes it has the potential to significantly reduce aircraft deicing discharges in a safe manner. See DCN AD01334 for more details on industry's pollution prevention program.

#### a. Infrared (IR) Deicing Systems

A few U.S. airports have used IR heating systems for several years and these systems have been demonstrated to deice aircraft effectively. One type of IR system consists of an open-ended hangar-type structure with IR generators mounted inside, suspended from the ceiling. The IR equipment is designed to use specific wavelengths that heat ice and snow, and minimize heating of aircraft components. The IR energy level and wavelength may be adjusted to suit

the type of aircraft. Although the system can deice an aircraft, it cannot provide aircraft with anti-icing protection. Consequently, when the ambient temperature is below freezing, anti-icing fluid is typically applied to the aircraft after it leaves the hangar. In addition, a small amount of deicing fluid may be required for deicing areas of the aircraft not reached by the IR radiation, such as the flap tracks and elevators. The system, therefore, does not completely replace glycol-based fluids, but may greatly reduce the volume required.

Vendors claim use of an IR system reduces the amount of Type I ADF required by up to 90 percent. John F. Kennedy International Airport, in New York, uses an IR system for a small percentage of its flights.

#### b. Forced Air/Hot Air Deicing Systems

Forced air/hot air deicing systems are currently in operation at a few U.S. airports. These systems use forced air to blow snow and ice from aircraft surfaces. Some systems allow deicing fluids to be added to the forced air stream at different flow settings (e.g., 9 and 20 gallons/minute), while other systems require separate application of deicing fluid. Several vendors are currently developing self-contained, truck-mounted versions of these forced-air systems, and most systems can be retrofitted onto existing deicing trucks.

The double gantry forced-air spray system is a similar method to truck-mounted forced-air systems. The gantries support a set of high- and low-pressure nozzles, which blast the aircraft surfaces with heated air at a pressure of 40 to 500 pounds per square inch. When weather conditions are severe, a small volume of water and glycol may be added to the air stream to remove dense coverings of snow and ice. Airfield use of the gantry system has been limited, perhaps because it is a permanently mounted system that has been known to cause delays in aircraft departures.

#### c. Product Substitution

Another solution to environmental problems associated with deicing chemicals is to replace chemical deicers with more environment-friendly products. In the ADF products category, initially the predominant deicers were based on ethylene glycol, whereas in recent years, propylene glycol-based deicers, which are less toxic to mammals, have become more widely used. Chemical manufacturers, the aviation industry, and the U.S. Air Force are continuing to explore development of deicers that could

generate lower levels of pollutants compared to the glycol-based products.

#### 4. Airfield Pavement Deicing Control Technologies

EPA identified product substitution as an available control technology for airfield pavement deicing chemicals. The Agency did not identify an available economically achievable technology to collect and treat wastewater containing pavement deicing pollutants.

Several types of products, such as potassium acetate, sodium formate, and sodium acetate, are available as alternatives to pavement deicers containing urea. The results from EPA's airport questionnaire reported that 83 percent of primary airports use airfield pavement deicers that do not contain urea. The most widely used substitute product, potassium acetate, accounts for 63 percent (by weight) of the annual airfield pavement deicer usage in the United States.

#### E. Regulated Pollutants

EPA identified 31 pollutants of concern that stem directly from airport deicing operations. For today's final rule, EPA identified COD as a pollutant of concern to be controlled for discharges of collected ADF contaminated stormwater and urea and ammonia as pollutants of concern to be controlled in discharges of airfield deicing contaminated stormwater. See Section 6 of the TDD for a full discussion of pollutants of concern and for EPA's rationale for selecting regulated pollutants.

#### V. Final Regulation

##### A. BPT and BCT

EPA considered whether, in this rule, it was necessary to establish BPT limits, given that pavement deicers will be controlled at the BAT level, which is no less stringent than the BPT limit. Because the same wastestream that would be controlled by BPT is also controlled by BAT, it is not necessary for EPA to promulgate BPT effluent limitations guidelines for the Airport Deicing Category, given that the BAT collection and treatment requirements on that wastestream would be at least as stringent as BPT requirements. Similarly, EPA is not establishing BCT limitations for this industry because the same wastestream that would be controlled by BCT is being controlled by BAT.

## B. BAT

### 1. Airfield Deicing

#### a. Applicability/Scope of Airfield Deicing Discharge Requirements

EPA did not receive significant comments regarding the scope of the requirements for controlling airfield deicing discharges. EPA has retained the scope as described in the proposal: primary airports with departures of 1,000 or more non-propeller aircraft departures.

#### b. Candidate BAT Airfield Deicing Technologies: Product Substitution of Pavement Deicers Containing Urea

In general, airports discharge airfield pavement deicing chemicals without treatment, due to the difficulty and expense of collecting and treating the large volumes of contaminated stormwater generated on paved airfield surfaces. EPA is not aware of an available means to control these pollutants through collection and use of a conventional, end-of-pipe treatment system. It is possible, however, to reduce or eliminate certain pollutants by modifying deicing practices, such as using alternative chemical deicing products. In particular, EPA has identified ammonia and COD from airfield deicing as pollutants of concern, and both of these pollutants are a byproduct of pavement deicers containing urea. Accordingly, to address discharges of ammonia from airfield pavement, EPA identified one candidate for best available technology, namely, product substitution, or discontinuing the use of pavement deicers containing urea and using alternative pavement deicers instead. EPA found that the use of deicers without urea is the best available technology for reducing discharges of ammonia from pavement deicing, because it is safe, technologically feasible, and available across the industry. The technology does not produce discharges of ammonia as produced by deicers containing urea. Currently, only about 10 percent of chemical pavement deicers applied nationwide contain urea. The most widely used pavement deicer is potassium acetate, which represents 63 percent of all chemical pavement deicers applied nationwide.

### 2. Aircraft Deicing

For today's final rule, based on comments to the proposed rule, EPA revised the requirements related to the collection and discharge of ADF.

#### a. Applicability/Scope of Aircraft Deicing Discharge Requirements

Commenters raised multiple concerns with EPA's proposed approach of using departures as a proxy for ADF use. First, commenters explained that an airport in the very southern portion of the United States could have significant departures but use little ADF. Second, commenters requested that EPA consider a de minimis cut-off to account for defrosting (*i.e.* ADF application in the absence of active precipitation). Under the proposal, defrosting would be counted towards the volume of ADF required to be collected, yet commenters claim that it evaporates and is unable to be collected. Finally, airports with low overall ADF usage also requested EPA consider a de minimis cut-off. They cited concerns that the costs of the collection and treatment for ADF at these airports are disproportionately high in relation to the amount of pollutants generated. For example, one commenter, a non-hub primary airport, explained that it typically receives little snow and conducts occasional defrosting of aircraft, and generates no ADF-contaminated water, yet it would effectively be required to purchase a GCV if subject to the 20 percent collection requirement.

EPA reviewed its data with respect to each of these comments. On further review of the data and comments, EPA agrees that ADF usage in general is not closely related solely to the number of departures at airports. As such, in considering options for today's final rule, EPA did not base ADF collection and associated discharge options on the number of departures. Instead, EPA considered options based directly on estimates of the overall volume of ADF use, which EPA indicated in the proposal was another possible threshold criterion for the rule (74 FR 44714).

EPA reevaluated ADF usage data for all existing airports. This evaluation showed that airports with less than 30,000 gallons of available ADF may conduct a significant amount of defrosting, rather than deicing. See DCN AD01335. Defrosting results in limited amounts of ADF available for collection—effectively rendering collection technologies infeasible. Additionally, EPA found that the costs and economic impacts of ADF collection and treatment technologies for airports using less than 60,000 gallons of normalized ADF annually were disproportionately higher than those with greater ADF use.<sup>1</sup> See DCN

<sup>1</sup> EPA notes, however, that many existing airports with annualized normalized ADF usage below

AD01338 for additional details. As a result, in today's final rule, EPA evaluated options based on a cut-off of greater than or equal to 60,000 gallons of normalized ADF per deicing season. Under this option, airports at or above this threshold would be subject to these requirements, but airports below this threshold would have the technology-based limitations for aircraft deicing discharges in their NPDES permits determined by the permitting authority on a case-by-case, best professional judgment basis.

#### b. Exempted Wastewater (Those Associated With Deicing for Safe Taxiing)

EPA also altered its consideration of exempting wastewaters associated with deicing for safe taxiing. The proposed rule included a provision that would have exempted ADF-contaminated wastewater associated with deicing for safe taxiing from the proposed collection and treatment requirement. EPA proposed to limit deicing for safe taxiing to 25 gallons of ADF, based on an allowance at Denver International Airport (DIA), as the maximum amount that could be applied to an aircraft for the purposes of safe taxiing. This definition was intended to apply to airports with CDPs, and to prohibit conducting complete deicing of an aircraft at a terminal area without a collection system, instead of using the deicing pad. However, commenters expressed concern that climatic conditions at airports in the Midwest, Alaska, and on the East Coast differ greatly from those at DIA: commenters claimed that any "deicing for safe taxiing" allowances established at DIA cannot form a reasonable basis for application to airports in other regions of the country. In addition, cargo aircraft sometimes experience layovers in excess of 24 hours, potentially increasing the amount of snow or ice that must be removed to achieve compliance with FAA regulations. EPA agrees with the commenters and therefore the final rule does not limit the amount of ADF sprayed for the purposes of safe taxiing, nor does EPA require an airport to collect and treat ADF applied for safe taxiing purposes.

#### c. Candidate BAT Technology Bases for Collection and Discharge Requirements

EPA is not aware of an available and economically achievable technology that is capable of capturing 100 percent of the sprayed ADF. Section IV.D.1 details the available technologies for

60,000 currently employ deicing collection technologies including centralized deicing pads.

collecting ADF, which include GCVs, plug and pump equipment, and CDPs. EPA estimates that these technologies collect 20 percent, 40 percent, and 60 percent of available ADF, respectively.

Commenters raised multiple concerns about CDPs, the technology that EPA proposed to identify as the basis for the 60 percent collection requirement. First, commenters raised concerns that CDPs are not feasible at all locations because of lack of space. Some of these commenters provided detailed engineering plans and analyses demonstrating their specific space constraints. Second, commenters raised concerns that using CDPs for all deicing operations would cause traffic and/or safety problems. Third, commenters asserted that the use of CDPs would lead to flight delays and that EPA had not included costs associated with such delays in its analyses. In addition, FAA indicated that it had similar concerns to those raised by industry commenters, regarding the identification of centralized deicing facilities as BAT. FAA indicated that the 60 percent collection requirement based on the exclusive use of CDPs might adversely affect the operational efficiency of some of the nation's largest and busiest airports. Further, FAA was concerned that for those land-constrained airports, construction and operation of CDPs for all deicing operations would not be able to meet FAA design standards. In explaining its concerns, FAA noted that delays associated with the use of CDPs would be extremely costly to the nation's productivity, economy, businesses, and the traveling public.

After considering these comments and reviewing the information in its record, EPA is not establishing a 60 percent ADF collection requirement based on CDPs for BAT. First, in response to FAA's concerns about the exclusive use of deicing pads for aircraft deicing, EPA contacted a number of large hub airports that currently use CDPs. EPA found the current percentage of flights for which these airports use the CDPs ranges from 50 to 95 percent. The airports explained that various operational or weather-related issues may make deicing pad use for all flights cumbersome if not impossible, (*i.e.*, severe system-wide delays), and require them to deice at the gate in some circumstances. EPA shares the commenters' and FAA's concerns that moving to exclusive use of CDPs for all deicing might lead to operational issues and delays. EPA, in discussions with FAA, attempted to craft regulatory provisions to allow an airport limited ability to bypass the use of a centralized pad in order to avoid these circumstances. However, limited data

on the site-specific nature of this industry left EPA unable to develop regulatory provisions that would give airports the flexibility they need to avoid significant operational issues and delays. Second, based on public comments and information from FAA, EPA is concerned that some large airports critical to efficient air traffic operations in this country are space (land) constrained, and that building well-located CDPs for all deicing operations at these airports is likely not feasible for that reason. At the time of the proposal, EPA estimated that 14 airports would be subject to the 60 percent collection requirement. Because the data in EPA's record indicate that many of these airports currently meet this requirement, EPA estimated approximately seven airports would likely need to install pads as a result of the proposed requirement. Of these seven airports, four are large hubs, which, over years of expansions and other improvements, have already built out the majority of the land available to them. EPA has concluded that the lack of remaining available land, coupled with their existing layouts, has left these airports in a position where a CDP conforming to FAA's Advisory Circulars on deicing pad design, (*e.g.*, in a location that aircraft can travel to safely and efficiently to conduct deicing operations) cannot be constructed.

Therefore, for today's final rule, EPA has not established a 60 percent ADF collection requirement, which would have been based on identification of centralized deicing facilities as BAT for 100 percent of aircraft departures. This technology is not available at a number of existing airports due to land constraints, and therefore is not technologically feasible on a nationwide basis. For this and the other reasons discussed above, EPA finds that centralized deicing facilities should not be identified as BAT for this nationwide rulemaking. See CWA 304(b)(2)(B)—factors relating to the assessment of BAT include “the process employed, the engineering aspects of the application of various types of control techniques, \* \* \* and such other factors as the Administrator deems appropriate.” EPA then considered the other two technologies described in the proposal as a possible basis of BAT for aircraft deicing discharges for today's final rule: 40 percent ADF collection requirement based on plug and pump with GCVs and 20 percent ADF collection requirement based on GCVs. With either of these collection technologies, as was the case in the proposed rule, EPA also included numeric COD limitations for direct

discharges of collected ADF based on anaerobic treatment. For a discussion of other technologies examined but not selected as candidates for the basis of the COD limitations, see Section VII.E.2 in the proposed rule preamble (74 FR 44692) and Section 7 of the TDD.

### 3. Options Considered for Today's Final Rule

Using the technology bases identified above for airfield and aircraft deicing discharges, EPA developed three primary options for today's final rule. All three of these options have the same airfield pavement deicing discharge requirements based on product substitution of deicers that do not contain urea, but would vary the approach to control aircraft deicing discharges:

- Option 1: 40 percent ADF collection requirement for large and medium ADF users (based on plug and pump with GCVs); numeric COD limitations for direct discharges of collected ADF (based on anaerobic treatment).

- Option 2: 40 percent ADF collection requirement for the large ADF users (based on plug and pump with GCVs) and 20 percent ADF collection requirement for medium ADF users (based on GCVs); numeric COD limitations for direct discharges of collected ADF (based on anaerobic treatment).

- Option 3: Site-Specific Aircraft Deicing Discharge Controls: Do not establish effluent limitation guidelines in the final rule for aircraft deicing discharges, but instead, leave the determination of BAT requirements for each airport to the discretion of the permit writer on a case-by-case, “best professional judgment” basis based on site-specific conditions.

Under the first option, in addition to the airfield pavement requirements, all airports that use greater than or equal to 60,000 gallons of normalized ADF annually would be required to collect 40 percent of available ADF based on plug and pump with GCV technologies. In the proposed rule, EPA considered but did not identify this as its lead option because it found its costs to be comparable to those of CDPs, while CDPs achieved greater ADF collection. In the proposal, EPA therefore identified CDPs as BAT. EPA subsequently determined that CDPs are not achievable nationwide for existing airports and dropped it as an option for consideration in the final rule. This left the plug and pump with GCV option as the technology, among those that remained under consideration for today's rule, that would achieve the greatest collection of ADF.

Under the second option, in addition to the airfield pavement requirements, all airports that use greater than or equal to 60,000 gallons of normalized ADF annually but less than 460,000 gallons of normalized ADF (“medium ADF users,” estimated to be 42 airports) would be required to collect 20 percent of available ADF based on GCVs, and airports that use more than 460,000 gallons of normalized ADF (“large ADF users,” estimated to be 14 airports) would be required to collect 40 percent

of available ADF based on the use of plug and pump with GCV technology.

Under both Options 1 and 2, the requirement to meet numeric effluent limits for COD for the collected ADF would need to be met prior to commingling with other wastestreams prior to discharge. For a discussion of other technologies examined but not selected as candidates for the basis of the nationwide COD limitations, see Section VII.E.2 in the proposed rule

preamble (74 FR 44692) and Section 7 of the TDD.

Under the third option, EPA would establish national deicing discharge controls for airfield pavement deicing only. BAT limitations for aircraft deicing discharge would continue to be established by the permitting authority on a case-by-case basis.

Table V–1 provides the estimated national cost of each option along with the estimated national removals.

TABLE V–1—COST OF FINAL RULE OPTIONS

Option	Total pollutant removals (million lb)	Total annualized costs (2006 \$million)
1 .....	33.0	\$78.4
2 .....	30.2	49.4
3 .....	16.4	3.5

4. BAT Options Selection

EPA is selecting Option 3 as best available technology for controlling airport deicing discharges. EPA has determined the best available technology for controlling airfield pavement discharges is product substitution. The record shows that products without urea are widely available in the industry, and in fact are already in use at a majority of airports across the country.

With respect to aircraft deicing discharge controls, EPA’s record demonstrates that ADF collection and associated treatment technologies are technically feasible for many airports. Data supplied from the industry through EPA’s nationally representative survey of airports indicates that dozens of airports currently use GCVs and plug and pump collection systems, in addition to a myriad of P2 technologies and practices, ranging from alternative means of applying ADF such as forced air nozzles, to alternate deicing technologies such as IR deicing. In addition, many airports also employ a variety of treatment technologies to treat collected ADF prior to discharge. Thus, EPA concludes this industry has several technology options potentially available for mitigating the pollutants associated with aircraft deicing activities. See the TDD for more information about collection and P2 technologies.

However, EPA has determined that none of the ADF collection technologies considered for today’s final rule represents the best available technology for the entire category. Rather, EPA concludes that best available technology determinations should continue to be

made on a site-specific basis because such determinations appropriately consider localized operational constraints (e.g., traffic patterns), land availability, safety considerations, and potential impacts to flight schedules. Based on the information in its record, EPA cannot identify with precision the extent to which such limitations may preclude, at any particular airport, the use of the technologies that it considered for BAT control of aircraft deicing discharges for today’s final rule. However, the record demonstrates that such limitations exist and are not isolated or insignificant. In light of this finding, EPA decided that it should not establish national ADF collection (and associated discharge requirements) based on any one or more of the ADF collection technologies as the presumptive BAT-level control technology. Rather, site-specific proceedings are the appropriate forum for weighing all relevant considerations in establishing aircraft deicing discharge controls.

More specifically, commenters provided by airport and airline industry on the proposed regulation raised concerns about the impacts that ADF collection technologies may have on safety and operations at airports across the country. They also commented on the lack of available space at many land constrained airports for ADF collection and treatment technologies. EPA reviewed the information submitted in comments, subsequent information provided by industry, and information obtained from site visits to thoroughly evaluate these concerns. After reviewing this information, EPA agrees with

commenters that while many airports likely have the ability to implement some form of collection or P2 technologies in order to mitigate pollutant discharges associated with aircraft deicing, space, safety and operational considerations may limit the selection of the specific technologies and the extent to which they can be implemented at any particular airport. This finding became particularly apparent after reviewing questionnaire responses for some of the airports at which EPA also conducted site visits. EPA found that its “model facility” approach was not a suitable substitute for a detailed analysis of the site constraints at each airport. For example, a permit authority may need to evaluate existing traffic patterns at an airport, not only of the aircraft, but also of the service vehicles to determine if additional collection vehicles would lead to unacceptable safety concerns. With respect to land constraints, in the absence of detailed airport schematics, or without conducting a detailed site visit at each airport, EPA cannot determine if adequate space exists to incorporate the specific treatment and collection technologies evaluated as the basis for today’s final rule.

Additionally, industry and FAA, in particular, have expressed overarching concerns about possible delays and economic impact that could result from the use of plug and pump and GCVs, both at specific airports and nationwide. EPA agrees that delays must be a factor in considering today’s possible requirements and recognizes that such delays fundamentally affect U.S and

international business and recreational interests.

Airplane deicing activities, by their very nature, occur during freezing precipitation events. For some airports, even small amounts of precipitation can lead to delayed aircraft departures—even without deicing activity and/or ADF collection and treatment. As such, when delays occur at an airport during inclement weather, it is difficult to determine whether the delays are associated with the weather, the ADF collection and treatment technologies, or both. Further, even small delays at certain hub airports have a ripple effect that can affect the entire national air traffic schedule.

Some airports have identified procedures to mitigate or prevent delays associated with aircraft deicing discharge controls. These airports can handle large amounts of precipitation and/or operate ADF collection and treatment technologies with little or no delay, but these approaches may not be applicable nationwide. Further, the extent of delays deemed acceptable is likely to vary by airport. As was the case with land constraints, the confounding factors that need to be considered to evaluate possible delays that may be associated with the technology bases do not lend themselves to a national determination using a model facility approach. Further, EPA does not have detailed site-specific information to evaluate delays on an airport-by-airport basis.

While the facts stated above do not necessarily preclude the ability of an airport to collect and treat spent ADF, they do illustrate why EPA did not select any of the technologies considered as BAT for today's final rule, and why a site-specific BAT determination for ADF collection and treatment requirements is the proper approach for today's final rule.

Therefore, for the reasons identified above, EPA determined Option 3 is the only technologically feasible and available option considered for today's final BAT requirements. Option 3 would remove 4.4 million pounds of ammonia and 12 million pounds of COD, with a projected annual cost of \$3.5 million. The costs of Option 3 are reasonable in terms of the pollutant reductions achieved (\$0.21/lb). Further, as discussed in more detail in Section VII, EPA finds Option 3 is economically achievable. In addition, EPA examined the non-water quality impacts anticipated from compliance with Option 3 requirements and found none or only very minor impacts in comparison to typical industry energy use, emissions generation and sludge

generation. See Section IX, "Non-Water Quality Environmental Impacts." Therefore, based on all the factors above, EPA is identifying Option 3 as BAT and has based today's final rule on the Option 3 BAT requirements.

### C. NSPS

#### 1. New Source Definition

In the proposed rule, "new source" would have included both new airports and new runways constructed at existing airports. Commenters objected to the inclusion of new runways at existing airports in the new source definition. They noted that a new runway is not a source of pollutant discharges from aircraft deicing activity and that a new runway is not "substantially independent" of an existing source as required under the regulatory definition of "new source." See 40 CFR 122.2 and 40 CFR 122.29(b)(1). Commenters acknowledge that a new runway may lead to additional discharges associated with airfield deicing, but noted that the requirements for airfield deicing discharges are the same for new and existing discharges. With respect to the requirements associated with discharges from aircraft deicing, they explained that a new runway is not a source of new discharges because aircraft deicing is performed at locations away from airport runways. Moreover, they explained that unlike a plant or factory from which a new source of discharge associated with a new process, production line, or piece of equipment can be clearly distinguished as a new source of discharge associated with an existing source, a new runway is not operated independently from other runways at an airport. Rather, a new runway and associated deicing operations are part of a wholly integrated airport system. After carefully considering these comments, EPA agrees that new runways should not be treated as new sources because new runways are generally too integral to the operations of an existing airport to be considered "substantially independent" of the existing airport.

#### 2. NSPS Applicability

For today's final rule, the applicability of the NSPS provisions is effectively the same as that in the proposed rule. New primary airports with greater than or equal to 1,000 annual departures by non-propeller-driven aircraft are subject to the provisions of § 449.11(a) and (b).

In the proposed rule, § 449.1 defined the applicability of the overall category as covering primary airports with at

least 1,000 annual scheduled commercial air carrier jet departures. In the final rule, the language in § 449.1 has been simplified to just "primary airports," and the 1,000-departure threshold criteria are included in the provisions at §§ 449.10 and 449.11. This arrangement results in the same requirements for new source airports that EPA had intended in the proposed rule, with a clarification: A new primary airport with initially less than 1,000 departures is a new source, but not subject to the requirements of § 449.11. If the airport eventually exceeds 1,000 departures, then the provisions of § 449.11 apply.

The proposed rule defined the threshold for the new source ADF collection and associated discharge requirements as any new source with 10,000 or more annual departures. As was the case with existing sources, commenters explained that the number of departures is not a good analog for the amount of ADF usage, citing, for example, airports in the South that may have significant numbers of departures but typically need to deice their aircraft only once a year. After reviewing these comments and the information in its record, EPA agrees that departures alone are not the most appropriate indicator of ADF usage.

Therefore, for today's final rule, in addition to the proposed departure threshold, EPA is adding a geographical component to define which new sources are subject to the ADF collection and discharge requirements. As explained in Section V.B, EPA determined that, on a national basis, ADF collection may be infeasible at airports with annual ADF usage below 30,000 gallons. ADF usage below 30,000 gallons may reflect significant volumes of defrosting activity, which does not leave ADF available for collection.

Unlike existing sources, however, new sources do not have past ADF usage data available for establishing a threshold for being subject to ADF collection requirements. Therefore, in combination with the proposed departure threshold, in today's final rule, the Agency is incorporating a geographically based component that is closely aligned with a 30,000 gallon annual ADF usage threshold. In addition to applying the proposed departure threshold, EPA is making NSPS collection requirements for ADF applicable based on whether the airport is located within specific colder climatic zones (called a "heating degree day [HDD] category") as documented by the National Oceanic and Atmospheric Administration (NOAA). For airports within the scope of today's rule,

location in a warmer climate zone is generally associated with the use of smaller volumes of ADF.

HDD means the number of degrees per day the daily average temperature is below 65 degrees Fahrenheit. The daily average temperature is the mean of the maximum and minimum temperature for a 24-hour period. The annual HDD value is derived by summing the daily HDDs over a calendar year period. HDDs are computed using data from the U.S. National 1961–1990 Climate Normals, published by the National Climatic Data Center of NOAA. The original data are in whole degrees Fahrenheit. HDD values range from 0 to more than 9,000. NOAA presents this information in 1,000-HDD increment groups. EPA used the NOAA information to create HDD groups. These groups range from A to I, with group A being the lowest HDD values (less than 1,000 HDD) and group I being the highest (greater than 9,000 HDD).

EPA identified the corresponding HDD groups for existing airports and then compared the HDD group to ADF usage at each airport. In general, airports with greater than 10,000 departures in HDD groups A through C (3,000 HDD or less) used less than 30,000 gallons of ADF while those in HDD groups D through I used more than 30,000 gallons of ADF. As a result, these HDD groups in combination with the departure cut-off provide a dividing line nationwide that corresponds well with the ADF usage dividing line that EPA determined makes ADF collection feasible. EPA concludes that this approach best captures those new airports that will conduct more frequent deicing operations, as opposed to defrosting operations, and excludes those new airports that will likely conduct infrequent deicing. See DCN AD01267 for EPA's analysis of HDD categories.

In addition, EPA received comments questioning the feasibility of ADF collection technologies for airports located in Alaska. These commenters stated that deicing wastewater generation at Alaskan airports is substantially different from airports in the lower 48 states. First, often airports in Alaska will suspend air traffic as opposed to conducting deicing operations. Second, commenters stated that long periods of below freezing temperatures result in runoff characteristics that are substantially different from those in the lower 48 states and, as such, deicing materials are not available for collection (due to lack of runoff) making collection technologies infeasible. The data provided in the survey responses from Alaskan airports show that airports in

this climactic zone use widely varying amounts of ADF per departure. Based on this data, EPA is unable to conclude that Alaskan airports conduct significant deicing, rather than defrosting, and as such, today's final new source ADF collection and discharge requirements do not apply to new airports in Alaska.

For the airports that are excluded from the NSPS requirements in today's final rule, permit authorities would determine an applicable new source performance standard on a case-by-case, best professional judgment basis.

### 3. NSPS Option Selection

For today's final rule, EPA evaluated "best available demonstrated control technologies" for purposes of setting NSPS under CWA section 306. Section 306 directs EPA to promulgate NSPS "for the control of the discharge of pollutants which reflects the greatest degree of effluent reduction which the Administrator determines to be achievable through application of the BADCT, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants." Congress envisioned that new treatment systems could meet tighter controls than existing sources because of the opportunity to incorporate the most efficient processes and treatment systems into the facility design. As a result, NSPS should represent the most stringent controls attainable through the application of the BADCT for all pollutants (that is, conventional, nonconventional, and priority pollutants).

After careful consideration of the information in its record, EPA is today promulgating the same NSPS requirements for both airfield pavement deicing discharges and airplane deicing discharges as it proposed; however, the applicability of the NSPS requirements has changed. Clearly, product substitution, the technology basis for the airfield deicing discharge requirements promulgated today for existing airports, is fully applicable to new airports. EPA determined that, just as with existing sources, all new sources would be capable of using airfield deicing products without urea. Furthermore, product substitution represents the greatest level of reduction in ammonia among the available technologies considered. Accordingly, EPA identifies product substitution of non-urea-containing airfield deicers as the best demonstrated available control technology for all new sources. As with BAT, there would be two alternatives for meeting this effluent limitation: either a certification requirement or a

numeric limit on ammonia for all direct discharges of the stormwater from the airfields.

With respect to aircraft deicing discharge controls, EPA, in consultation with FAA, finds that its determination about safety, space, and operational constraints that may be present at existing airports for all the collection and treatment technologies discussed in today's final rule (CDPs, plug and pump with GCVs, GCVs alone and AFB treatment) would not similarly apply to new airports. This finding is supported because new airports can be designed to minimize space and logistical constraints that have been identified for retrofits at existing airports (see DCN AD01285). Further, among the ADF collection technologies that EPA considered, CDPs collect the greatest level of available ADF and are available to new sources in this category. With respect to new airports, the use of CDPs does not present the space/land, safety, or operational issues that would be raised in connection with the use of deicing pads at existing sources. In addition, CDPs in combination with AFBs for treatment of collected ADF are not so costly in comparison to the cost of a new airport<sup>2</sup> that they would be considered a "barrier to entry." Moreover, according to FAA, when designed properly, CDPs often improve traffic flow and reduce delays associated with aircraft deicing. When designing a new airport, the local operating agency plans the site for all needed facilities, such as runways, taxiways, terminal(s) and other components needed to comply with safety and environmental requirements, which includes deicing facilities. See DCN AD01285. The new airport must be designed and built on enough land, in total, to accommodate a deicing pad and AFB treatment system (or other technology that meets the 60 percent collection requirement and the discharge requirements), to be installed either during initial construction or at a later time when it exceeds the 10,000 departure threshold. The airport sponsor would design its layout of runway(s), taxiways, location of terminal(s) and other buildings with sufficient space so that deicing facilities can be installed later without the need to acquire additional land. Therefore, EPA is promulgating the same NSPS requirements for airfield pavement deicing discharges as for existing sources, but in contrast to existing sources, EPA is promulgating NSPS requirements for ADF collection and discharge requirements at new airports

<sup>2</sup> Includes total costs for controls both for airfield pavement and aircraft deicing discharges.

based on the use of CDPs and anaerobic biological treatment. Meeting this combination of new source requirements for both airfield pavement deicing discharges and aircraft deicing discharges would not be an economic barrier to entry for new airports, as the cost of new airport construction, even at small airports, is significantly greater than the costs associated with product substitution and collection and/or treatment of spent deicing fluids. See Section VII.E.

As a point of clarification, EPA is promulgating the same numeric COD limitations for collected ADF that is discharged directly for new sources as was proposed. The technology basis, AFB system, is available to new airports. In addition, AFB achieves the greatest level of pollutant removals of those technologies considered during the development of this regulation, and the installation and use of this technology is not economically a barrier to entry for new airports.

Additionally, although EPA did not identify pollution prevention approaches and technologies as a basis for NSPS, these technologies may be effective at reducing available ADF. Moreover, future pollution prevention technologies may become available to aid in meeting the NSPS requirements. As such, the final rule includes a provision that allows dischargers to request a credit to be applied to the NSPS ADF requirement. See Section X.C.3 for additional information and examples.

#### D. PSES and PSNS

EPA is not promulgating PSES and PSNS for the Airport Deicing Category. Although some airports in the United States discharge ADF-contaminated stormwater to POTWs, EPA received no comments or other information indicating that POTWs currently have problems of pollutant pass-through, interference, or sludge contamination stemming from these discharges that would necessitate the promulgation of national categorical pretreatment standards.

Like the biological treatment system that forms the basis for today's COD new source performance standard, POTWs typically employ biological treatment systems and are similarly designed to remove organic pollutants that contribute to COD and/or BOD<sub>5</sub>. In general, POTWs have the capability to achieve comparable removals to the NSPS technology basis. However, some airports and POTWs may need to make operational adjustments in order to process the wastewater effectively while avoiding POTW upset. EPA received a

comment about the Downriver Treatment Facility in Detroit, Michigan, which accepts ADF wastewater from the Detroit Metropolitan Wayne County Airport. The treatment plant experienced viscous bulking due to a nutrient imbalance that occurred during the months that ADF was accepted. The issue was resolved by removing phosphorus at a later stage in the treatment plant system, rather than from the raw wastewater. The airport also made significant changes in order to segregate the deicing wastewater, collect and recycle the most concentrated ADF wastewater, and control the amount and concentration of wastewater discharged to the POTW.

EPA is aware that high concentration or "slug" discharges of deicing wastewater can create POTW upset. The national pretreatment program regulations specifically prohibit industrial users from discharging high concentrations of oxygen-demanding pollutants to POTWs if they cause interference to the POTW. See 40 CFR 403.5(b)(4). Under 40 CFR 403.5(c), control authorities may set and enforce "local limits" for airport discharges to POTWs to implement the prohibitions listed in § 403.5(b)(4). This provision ensures that any potential limits would protect against POTW interference by the oxygen-demanding pollutants in airport deicing discharges. See "Local Limits Development Guidance," document no. EPA 833-R-04-002A, July 2004, available on EPA's Web site at <http://cfpub.epa.gov/npdes/pretreatment/pstandards.cfm>. As a result, many airports that discharge to POTWs have airport-specific requirements on allowable BOD<sub>5</sub> or COD discharge loading per day. These limits on daily pollutant loadings are specific to the receiving POTW. Airports usually meet this requirement by storing deicing stormwater in ponds or tanks and metering the discharge to meet the POTW permit loading requirements.

## VI. Technology Costs and Pollutant Reductions

### A. Compliance Costs

#### 1. Overview

EPA estimated industry-wide compliance costs for the three options considered for today's rule. This section summarizes EPA's approach for estimating compliance costs, while the TDD provides detailed information on these estimates. All final cost estimates are expressed in terms of 2006 dollars and represent the cost of purchasing and installing equipment and control technologies, annual operating and maintenance costs, and associated

monitoring and reporting requirements. In general, this approach is the same as the approach used in the proposal. However, some modifications were made for costing specific technology pieces in the costing models, including the numbers of GCVs per airport and the manner in which airports would store collected ADF containing wastewater.

EPA estimated compliance costs associated with the three options considered for today's rule using data collected through survey responses, site visits, sampling episodes, specific airport requests, and information supplied by vendors. Under the options considered, certain airports would have limitations based on the substitution of non-urea-containing pavement deicers and also would be required to collect a percentage of their available ADF that was applied to aircraft and treat the collected wastewater to comply with numeric limitations if discharged directly. EPA estimated costs for an airport to install technology to comply with the options, as well as to annually operate and maintain equipment and perform required monitoring or other activities to demonstrate ongoing compliance. EPA's cost estimates represent the incremental costs for a facility when its existing practices would not lead to compliance with the option being evaluated.

EPA calculated costs based on a computerized design and cost model developed for each of the technology options considered. EPA developed facility-specific costs for each of the airport industry questionnaire respondents (149 facilities), where each facility was treated as a "model" airport. Because the questionnaire respondents represent a subset of the industry, EPA subsequently modeled the national population by adjusting the costs upward to estimate the entire affected airport population.

The questionnaire responses provided EPA with information on three consecutive deicing seasons (2002 to 2005) for each of the model facilities. Some portions of EPA's costing effort reflect the airports' operations as reported for the three seasons. For example, estimates of applied deicing chemicals were taken as an average of the years for which the information was reported. In instances where aspects of an airport's operation changed over the three-year period, EPA used the most recent information.

EPA first established existing conditions (*i.e.*, baseline) for each model airport based on information and site plans submitted as part of the airport questionnaire. EPA then determined what upgrades or changes, if any, would

be required to comply with the option being considered for today's final rule. For example, in general, when an airport lacked a comparable collection system to the one used as the basis for an option, EPA included costs for installation/operation and maintenance of the option technology basis (e.g., plug and pump systems in conjunction with GCVs).

## 2. Approach for Estimating Airfield Pavement Deicing Costs

Today's rule sets requirements for an airport to certify it uses non-urea-containing airfield deicers (unless it chooses to meet a numeric limit for ammonia). Through the airport questionnaire responses, EPA estimates that 198 airports will be subject to today's requirements. Of these 198 airports, 37 airports use deicers containing urea for airfield pavement deicing. As detailed in Section IV.D.4, EPA based its airfield pavement deicing requirement on product substitution. EPA calculated the cost for facilities to substitute the deicers containing urea with another widely available pavement deicer that does not produce ammonia in the wastewater. EPA chose to model the substitution costs on what it would cost to switch to potassium acetate, specifically because that product accounts for 63 percent of the applied chemical airfield deicer usage (by weight) in the United States. These incremental costs include capital costs associated with application equipment and storage, as appropriate, as well as the differential chemical costs. EPA assumed that those airports that currently do not use urea-containing deicers as a means of pavement deicing would experience no cost associated with this portion of today's regulation.

Using the facility area usage data as provided in the airport questionnaire, and available literature on typical urea-containing pavement deicer application rates, EPA estimated the airfield area that was annually deiced at each model facility. Using the estimated model facility deicing area in conjunction with the estimated \$2.92/1,000 square feet cost of potassium acetate, EPA was able to calculate the cost per model facility to perform airfield deicing with potassium acetate. This cost was compared to the questionnaire-reported urea-containing deicer costs to determine the incremental costs of switching chemical airfield deicers. See the TDD for additional details on costing for airfield deicing product substitution.

## 3. Approach for Developing Aircraft Deicing Costs

Under two of the options considered for this rule, certain existing airports would be required to collect a percentage of their available ADF, and treat the collected wastewater to comply with numeric effluent limitations if it discharges directly. EPA estimated the costs for an airport to comply with collection and treatment requirements, as applicable, as well as perform required monitoring to demonstrate compliance. Of the 198 airports within the scope of the aircraft deicing controls considered for BAT, EPA expects that 55 airports would exceed the threshold for ADF use that would trigger the collection/discharge requirement. Costing for ADF collection is not relative to baseline practices in all instances, as an airport's existing collection technology may not be incrementally upgradeable to achieve the required collection efficiency. As such, EPA assessed all costs to comply with the options based on ADF collection and treatment with the assumption that any airport required to make upgrades to its collection and/or treatment system to meet the option would be starting from a baseline of zero collection and treatment. Note that this assumption does not carry through to pollutant removals, as baseline removals are accounted for when assessing pollutant removals associated with today's options. See section VI.B for more detail on the pollutant removal calculations.

EPA first established existing conditions for each model airport based on information and site plans submitted as part of the airport questionnaire. EPA then determined what upgrades, if any, would be required to comply with an option. As explained above, in general, when an airport lacked a comparable collection system to the one used as the basis for the option, EPA included costs for installation/implementation of the option technology basis such as plug and pump systems in conjunction with GCVs and an AFB treatment system for Option 1.

For those airports that would be required to collect additional ADF and meet associated discharge requirements to comply with the option, EPA estimated costs for storage/equalization (and associated piping to transfer collected ADF to storage) as part of the costs of the treatment technology. The option would not require, nor is it based on, collecting the full volume of wastewater generated in a deicing season. Rather, storage is included as part of the technology basis for flow

and/or pollutant equalization to support the AFB treatment system. Where EPA estimates an airport would incur capital costs associated with ADF collection and discharge requirements, the Agency included costs for above-ground storage tanks, since above-ground storage tanks will have less of an impact on subsurface utilities, for which EPA does not have site-specific information. If airports needed to install below-ground storage tanks for operational reasons, this would likely be more expensive.

For the 15 airports that EPA anticipates would need to collect additional quantities of ADF-contaminated stormwater to comply with Option 1 or 2, EPA assumed these additional quantities would be discharged directly, thus requiring treatment to comply with the COD limitations. For example, for Option 1, this includes all airports that EPA estimates collect less than 40 percent of available ADF. Specifically, this includes those facilities that currently collect some portion of ADF-contaminated stormwater and subsequently discharge indirectly to a POTW or a centralized waste treatment (CWT) facility. EPA recognizes that an airport may decide to discharge to a POTW or CWT facility rather than directly discharge its wastewater. While this is likely a lower cost alternative in some cases, EPA did not assume that airports could discharge to a POTW or CWT, because the Agency does not have enough information about the capacity or willingness of a specific POTWs to receive these volumes of wastewater. To the extent that an airport selects this alternative, EPA may have over-costed the option.

Additionally, airports may have costs associated with permit application requirements or demonstrating compliance with Option 1 or 2, including assessing yearly ADF usage, determining ADF stormwater collection, system inspections, and COD monitoring. Monitoring requirements will continue to be determined by the permitting authority. However, for purposes of estimating monitoring costs associated with today's options, EPA assumed that airports that directly discharge collected ADF would take a 24-hour composite sample and analyze that for COD, and perform that analysis seven times per week for the duration the treated discharge occurs. EPA made a similar assumption for purposes of computing the weekly average effluent limitation (see the TDD for additional details). As a conservative estimate, EPA assumed a six-month discharge duration season for all modeled facilities.



#### 4. Calculation of National Costs

EPA categorized all of the costs as either capital costs (one-time costs associated with planning or installation of technologies), or as operations and maintenance (O&M) costs (costs that occur on a regular ongoing basis such as monitoring or annual purchases of deicing materials). EPA amortized these capital costs over the lifespan of the capital improvement. For additional information on amortization, see the EA. Finally, EPA combined the amortized capital costs with the annual O&M costs to calculate the total annual cost of the option for that model facility.

EPA then utilized statistical weights assigned to each of the 149 model facilities to calculate a national estimated cost of complying with the option. Further discussion of all of the calculations discussed can be found in the TDD and in the EA.

#### B. Approach to Estimating Pollutant Reductions

##### 1. Overview

The pollutants of concern associated with airfield and aircraft deicing and anti-icing chemicals are discussed in Section 6 of the TDD. These chemicals commingle with stormwater and may be discharged to the environment. These discharges are of environmental concern because the biodegradation of deicing chemicals results in oxygen depletion in the receiving water body. Moreover, some of these pollutants, such as ammonia, have toxic properties.

Pollutant loadings from airport deicing operations are challenging to estimate because they are highly variable and airport-specific. Because the use of deicing and anti-icing chemicals is weather dependent, the pollutant loadings at each airport vary based on weather conditions. The pollutant loadings also vary from airport to airport based on each airport's climate. In addition, the amount of applied chemical that is discharged to surface water is airport-specific, based on the existing stormwater separation, collection, and/or containment equipment present at each airport.

Due to the variable nature of these pollutant loads, EPA developed a baseline (or current) pollutant loading methodology based on the usage of ADF and airfield chemicals at the airports responding to the survey questionnaires. The methodology takes into account EPA's existing data sources and provides a better estimate of the loadings than those based on sporadic monitoring data alone. Similar to the costing methodology, EPA developed facility-specific baseline loads for a

subset of the industry (*i.e.*, model facilities). For those model airports where existing practices would not lead to compliance with today's options, EPA then calculated the incremental pollutant removals associated with compliance. EPA subsequently adjusted the incremental pollutant removals upward to estimate the entire affected airport population. This approach is the same as the approach taken in the proposal.

##### 2. Sources and Use of Available Data

While developing the pollutant loading models, EPA considered the following data sources:

- Pavement deicing chemical usage/purchase information for the 2002/2003, 2003/2004, and 2004/2005 deicing seasons, as reported by airport authorities in the Airport Deicing Questionnaire.
- ADF purchase information for the 2002/2003, 2003/2004, and 2004/2005 deicing seasons, as reported by air carriers in the Airline Deicing Questionnaire.
- Standard airport information available from the FAA and the Bureau of Transportation Statistics, including the number of operations and departures by airport.
- Weather information for each airport from NOAA, including temperature, freezing precipitation, and snowfall data.
- Existing airport stormwater collection and containment systems, as reported by airport authorities in the Airport Deicing Questionnaire.
- Standard chemical information about ADF and pavement deicing chemicals, including molecular formulas and densities.
- Analytical data from EPA sampling episodes of airport deicing operations.

##### a. Baseline Loading Calculations

The Agency estimated the total amount of pavement deicing chemicals and ADF used based on data collected in the Airport and Airline Questionnaires. The Airport Questionnaire respondents reported the purchase/usage amount, concentration, and brand name of pavement deicing materials. Using the Airline Questionnaire, EPA collected ADF purchase data from airlines with 1,000 or more departures operating at selected airports. During questionnaire development, airports indicated they did not have information on ADF usage and that EPA should direct this question to airlines. Purchase data were collected because the airlines stated that purchase data were most readily available, while usage data was not. For the purposes of

these loading calculations, EPA estimated that the annual amount purchased was equal to the amount used for a deicing season. For instances in which EPA did not have ADF purchase data for every airline operating at a particular model airport, EPA extrapolated the amount of ADF used by the reporting airlines to estimate the total amount of ADF used by the entire airport. This was done based on the number of airport operations (departures) at the reporting airlines versus the total number of airport operations. In addition to the 56 airports for which EPA collected ADF purchase/usage data from the airline tenants, 10 airports reported the total volume of their ADF usage to EPA in their comment section of the Airport Deicing Questionnaire, resulting in estimates of total ADF usage for 66 model airports.

Using the airline and airport ADF purchase and usage data obtained from the questionnaire, airport departure data, and climate data, EPA developed a relationship between the amount of ADF used, and the climate and size of each model airport. EPA then used this equation to estimate the total gallons of ADF used at model airports that did not have ADF usage data in the Airport or Airline Questionnaires. EPA is aware that part of the methodology for developing today's regulation involved estimating airport-specific ADF usage. However, in order to prevent mandatory survey responses marked as CBI from being released, EPA is not revealing the exact methodology for modeling this ADF usage due to the potential for the deduction of CBI data through back calculation.

Once the amount of ADF used at each model airport had been determined, EPA needed to determine the amount of ADF available for direct discharge to the waters. EPA assumed that 75 percent of applied Type I ADF falls onto the pavement at the deicing area and is available for discharge. EPA assumed that 10 percent of Type IV ADF falls to the pavement in the deicing area and is available for discharge; the remaining 90 percent adheres to the plane. See the TDD for more information on these estimates. EPA then multiplied the total amount of applied ADF for each model airport by the appropriate percent available for discharge to determine the amount of ADF available for discharge. Note that collection requirements in the options are specified as percentages of ADF available for discharge, not percentages of total ADF applied. Evaluating the amount of ADF available for discharge, coupled with the estimated baseline collection rate, results in the total amount of discharged

available ADF. EPA then calculated the amount of COD loading associated with these discharges, described as follows.

Airfield pavement deicing chemicals are applied at various airside locations such as runways, taxiways and ramps. Theoretically, the amount of pavement deicers being discharged could range from approximately 0 percent, for chemicals that infiltrate highly permeable soils in unpaved areas during a thaw, to virtually 100 percent for paved areas near storm drains. In general, soil in unpaved areas is frozen during deicing season and is impermeable, promoting the overland flow of stormwater and pollutants to surface waters. Estimating the amount or proportion of pavement deicers discharged at a particular airport is difficult without performing a detailed study at the airport. EPA has not received any such detailed studies, nor other information from airports indicating that pavement deicers are absorbed into soil during the deicing season. Therefore, the Agency assumed for this rulemaking that 100 percent of the pavement deicers used could be discharged to surface waters.<sup>3</sup> This means the estimates of baseline pollutant loadings and removals associated with pavement de-icing are upper bound estimates. EPA then calculated the amount of COD loading associated with airfield chemical use and discharge as described below.

To calculate the COD loading associated with either ADF or airfield chemical discharge, EPA determined the theoretical oxygen demand (ThOD) associated with the degradation of each of the deicing chemicals. EPA based the ThOD estimate on the molecular formula of the chemical and the stoichiometric equation of the breakdown of the chemical to the end products of CO<sub>2</sub> and water. EPA assumed that the chemical would completely degrade in the environment over time and, therefore, the calculated ThOD load would be equivalent to the COD load. EPA estimated the COD load associated with each reported chemical based on the calculated mass of the chemical discharged, the molecular weight of the chemical, the ThOD, and the molecular weight of oxygen. EPA estimated the ammonia load associated with deicers containing urea based on the chemical equation for the

breakdown of urea to ammonia, the mass of urea use, and the molecular weights of urea and ammonia. See Section 9 of the TDD for more information and example calculations of baseline loadings associated with ADF and airfield deicers.

#### b. Calculation of Pollutant Removals

After determining baseline loadings, EPA calculated total reductions of COD and ammonia associated with a national implementation of today's options.

##### i. Aircraft Deicing Related Pollutant Removals

EPA estimated the amounts of COD that would be reduced by Option 1 and 2, by estimating the existing baseline loadings associated with aircraft deicing at model airports and comparing that to the COD load that would be discharged after complying with the option (*e.g.*, for Option 1, COD load discharged if 40 percent of available ADF were collected and treated to meet the required discharge limitation). If a particular airport would be subject to a collection requirement of 40 percent under this option and is currently estimated to collect a greater proportion of available ADF, then no load removals were estimated for that airport.

##### ii. Airfield Deicing Related Pollutant Removals

EPA calculated ammonia and COD baseline loads for those model facilities using deicers containing urea. The Agency then calculated ammonia and COD loads for those same model facilities if they replaced their deicers containing urea with the substitute product, potassium acetate (which does not form ammonia and exerts a lower COD than urea). EPA computed the total load reduction by subtracting the ammonia and COD loadings between the baseline and the regulatory compliance conditions.

##### iii. National Extrapolation

These calculated loading reductions, summed for both airfield and aircraft deicing chemicals, as applicable, were then extrapolated by multiplying the pollutant removals for each model facility by the airport survey weighting factors to determine national loads for the entire industry for each regulatory option considered for today's rule.

#### *C. Approach to Determining Long-Term Averages, Variability Factors, and Effluent Limitation Guidelines and Standards*

This section describes the statistical methodology used to develop the daily maximum and the maximum for weekly

average NSPS representing the BADCT levels of control for COD. EPA also used the same statistical methodology to develop the daily maximum limitation/standard for ammonia that is a compliance alternative when deicers containing urea are applied to runways. The following discussion uses the term "limitation" to collectively refer to effluent limitations guidelines and NSPS.

The following sections describe the data selection criteria, the statistical percentile basis of the effluent limitations, rationales for certain limitations, the calculations, the recommended long-term average value for treatment operations, and the engineering evaluation of the model technology's ability to achieve the levels required by the limitations.

#### 1. Criteria Used To Select Data as the Basis of the Limitations

Typically, in developing effluent limitations for any industry, EPA qualitatively reviews all the data before selecting the appropriate data to use for calculating the limitations. EPA typically uses four criteria to assess the data. One criterion generally requires that the influent and effluent represent only wastewater from the regulated operations (*e.g.*, deicing), and do not include wastewater from other sources (*e.g.*, sanitary wastes). A second criterion typically ensures that the pollutants were present in the influent at sufficient concentrations to evaluate treatment effectiveness. A third criterion generally requires that the facility must have the technology and demonstrate proper operation of the technology. A fourth criterion typically requires that the data cannot represent periods of treatment upsets or shutdown and start-up periods. Shutdown periods can result from upset conditions, maintenance, and other atypical operations.

EPA has adapted the application of the fourth general criterion for data corresponding to start-up periods to reflect some unique characteristics of treating discharges from aircraft deicing operations. Most industries incur start-up conditions only during the adjustment period associated with installing new treatment systems. During this acclimation and optimization process, the concentration values tend to be highly variable with occasional extreme values (high and low). After this initial adjustment period, the systems should operate at steady state for years with relatively low variability around a long-term average. Because start-up conditions reflect one-time operating conditions, EPA

<sup>3</sup> As a point of clarification, in contrast to the NSPS requirements for aircraft deicing where an airport is only required to meet the standards for a portion of the applied deicing chemical, this means that an airport that elects to comply with today's BAT or NSPS requirements by meeting the ammonia limitation must meet this limitation for all airfield deicer that is discharged.

generally excludes such data in developing the limitations. In contrast, EPA expects airports to encounter start-up operations at the beginning of every deicing season because they probably will cease treatment operations during warmer months. Because this adjustment period will occur every year for the Airport Deicing Category, EPA has included start-up data in the data set used as the basis of the limitations. However, through its application of the other three criteria, EPA excluded extreme conditions that do not demonstrate the level of control possible with proper operation and control even during start-up periods. For detailed information on these exclusions, see Section 14 of the TDD.

In part, by retaining start-up data for the limitation's development, the limitations will be achievable because EPA based these limits on typical treatment during the entire season. As a point of clarification, once acclimated, EPA expects a typically well-designed and operated system for the collected deicing fluid to run continuously until the end of the deicing season, as facilities utilize storage/equalization prior to the AFB to manage a steady flow rate.

## 2. Data Used as Basis of the Effluent Limitations

As explained in Section 8 of the TDD, the technology basis for the COD numerical limitations associated with discharges of collected ADF wastewater is AFB biological treatment. Of the effluent data available to EPA, 2,562 concentration values for COD met the requirements in the criteria described above and are the basis of the COD final NSPS. The concentration values are measurements of filtered effluent collected from Albany Airport's two-unit anaerobic treatment system. The 2,562 COD values were collected by the airport during its daily monitoring of COD over ten deicing seasons (December 1, 1999 through April 10, 2009).

Product substitution is the basis for today's effluent limitation regarding airfield deicing chemicals. EPA also established ammonia discharge limitations as a compliance alternative. Ammonia naturally occurs in airport discharges as a result of excretions from wildlife that enter the stormwater; therefore, EPA determined it would not be appropriate to set this limitation at the non-detect level. Moreover, depending on a specific airports' drainage system, a portion of airfield deicing stormwater may be routed to the treatment system utilized in treating the collected ADF. Further, the AFB that

has been identified as the basis for the NSPS requirement for treating collected ADF will itself produce ammonia discharges as a byproduct of treatment. Therefore, where airfield deicing stormwater that is free of urea contamination is routed through the AFB treatment system, the discharge after treatment may have ammonia concentrations higher than the non-detect level (see DCN AD00842). Consequently, EPA used ammonia effluent discharge data from the same AFB system it used to establish NSPS discharge requirements for ADF, located at Albany, to establish today's ammonia compliance alternative. Five ammonia concentration values available from Albany met the limitations criteria described above. The five ammonia values were collected by EPA during its sampling episode (February 5 through February 9, 2006).

## 3. Statistical Percentile Basis for Limitations

EPA uses a statistical framework to establish limitations that well-operated facilities are capable of complying with at all times. According to EPA, well-operated facilities are those that represent the BAT/BADCT level of control. Statistical methods are appropriate for dealing with effluent data because the quality of effluent, even in well-operated systems, is subject to a certain amount of variability or uncertainty. Statistics is the science of dealing with uncertainty in a logical and consistent manner. Statistical methods, together with engineering analysis of operating conditions, therefore, provide a logical and consistent framework for analyzing a set of effluent data and determining values from the data that form a reasonable basis for effluent limitations. Using statistical methods, EPA has derived numerical values for its daily maximum limitations and weekly average limitations.

The statistical percentiles upon which the limitations are based are intended to be high enough to accommodate reasonably anticipated variability within control of the facility. The limitations also reflect a level of performance consistent with the CWA requirement that these limitations be based on the best available technologies (or BADCT for new sources), including proper operation and maintenance of these technologies.

In establishing daily maximum limitations, EPA's objective is to restrict the discharges on a daily basis at a level that is achievable for an airport that targets its treatment system design and operation at the long-term average while

allowing for the variability around the long-term average that results from a well-operated system. This variability means that at certain times airports may discharge at a level that is greater than the long-term average. This variability also means that airports may at other times discharge at a level that is lower than the long-term average. To allow for possibly higher daily discharges, EPA has established the daily maximum limitation at a relatively high level (*i.e.*, the 99th percentile). EPA has consistently used the 99th percentile as the basis of the daily maximum limitation in establishing limitations for numerous industries for many years; numerous courts have upheld EPA's approach. EPA typically establishes limitations based upon statistical percentile estimates and has done so for the weekly average limitation in today's final rule. In its derivation of the weekly average NSPS for COD, EPA used an estimate of the 97th percentile of the weekly averages of the daily measurements. This percentile basis is the midpoint of the percentiles used for the daily maximum limitation (*i.e.*, 99th percentile of the distribution of daily values) and the monthly average limitation (*i.e.*, 95th percentile of the distribution of monthly average values). Courts have upheld EPA's use of these percentiles, and the selection of the 97th percentile of a weekly average of the daily measurements is a logical extension of this practice. Compliance with the daily maximum limitation is determined by a single daily value; therefore, EPA considers the 99th percentile to provide a reasonable basis for the daily maximum limitation by providing an allowance for an occasional extreme discharge. Because compliance with the monthly average limitation is based upon more than one daily measurement and averages are less variable than daily discharges, EPA has determined that facilities should be capable of controlling the average of daily discharges to avoid extreme monthly averages above the 95th percentile. In a similar manner to the monthly average limitation, compliance with the weekly average limitation also would be based upon more than one daily measurement. However, the airport would monitor for a shorter time and thus would have fewer opportunities to counterbalance highly concentrated daily discharges with lower ones. Consequently, EPA has determined that the 97th percentile is an appropriate basis for limiting average discharges on a weekly basis. EPA considers the use of the 97th percentile for the weekly average limitation a level

that is achievable for airports using the model technology. EPA also considers this level of control in avoiding extreme weekly average discharges to be possible for airports using the model technology.

#### 4. Rationale for Establishing Limitation on Weekly Averages Instead of Monthly Averages for COD in Effluent Discharges

From a monitoring perspective, EPA considers the weekly average standard to be a better fit than the monthly average standards for the deicing discharges. In this situation, the weekly average standard would apply to every week that the treatment system operates during the deicing season. A weekly average standard preserves EPA's intention for an additional restriction beyond the daily maximum standard that supports its objective of having airports control their average discharges at the long-term average level.

When EPA establishes monthly average standards, EPA's objective is to provide an additional restriction to help ensure that facilities target their treatment systems to achieve the long-term average. The monthly average standard requires facilities to provide ongoing control that complements controls imposed by the daily maximum standard. To meet the monthly average standard, a facility must counterbalance a value near the daily maximum standard with one or more values well below the daily maximum standard. To achieve compliance, these values must result in a monthly average value at or below the monthly average standard.

The deicing season is unlikely to start at the beginning of a calendar month and close exactly at the end of a calendar month. This means that the facility would be monitoring at a reduced frequency during those two months. Increasing or decreasing monitoring frequency does not affect the statistical properties of the underlying distribution of the data used to derive the standard. However, monitoring less frequently theoretically results in average values that are more variable. For example, monthly average values based on 10 monitoring samples per month would be (statistically) expected to include some averages that are numerically larger (as well as some that are numerically smaller) than monthly average values based upon 20 monitoring samples. Because of this reduced monitoring, an airport might have trouble in complying with the monthly average standard even with an otherwise well-operated and controlled system. In other words, because it was not monitoring as frequently, the airport would have fewer opportunities to

counterbalance high concentrations with lower values.

#### 5. Rationale for Promulgating a Limitation Only for Daily Discharges of Ammonia in Effluent Discharges

Unlike the COD limitations, EPA believes that it is appropriate to rely only on a daily maximum limitation to ensure that airports appropriately control ammonia levels. As explained above, the technology basis for the COD effluent standards is a well operated and controlled AFB system whereas the technology basis for the ammonia limitation is product substitution. It is well documented that during start up, biological treatment systems, such as AFB, may require several days to acclimate the microorganisms. Once acclimated, well-operated and controlled AFB systems operate continuously (typically by managing a steady flow from their equalization tank). If the system only operated during storm events, it would have difficulties stabilizing and achieving the performance levels necessary to comply with the COD standards.

In contrast, with product substitution, the operator could consider the conditions associated with each storm event, and then decide whether to use urea. If the operator chose to use urea rather than product substitution, the operator would have to determine its approach for meeting the ammonia limitation. Anaerobic systems, such as AFB systems, would not be a good candidate because they generate, rather than treat, ammonia. However, depending on a specific airport's drainage system, a portion of airfield deicing stormwater may be routed to the treatment system utilized in treating the collected ADF. For this reason, by using the ammonia data from the AFB system which was preceded by product substitution for urea, EPA created an allowance for such situations. Because the choice to use urea or product substitution can vary on a daily basis, EPA has established only the daily maximum limitation for ammonia. Additionally, EPA expects airports to select product substitution (*i.e.*, non-urea deicers) rather than the compliance alternative that requires collection and treatment of runway deicing contaminated stormwater. Thus, it is possible that no airports will be subject to any limitation on ammonia discharges.

#### 6. Calculation of Limitations for COD and Ammonia

For COD, EPA used nonparametric statistical methods to estimate the percentiles used as the basis of the daily

maximum and weekly average standards. A simple nonparametric estimate of a particular percentile (*e.g.*, 99th) of an effluent concentration data set is the observed value that exceeds that percent (*e.g.*, 99 percent) of the observed data points.

For the daily maximum standard for COD, EPA used the nonparametric method to derive a 99th percentile of the more than 1,200 daily measurements for each unit, and then set the standard equal to the median of the two 99th percentile estimates, or 271 milligrams per liter (mg/L). The median is, by definition, the midpoint of all available data values ordered (*i.e.*, ranked) from smallest to largest. In this particular case, because there are two units, the median is equal to the arithmetic average (or mean).

For the weekly average standard of COD, EPA first calculated, for each unit, the arithmetic average of the measurements observed during each week, excluding weekends. EPA then used the nonparametric method to derive a 97th percentile of the more than 200 weekly averages for each unit, and set the standard equal to the median of the two 97th percentile estimates, or 154 mg/L.

For ammonia, EPA used a parametric approach in estimating the 99th percentile based upon the data collected during EPA's five-day sampling episode. The calculations assume the ammonia concentrations can be modeled by a lognormal distribution. EPA's selection of parametric methods, such as a model based on the lognormal distribution, used in developing limitations for other industries is well documented (*e.g.*, Iron and Steel [40 CFR part 420], Pulp, Paper and Paperboard [40 CFR part 430], and Metal Products and Machinery [40 CFR part 438] categories). Variance estimates based upon parametric methods can be adjusted for possible biases in the data. The limitation of 14.7 mg/L includes such an adjustment for possible bias from positive autocorrelation. When data are positively autocorrelated, it means that measurements taken close together in time (such as one or two days apart) are more similar than measurements taken further apart in time, such as a week or month apart. The adjusted variance then better reflects the underlying variability that would be present if the data were collected over a longer period.

#### 7. Derivation of Long-Term Average for COD and Ammonia: Target Level for Treatment

Due to routine variability in treated effluent, an airport that discharges consistently at a level near the values of

the daily maximum standard or the weekly average standard, instead of the long-term average, may experience frequent values exceeding the standards. For this reason and as noted previously in this section, EPA recommends that airports design and operate the treatment system to achieve the long-term average for the model technology. Thus, a system that is designed to represent the BADCT level of control will be capable of complying with the promulgated standards.

For COD, EPA recommends that airports target treatment systems to achieve the long-term average value of 52.8 mg/L, which is the median of the two averages, of 52.28 mg/L and 53.40 mg/L, of the daily values from the two units. The daily allowance for variability, or the ratio of the standard to the long-term average, is 5.13. EPA usually refers to this allowance as the "variability factor." In other words, the daily maximum standard of 271 mg/L is about five times greater than the long-term average achievable by the model technology. The weekly variability factor is 2.92.

For ammonia, EPA derived its recommended long-term average value of 5.24 mg/L from the statistical expected value of the lognormal distribution. The daily maximum limitation of 14.7 mg/L is about three times greater than the long-term average, of 5.24 mg/L, achievable by the ADF treatment model technology. Ammonia is generated as a byproduct of the model technology, and EPA expects the concentrations of ammonia to have similar variability to what is being treated (*i.e.*, COD).

#### 8. Engineering Review of Effluent Limitations

In conjunction with the statistical methods, EPA performs an engineering review to verify that the limitations are reasonable based upon the design and expected operation of the control technologies and the facility conditions. During the site visit and sampling trip at the Albany treatment plant, EPA confirmed that the airport used the model technologies, specifically AFB. EPA subsequently contacted the plant personnel to obtain more information about the installation and operation of the model technologies. EPA used this engineering information to select the subset of data from which to develop the effluent limitations.

As part of this engineering review, EPA concluded that the values of the limitations were consistent with the levels that are achievable by the model technologies. Next, EPA compared the value of the effluent limitations to the

data values used to calculate the limitations. None of the data selected for ammonia were greater than its daily maximum limitation, which supports the engineering and statistical conclusions that the limitation value is appropriate. Because of the statistical methodology used for the COD standards (*i.e.*, use of percentiles), some values were appropriately greater than the standards. See Section VI.C.3. Even though EPA would expect this statistically, EPA looked at the values that exceed the standards from an engineering perspective. EPA wanted to ensure there were no underlying conditions contributing to such exceedances. In particular, EPA looked at deicing season, influent concentrations, and start-up operations. In evaluating the impact of the deicing seasons, EPA concluded that the higher values did not seem to be predominant in any one season. In particular, the higher values occurred one to seven times in each of eight seasons. In evaluating influent concentrations, EPA found that influent concentrations were generally well controlled into the treatment plant. In general, the treatment system adequately treated even the extreme influent values, and the high effluent values did not appear to be the result of high influent discharges. In considering start-up operations, EPA noted that the higher values occurred in every month from December through May, except in April, and, thus, the standards appear to provide adequate allowance for start-up operations.

### VII. Economic Analysis

#### A. Introduction

EPA's EA assesses the costs and impacts of the regulatory options considered today on the regulated industry. This section explains EPA's methodology and the results of its EA. With one exception, all costs, airport counts and other results in this section are presented using sample weights to expand results from the surveyed airports to represent the entire population of airports potentially affected by the rule. The single exception, the results of the debt service coverage analysis, is clearly marked as "unweighted." In addition, all cost figures are presented in 2006 dollars.

#### B. Annualized Compliance Cost Estimates

EPA considered three regulatory options for today's final rule. Under all of these options, airports subject to BAT or NSPS would have requirements with respect to airfield deicing stormwater

(certify no use of airfield deicing products that contain urea, or airfield pavement discharges must achieve a numeric limit for ammonia). EPA estimates that 198 existing airports—those that perform deicing operations with at least 1,000 annual non-propeller aircraft departures—are subject to the airfield deicing requirements.<sup>4</sup> In addition, for two of the options, a subset of those airports—airports with annual normalized ADF usage equal to or exceeding 60,000 gallons per year (55 airports)—would also need to meet requirements related to wastewater from aircraft deicing (ADF collection and COD discharge limitations). The regulatory options that EPA considered differ in the level of ADF collection required for aircraft deicing at existing airports. Option 1 would require 40 percent collection and treatment for all airports with at least 60,000 gallons of annual normalized ADF usage. Option 2 would set a two-tier requirement: 20 percent collection and treatment for airports with at least 60,000, but less than 460,000 gallons of annual normalized ADF usage, and 40 percent collection and treatment for airports with at least 460,000 gallons of annual ADF usage. Under Option 3, aircraft deicing discharge BAT limitations would continue to be established by the permitting authority on a case-by-case basis. Under all three options, new airports with at least 10,000 annual departures and located in an area with at least 3000 HDDs would also have to collect 60% of ADF available for discharge and store and treat this effluent to meet a COD effluent limit. For both new and existing airports with deicing discharges that do not meet the NSPS airfield or aircraft pavement applicability requirements, limitations would continue to be set by the permitting authority on a case-by-case basis using BPJ.

EPA selected Option 3 for promulgation in this final rule. EPA estimates the technologies identified in this notice to comply with the BAT limitations will cost existing airports \$3.5 million annually. EPA has not estimated the cost for compliance with the NSPS, but separately discusses the potential for the NSPS to pose a barrier entry in section VII.E below.

<sup>4</sup> Because many airports do not meet the applicability criteria, EPA estimates that approximately 184 primary airports, 135 non-primary airports, and almost 3,000 general aviation airports are not required to meet the BAT effluent limitations guidelines and NSPS, but rather would be subject to site-specific BAT and NSPS requirements set on a best professional judgment basis.

In estimating costs associated with Option 1 and Option 2, EPA projects the effective service life of GCVs and block-and-pump technologies to be 10 years; all other components necessary to meet the options have an effective service life of 20 years. Therefore, EPA selected a 20-year analytic period and incorporated replacement capital expenditures in year 10, in addition to the initial capital expenditure. For example, EPA estimated total capital costs to include all initial and replacement capital expenditures for GCV and plug-and-pump for Option 1. However, because the replacement capital expenditures occur 10 years after promulgation, the discounted present

value (PV) of those expenditures is less than their current value.

EPA uses 3 percent and 7 percent interest rates for two purposes. First, the interest rates are used to discount future capital replacement costs required when the 20-year analytic period exceeds the effective service life of a technology. Second, the interest rates represent the opportunity cost of capital to industry, and, thus, essentially the interest rate the industry may be charged if the industry borrows money.

EPA discounted and annualized the stream of capital costs projected to be incurred by industry over 20 years using two different discount rates, 3 percent and 7 percent, in accordance with EPA and OMB guidance (“Economic Analysis of Federal Regulations under

Executive Order 12866,” January 11, 1996). The PV of capital costs under the final rule over the 20-year analytic period is \$6.02 million based on the discount rate of 3 percent, and \$5.27 million using the 7 percent rate.

The annual cost of operating and maintaining the technologies identified as BAT for deicing for this final rule is estimated at \$3.04 million. Adding this O&M cost to the annualized capital costs, the rule has aggregate national costs of \$3.43 million per year using a 3 percent discount rate and annualized costs to industry of \$3.5 million using a 7 percent rate (in 2006 dollars). Table VII–1 presents projected costs for the final rule, as well as the other option examined.

TABLE VII–1—COSTS TO EXISTING AIRPORTS THAT DEICE AIRCRAFT AND AIRFIELD PAVEMENT  
[2006 \$million—198 airports (weighted)]

Option	Total capital costs	Present value of capital costs	Annualized capital costs	Annual O&M costs	Total annualized compliance costs
<b>3 Percent Real Discount Rate</b>					
1 .....	\$319.9	\$309.0	\$20.2	\$52.0	\$72.1
2 .....	250.3	243.7	15.9	28.4	44.3
3 <sup>a</sup> .....	6.83	6.02	0.39	3.04	3.43
<b>7 Percent Real Discount Rate</b>					
1 .....	319.9	299.0	26.4	52.0	78.4
2 .....	250.3	237.6	21.0	28.4	49.4
3 <sup>a</sup> .....	6.83	5.27	0.46	3.04	3.50

<sup>a</sup> Selected option.

C. Economic Impact Methodologies

For the purposes of the economic impact analysis, the distinguishing feature of airports that makes the analysis different from more traditional analyses EPA would perform for a for-profit manufacturing industry, is that all potentially affected airports are publicly owned and operated by local, county, or state governments, or by quasi-governmental authorities created to operate the airport. As governmental or quasi-governmental entities, airports do not earn a profit or loss in the traditional financial sense; in fact, many airports have been operated with the expectation that they will break even financially, with the airlines that use the airport legally required to cover expenditures in excess of budgeted costs.

Airlines may also be impacted by today’s rulemaking. In the vast majority of cases, airlines are not directly subject to today’s requirements. In such cases, impacts to airlines are considered secondary impacts. Historically, EPA

determines economic achievability based on primary or direct impacts only (i.e., impacts to NPDES permit holders directly subject to ELG requirements) and does not evaluate secondary impacts. At the time of the proposal, EPA elected to evaluate secondary impacts to airlines because of the unique contractual relationship between airports and airlines, because airlines are the entities that use ADF, and because airlines are occasionally co-permittees (but never the principal permittee) at an airport.

In a revision from the proposal and consistent with past effluent guideline economic achievability analyses, for today’s final rule, EPA determined economic achievability based on primary or direct impacts only. EPA returned to its historical approach of evaluating economic achievability based on only primary impacts (here, impacts on airports and airline co-permittees) for today’s final rule because the Agency concluded that ultimately these entities will be responsible for incurring the

costs and associated impact of any additional regulation.

In the analyses described below, EPA first evaluates the economic achievability of the options assuming all costs are borne by airports, and the summaries of impacts to airports are based on that assumption. EPA also presents an analysis that shares compliance costs between affected airports and their co-permittee airlines, as applicable. Therefore, impacts to co-permittee airlines presented as follows are not in addition to the impacts to airports. To the extent that airports share costs with co-permittee airlines according to EPA assumptions, the costs and impacts to airports are reduced. This analysis is described in detail in the rulemaking record DCN AD01280. The following text describes the methodology and the results EPA used to evaluate economic impact associated with the three regulatory options considered for today’s final rule, both under the assumption that airports incur 100 percent of compliance costs, and

the assumption that airports share compliance costs with co-permittee airlines.

#### 1. Cost Annualization

Cost annualization is the first step in projecting the economic and financial impacts of the regulatory options rule. EPA projected the capital and operating and maintenance costs of the three regulatory options for each airport, then annualized those costs over 20 years. The method for estimating each airport's capital and operating costs is described in Section VI.A.

EPA used airport-specific interest rates based on recent General Airport Revenue Bonds (GARBs) issued to annualize compliance costs for the proposed rule. Based on public comments arguing that EPA underestimated the cost of capital to airports, EPA used a higher real interest rate of 7 percent to annualize airport capital costs for the final rule. However, EPA believes many airports will issue tax-exempt GARBs to fund capital expenditures. To the extent that airports use GARBs, the use of GARBs will lower the cost of capital, and reduce impacts to the financial health of the airports. EPA does not assume that airports will be able to fund capital expenditures using Airport Improvement Program (AIP) grants or Passenger Facility Charges (PFCs) because such funds are likely to already be committed to airport projects into the foreseeable future. However, to the extent that airports might use AIP or PFC funds for capital expenditures associated with this rule, it will also lower the cost of capital, and reduce impacts to the financial health of the airports relative to what EPA has projected in its analysis.

#### 2. Airport Impact Methodology

Because all in-scope airports are nonprofit government or quasi-government entities (e.g., port authorities), the effect of an effluent guideline on airport income statements and balance sheets is not best measured by a traditional closure analysis. Therefore, EPA chose to examine the financial impacts of the regulatory options using two measures. First, EPA compared total annualized compliance costs with airport revenues. Second, because many airports fund capital expenditures using debt financing, EPA examined the impact of additional debt on each airport's debt service coverage ratio (DSCR).

##### a. Revenue Test

EPA's "Guidelines for Preparing Economic Analyses" (2010) recommends the "revenue test" as a

measure for impacts of programs that directly affect government and not-for-profit entities. EPA finds that the revenue test is appropriate in this case. The revenue test compares the total annualized compliance costs of each regulatory option with the revenues of the governmental entities. Although the current Guidelines do not specify the use of one and three percent for the revenue test, EPA's 2000 Guidelines did specify that use, and the Agency's analysis for the proposed rule followed that guidance; EPA applied the same test here.

The 2000 Guidelines suggest evaluating the affordability of a regulatory option as follows:

- If total annualized compliance costs are less than 1 percent of revenues, the option is generally considered affordable for the entity.
- If total annualized compliance costs are greater than 3 percent of revenues, the option is generally considered not affordable for the entity.

EPA used operating revenue as reported on Form 127 of the FAA's Airport Financial Reporting Program as the denominator for the revenue test ratio, and total annualized compliance costs as described under Cost Annualization as the numerator for the ratio.

Industry commenters on the proposed rule objected that the revenue test is too simplistic. EPA disagrees, and moreover, industry commenters were unable to provide any alternative test that would more accurately project economic impacts on the industry. Some industry commenters suggested that EPA examine different, more narrowly defined ratios, such as the ratio of compliance costs to aeronautical revenues, or the incremental cost per enplaned passenger. EPA did not choose to replace the revenue test with one of these variants because EPA determined that total operating revenues are the appropriate denominator for the test; the sole purpose of the airport is to support air transportation services. Landside revenues raised through parking, retail, and food concessions, for example, are not designed to provide a revenue stream to support the provision of a different service or product, but to allow airports to accumulate revenue from non-airline sources. Thus, the intent of these revenue streams is also to support the provision of air transportation services and is therefore a component of an airport's resources relevant to its implementation of these effluent limitation guidelines. Furthermore, industry commenters offered no suggestions for alternative thresholds for finding airport impacts, and, in fact,

acknowledged that such thresholds do not exist in the case of their recommended incremental cost per enplaned passenger test. EPA did, however, perform several of these alternative tests as sensitivity analyses and determined that the resulting projections of economic impacts to the industry did not differ qualitatively from those under the revenue test analysis.

##### b. Debt Service Coverage Ratio

When creating quasi-governmental agencies such as port authorities, the legislation that created the agency typically includes a lower limit on the authority's DSCR. Airports owned and operated directly by a state or local government might also have direct limits on airport debt (if the airport has authority independent of the city or county government to incur debt). The authority will be in default on its debt if the DSCR falls below the relevant benchmark. A review of Comprehensive Annual Financial Reports for affected airports shows that generally the ratio of net revenues to debt service for any given year cannot fall below 1.25. Therefore, EPA estimated the impact debt financing will have on the post-regulatory DSCR for each airport incurring capital expenditures under each regulatory option.

Using the Airport Questionnaire responses, EPA collected each airport's current DSCR, and the net revenues and debt service used to calculate that ratio. For airports that belonged to multi-airport systems under the same ownership, DSCR was reported at the level of the entire system. Therefore, for each regulatory option, EPA aggregated compliance costs for all affected airports in the system, and performed a single calculation for the post-regulatory DSCR.

Some evidence suggests airports will pass on less than 100 percent of costs, at least in the short run, if there is concern an airline might withdraw service if the airport increases fees too much. This might occur if the airport has nearby competitors, or if airline finances are fragile. EPA wanted to determine if an airport would be in danger of default on its debt even if it was unable to pass through compliance costs to its airline customers. Thus, the Agency calculated post-regulatory DSCR in two ways: (1) Assuming costs are passed through to airlines in the form of higher landing fees, and (2) assuming no costs are passed through.

In the baseline, the DSCR is calculated by dividing airport net revenues by airport debt service. Assuming 100 percent cost pass-through

from airports to airlines, EPA estimated the post-regulatory DSCR of each regulatory option by: (1) Assuming zero change in airport net revenues in the numerator (more precisely, EPA assumes that annual increase in landing fees are exactly equal to incremental annual deicing costs, thus leaving net revenues unchanged), and (2) adding the annualized value of capital compliance costs to debt service in the denominator. The DSCR decreases even when assuming 100 percent cost pass-through; although the value of the numerator is unchanged, the denominator increases by the amount equal to annualized capital cost, decreasing the value of the ratio.

Assuming no cost pass-through from airports to airlines, EPA estimated the post-regulatory DSCR by for each regulatory option by: (1) Subtracting incremental annual deicing operating and maintenance costs from pre-regulatory airport net revenues in the numerator, and (2) adding the annualized value of capital compliance costs to debt service in the denominator. With zero cost pass-through, the numerator in the ratio decreases because incremental O&M costs are subtracted from existing revenues, while the denominator increases because incremental debt service is added to existing debt service; thus, the DSCR clearly falls.

All additional analyses, their methodologies, justifications, and results, are presented in the Economic Analysis (EA).

### 3. Co-Permittee Airline Impact Methodology

In response to public comment, EPA examined potential economic impacts to airlines that are directly subject to today's final regulation: those that are co-permittees on NPDES permits. EPA conducted analyses of impacts to airlines that are co-permittees at certain airports, under the assumption that co-permittee airlines would directly pay a share of the airport's compliance costs. EPA identified airline co-permittees through EPA's Airport Deicing Questionnaire, where airports had been asked to identify all co-permittees. While the questionnaire responses identified co-permittees, they did not provide any data or insight into how permit-related compliance costs are currently distributed to, and among, co-permittees, if at all. Although the general outlines of standard contractual relations between airports and airlines can be characterized (see section 2.8 of the EA), the inclusion of an airline on the airport's NPDES permit is not a common practice. In addition to

reviewing information supplied in the questionnaires, EPA searched publicly available information, reviewed comment responses, and inquired of airline representatives on such relationships. Industry representatives did not provide EPA with information on these contractual relationships in the questionnaires or their comments on the proposed rule, nor did they provide this information to the Agency in pre-proposal meetings that were arranged to discuss the economic methodology of the rule. EPA was unable to gather any specific insight into these relationships or the distribution of compliance costs among the principal NPDES permit holder and its co-permittees. Thus, for purposes of this analysis, EPA assumed compliance costs would be distributed equally among the principal permittee (*i.e.*, airport) and its co-permittee airlines. EPA recognizes that some individual airports may incur a higher percentage of the compliance costs relative to their co-permittees and others may incur a lower percentage. However, for purposes of a national analysis, and with a lack of informative data, EPA finds a 50 percent distribution assumption to be reasonable.

EPA does not separately assign capital costs to airlines and annualize those costs using airline-specific costs of capital; it seems more likely that with responsibility for the physical site, the airport would take the lead and have those costs reimbursed by the co-permittees. Thus, EPA assigned 50 percent of the total annualized compliance costs collectively to the co-permittee airlines. For each model airport with co-permittees, EPA needed to determine how to apportion the co-permittee portion of the compliance costs to the individual co-permittees. As explained in previous text, EPA does not have data to determine if co-permittees currently incur any permit compliance-related costs, nor, if they do incur those costs, how they are distributed among co-permittees at individual airport locations. In the absence of specific information, EPA chose to attribute airport-specific compliance costs to each co-permittee based on its share of total landed weight at the airport. EPA chose this method because ADF usage should be roughly proportionate to the number and type of aircraft an airline typically uses at the airport, and therefore proportionate to the costs of collecting and treating that ADF. Share of landed weight can be considered a simple summary measure that reflects both relative usage and aircraft size. This approach is also consistent with how airports typically

attribute airside operational costs to airlines. EPA then calculated an airline's total compliance costs by summing its airport-specific compliance costs over all airports at which the airline is a co-permittee. Finally, each airline's compliance costs were compared to its system-wide operating revenue, operating profit, and net income.

The comparison of one year's average annualized compliance costs with operating profit and net income is consistent with a typical economic impact analysis. In a typical economic impact analysis, EPA would project the affected entities' discounted compliance costs and cash flow over the period of analysis. If an entity's pre-regulatory discounted cash flow is positive, and its post-regulatory discounted cash flow is negative (*i.e.*, projected pre-regulatory discounted cash flow less discounted compliance costs), the entity would be projected to close as a result of the effluent guideline. EPA then typically examines economic achievability by looking at the total number of closures relative to the total number of in-scope companies. In this case, if average compliance costs in one year exceed average operating profit or net income for that year (*i.e.*, the ratio of compliance costs to operating profit or net income is greater than 100 percent), the airline can be projected to "close" as a result of the effluent guideline.

However, such an analysis is problematic for airlines for a number of reasons. First, a baseline closure, an entity with negative income prior to the promulgation of the effluent guideline, cannot be evaluated on the basis described above because the logic of that analysis requires that the entity's pre-regulatory income be greater than zero. As amply documented in the EA (and updated in DCN AD01285), the last decade has been financially difficult for the airline industry, and approximately half the U.S.-flag airlines incurring compliance costs as co-permittees under normal circumstances would be categorized as baseline closures and could not be analyzed by this standard.

Second, airlines have many options they can undertake in response to increased costs, short of going out of business. For example, airlines have the option to change service to a particular airport by increasing fares, decreasing service frequency, using different (typically smaller) aircraft, eliminating destinations flown to directly from that airport, or even eliminating service altogether to that airport.

To address the baseline closure issue, EPA included airline operating revenue as a third measure against which



compliance costs can be compared, along with operating profit and net income. The purpose of using operating revenue is solely because such a large proportion of the airline industry cannot be evaluated due to negative baseline operating profit and/or net income: 23 of 46 co-permittee airlines with financial data available have negative baseline operating profit, and 25 of 46 have negative baseline net income. Furthermore, classifying an entity as a baseline closure does not mean it will necessarily close; a business entity might earn negative operating profit or net income at some point in its financial history without closing permanently, and this appears to be particularly prevalent in the airline industry (see, for example, the Industry Profile in the EA). Rather than ignore roughly half of all co-permittee airlines, EPA chose to evaluate them using the ratio of compliance costs to operating profit to determine if the rule imposes costs that can be characterized as “relatively small.” The primary drawback of using operating revenue to measure economic impacts is that, unlike with operating profit or net income, there is no obvious threshold that determines what is economically achievable.

To respond to the issue of changing service levels at an airport, it would also be informative to perform, if possible, a closure analysis at the route level for each airline’s routes associated with airports. However, EPA does not have airline financial data available, nor could it reasonably obtain airline financial data at either the route level or the airport level. Therefore, EPA must evaluate impacts to co-permittee airlines based on the only level at which airline financial data are available: their system-wide operations.

*D. Results of Impact Analysis*

1. Results of Airport Impact Analysis

a. Revenue Test Impact Results

Table VII–2 shows the projected financial impact of the regulatory options considered for today’s rule based on the revenue test. Under Option 1, airports would incur \$78.4 million in annualized costs (7 percent real interest rate), and 9 of the 198 airports (4.5 percent) are projected to incur costs exceeding 3 percent of operating revenue. Of the 198 BAT airports, 172 airports (87 percent) are projected to incur annualized compliance costs composing less than 1 percent of

operating revenue. Under Option 2, airports would incur \$49.4 million in annualized costs (7 percent real interest rate), and 5 of the 198 airports (2.5 percent) are projected to incur costs exceeding 3 percent of operating revenue. Of the 198 airports subject to BAT, 176 airports (89 percent) are projected to incur annualized compliance costs composing less than 1 percent of operating revenue. Under both Option 1 and Option 2, five airports incur costs but do not have airport-specific financial data because they are part of Alaska’s Rural Aviation System (RAS), and therefore could not be analyzed. Under Option 3, airports would incur \$3.5 million in annualized costs (7 percent real interest rate), and one of the 198 airports (0.5 percent) are projected to incur costs exceeding 3 percent of operating revenue. Of the 198 BAT airports, 190 airports (96 percent) are projected to incur annualized compliance costs composing less than 1 percent of operating revenue. Under Option 3, two airports incur costs but do not have airport-specific financial data because they are part of Alaska’s RAS, and therefore could not be analyzed.

TABLE VII–2—FINANCIAL IMPACTS OF BAT OPTIONS ON AIRPORTS THAT DEICE  
[2006 \$million—198 airports (weighted)]

Option	Total annualized costs	Number of airports with ratio of annualized compliance costs to operating revenue of:			
		Less than 1%	Between 1% and 3%	Greater than 3%	Not analyzed <sup>a</sup>
1 .....	\$78.4	172	13	9	5
2 .....	49.4	176	13	5	5
3 <sup>b</sup> .....	3.50	190	6	1	2

<sup>a</sup> Airports incurred compliance costs but are owned by the state of Alaska; financial impacts could not be analyzed because Alaska does not track revenue data for these airports.

<sup>b</sup> Selected option.

b. DSCR Impact Results

For multi-airport systems, the DSCR must be evaluated at the level of the owner, aggregating compliance costs incurred by all system airports. Thus, EPA analyzes entities owning single airports separately from multi-airport systems. Under today’s final rule, among owners of single airports, none

are projected to be in danger of default on its debt even if 0 percent of compliance costs are assumed to be passed through to airlines (see Table VII–3). EPA identified three multi-airport systems owning four airports projected to incur costs under the final rule (note these owners also owned other airports not projected to incur

costs); the results presented in Table VII–4 show that today’s final rule is projected to have no impact on the ability of multi-airport authorities to finance debt. EPA did not analyze impacts to the DSCR for the Alaska RAS (one system owning two BAT airports) because Alaska does not use debt financing to fund this system.

TABLE VII-3—IMPACT OF FINANCING BAT OPTIONS ON AIRPORT DEBT SERVICE COVERAGE RATIO—SINGLE AIRPORT OWNERS  
[172 Airports (weighted)]

Option	Incur costs <sup>a</sup>	Not analyzed <sup>a</sup>	Owners with pre-regulatory DSCR > 1.25 and post-regulatory DSCR < 1.25	
			100% cost pass through	0% cost pass through
1 .....	172	59	2	3
2 .....	172	59	1	2
3 <sup>b</sup> .....	29	3	0	0

<sup>a</sup>Of 198 airports (weighted), each of the 172 airports was estimated to be both subject to BAT under Option 1 and Option 2 and the only airport controlled by its ownership. These columns represent the number of those 172 airports projected to incur costs under each option, and of those airports incurring costs, the number that cannot be analyzed due to lack of sufficient data. Under Option 3, 29 airports incur costs under BAT; three of which cannot be analyzed due to lack of sufficient data.

<sup>b</sup>Selected option.

TABLE VII-4—IMPACT OF FINANCING BAT OPTIONS ON AIRPORT DEBT SERVICE COVERAGE RATIO—MULTI AIRPORT OWNERS

[Nine airport authorities owning 21 in-scope airports (unweighted)<sup>a</sup>]

Option	Incur costs <sup>b</sup>		Not analyzed <sup>b</sup>		Owners with pre-regulatory DSCR > 1.25 and post-regulatory DSCR < 1.25	
	Owners	Airports	Owners	Airports	100% cost pass through	0% cost pass through
1 .....	9	21	1	5	0	0
2 .....	9	21	1	5	0	0
3 <sup>c</sup> .....	3	4	0	0	0	0

<sup>a</sup>Some airports that are part of a multi-airport system have a sample weight greater than one; because airports were not sampled based on ownership patterns, it is not appropriate to use the sample weight in this analysis. The results cannot be extrapolated to represent any airports and their ownership patterns other than themselves.

<sup>b</sup>EPA found nine distinct airport authorities owning 21 airports that were determined to be subject to BAT under Options 1 and 2. These columns represent the number of airport owners and the number of airports they owned that are projected to incur costs under each option, and of those owners and airports incurring costs, the number that cannot be analyzed due to lack of sufficient data. Four airports owned by three airport systems incur costs under Option 3.

<sup>c</sup>Selected option.

For the selected option, the DSCR analysis was performed on 26 airports owned by single airport authorities and 4 airports owned by 3 multi-airport authorities expected to incur costs under BAT (3 airports owned by single airport authorities cannot be analyzed). EPA projects that none of these airports are at risk for default on their debt.

c. Impacts to Alaska’s RAS

Five airports operated by Alaska could not be analyzed using the revenue test or the DSCR as presented above; all five airports are projected to incur costs under Option 1 and Option 2, while only two of these five airports are projected to incur costs under Option 3. These airports are part of Alaska’s RAS, which is not a self-supporting system; Alaska has determined these airports must remain open despite financial losses to provide access to otherwise isolated rural communities. EPA evaluated economic impacts to these airports separately, which is described as follows.

Alaska operates two airport systems. The Alaska International Airport System (Ted Stevens Anchorage International Airport and Fairbanks International Airport) is a major enterprise fund of the state of Alaska, and considered to be self-sufficient; in short, the Alaska International Airport System operates in the same manner as most other multi-airport authorities in the United States. Alaska’s second system, the RAS, which consists of 256 rural airports, is not a self-sufficient government unit and loses money every year. EPA determined that five RAS airports (Bethel, Ketchikan International, Sitka Rocky Gutierrez, Nome, and Ralph Wien Memorial) would be subject to BAT requirements. Due to the nature of transportation in Alaska, it is vital that these airports remain in operation despite not being profitable; approximately 82 percent of Alaskan communities are not served by roads, and these communities rarely have a practical alternative to air transportation for access (see DCN AD01336). According to the Alaska Department of

Transportation and Public Facilities, RAS airports “are funded through a combination of user fees, state, local, or tribal funds, and federal funds.” However, the rural airports have very limited opportunities for generating revenue; in 2004 revenues from airport users, concessions, and leasing of airport property comprised less than 17 percent of the cost of operating the system (DCN AD05081). The system is largely reliant on state subsidies to pay O&M costs at these airports. Therefore, EPA evaluated impacts to the RAS separately.

EPA estimated compliance costs for the five RAS airports subject to BAT. EPA used the estimated yearly contribution of \$23 to \$24 million by the state of Alaska to cover the operating costs of the RAS (DCN AD05081) as a proxy for RAS operating revenues for the purpose of measuring economic impacts; this is an underestimate of RAS revenues because it does not account for the unknown revenue stream from other sources. Under the selected BAT option in the final rule, projected compliance

costs for the five RAS airports together total \$61,000, which compose 0.26 percent of the state's contribution to airport operations. EPA therefore determined that because compliance costs to the RAS compose less than 3 percent of the system's revenues, the rule is economically achievable to the RAS.

## 2. Results of Co-Permittee Airline Impact Analysis

Under Options 1 and 2, EPA determined that 27 airports subject to BAT and incurring costs listed 75 individual airlines as co-permittees. However, under the selected Option 3, six airports subject to BAT and incurring costs listed 28 individual airlines as co-permittees. Twenty-seven of these co-permittee airlines were U.S.-flagged, and one was foreign-owned under Option 3. On average, each of the 27 U.S.-flagged air carriers was a co-permittee at two airports, with a range of co-permitting of between one to four airports. Under an assumption of a 50:50 split of compliance costs between airports and co-permittee airlines, these 27 carriers would incur \$180,000 in annualized compliance costs, and the foreign-flag carrier would incur less than \$150 in annualized compliance costs.

Twenty-five of the 27 U.S. co-permittee airlines have available financial data. Ten co-permittees have positive baseline operating profits, while nine have positive baseline net income, and therefore are eligible to be analyzed using these metrics. EPA projected that none of these airlines will incur costs exceeding 3 percent of operating profit or net income under Option 3, which is well short of the 100 percent threshold that would indicate a definitive closure. Furthermore, none of the 25 airlines were projected to incur compliance costs exceeding 1 percent of operating revenues under Option 3.

Finally, to the extent that 50 percent of airport compliance costs are shared with co-permittee airlines, impacts to airports are reduced as measured by the ratio of compliance costs to operating revenue. EPA projects that no airports incur costs exceeding 3 percent of revenues under the promulgated option using the assumptions of the co-permittee airline analysis. Assuming no costs are shared with co-permittee airlines, EPA projected that one airport incurs costs exceeding 3 percent of revenues under this option.

## 3. Economic Achievability

Based on the analyses presented above, EPA has determined that the selected option is economically

achievable. EPA finds that the promulgated option is economically achievable both when airports are assumed to incur 100 percent of compliance costs, and when airports and their applicable airline co-permittees are assumed to share compliance costs.

Under previous rulemaking efforts that directly impose compliance costs on government agencies, EPA used the revenue test to evaluate impacts to these agencies; when projected compliance costs exceed 3 percent of operating revenues, the rule is judged to be unaffordable for a facility. As shown in Table VII-2, only one airport, which represents 0.5 percent of the airports subject to BAT, is projected to incur costs exceeding 3 percent of operating revenue when airports are assumed to incur 100 percent of compliance costs. EPA used several conservative assumptions in evaluating impacts to airports; costs were annualized using a real 7 percent interest rate, which is significantly higher than airports typically pay for debt financing. At the 7 percent real interest rate, EPA demonstrated that airports' ability to service debt would not, in general, be negatively affected by the rule. EPA also did not take into account airports' ability to access other funding for capital expenditure, such as AIP grants or PFCs. Also, EPA performed its analysis of airport impacts without distributing any costs to co-permittee airlines. As such, the estimates of impacts at airports with co-permittees may be overstated.

As noted in the previous section, EPA examined a number of alternative measures of economic impacts for airports in response to public comments on the proposed rule. However, EPA found none of these alternative approaches to be preferable to the revenue test method. None of the approaches provided a clear dividing line for determining what impacts might or might not be economically achievable for airports. That is, even if EPA selected one of industry's alternative measures, EPA would still have to determine some threshold that distinguishes impacts that are economically achievable from those that are not; industry did not provide such thresholds with their preferred measures, and for one measure specifically stated they did not know the appropriate threshold. Nevertheless, EPA did perform sensitivity analyses to determine what affect the use of these alternative measures might have on its conclusions on economic achievability of the final rule. EPA's sensitivity analyses found that using these

alternative measures would not substantively change the overall results on the final rule's economic achievability. The results of these alternative analyses are not presented in this preamble, but are included in the EA as sensitivity analyses.

With respect to airlines that are NPDES co-permittees, none of these airlines are shown to incur a demonstrable impact under the selected option on three airline income measures: operating revenue, operating profit, or net income. Therefore, EPA finds the costs to be economically achievable for co-permittee airlines for today's final rule.

Finally, EPA also assumed compliance costs would not be passed through to airlines and/or their passengers in the form of higher rates and charges. As previously explained, EPA did assume costs would be shared by co-permittee airlines. The no-pass-through assumption is conservative and EPA believes that airports and, ultimately, airlines will likely pass through costs to reduce the cost and impact of the rule, which is further support for EPA's conclusion that today's final rule is economically achievable.

## E. Economic Impacts for New Sources

EPA has determined that the NSPS in the final rule would not impose a barrier to entry for new sources. DIA is the only "greenfield" airport, or an airport built on undeveloped land or land not previously used for aviation, that definitely meets the scope of this rulemaking, and was built in the past 25 years.<sup>5</sup> DIA was developed with deicing pads and an extensive treatment system for collected ADF; information from DIA demonstrates that the CDPs, along with the extensive treatment system, comprised 3.6 percent of the cost of building a new airport, and did not pose a barrier to entry (DCN AD01260).

As previously indicated, the building of major greenfield airports has become a relatively rare occurrence. Conversion of ex-military airports (e.g., Orlando International) appears to be a much more common source of sites for cities seeking to increase air transportation access. Such conversions would not be considered "new sources" under today's rule. EPA reviewed FAA's National Plan of Integrated Airport Systems (NPIAS) reports published between 2002 and 2010, and found that the development of any new commercial service airports

<sup>5</sup> DIA opened in 1995, but new, major airports built prior to Denver predate it by 20 or more years: Dallas-Fort Worth, which opened in 1973, George Bush International in Houston, Texas, and Washington Dulles, which opened in the 1960s.

is relatively rare, but a smaller commercial service greenfield airport is more likely to be built, as compared to a major airport. In 2002, FAA expected 125 airports, none of which were commercial service airports, to open within the next five years. Furthermore, when queried in 2011, FAA indicated that they had no applications for any new airports that would be subject to NSPS in today's rule, nor were they aware of any expected applications. However, two new primary airports recently opened in Panama City, Florida (May 2010), and St. George, Utah (January 2011). A new, smaller commercial airport is more likely than a large airport such as DIA, EPA wanted to examine the possible barrier to entry for new smaller commercial airports that might be subject to new source requirements.

Based on incomplete data published in the NPIAS, EPA assumes that the St. George airport, with a planned service level of 55,000 annual enplanements, cost \$159 million (approximately \$145 million in 2006 dollars). The Panama City airport, with a planned service level of 225,000 annual enplanements, appears to have cost \$318 million (approximately \$289 in 2006 dollars) in the same period. Because eligibility for the ELG is partly based on non-propeller driven aircraft departures, EPA estimated departures for these two airports based on expected annual

enplanements. Among the 198 existing airports subject to BAT requirements, only 14 airports in the lower 48 states have fewer than 100,000 annual enplanements, and only six airports have fewer than 60,000 annual enplanements. Thus, EPA believes an airport like St. George might be too small to be subject to the requirements of this new source performance standard.

EPA then looked to Panama City as a model for a barrier to entry analysis for small, commercial facilities. Clearly, due to its location, an airport such as Panama City airport will not be subject to NSPS requirements. However, this airport is the only airport EPA found with data available on construction costs, and is of sufficient size that it might be subject to the ELG were it located further north. Therefore, EPA used Panama City's cost data to represent a new, relatively small airport that could be subject to NSPS.

Based on the costs of constructing CDPs and related ADF wastewater treatment system at Denver, EPA estimated the average capital cost per departure of constructing a CDP and treatment system of appropriate size to meet the Denver airport's operating requirements as total capital cost of the deicing pad and treatment system divided by average annual departures. Thus, the average capital cost of a CDP and related ADF wastewater treatment

system is approximately \$897 per average annual departure at Denver. In addition, EPA estimated annual departures at Panama City; existing commercial service airports with annual enplanements between 200,000 and 300,000 have, on average, about 32.3 passengers per departure, so EPA expects Panama City will average somewhat less than 6,959 departures per year<sup>6</sup>. Therefore, EPA estimates that should an airport the size of Panama City need to build a CDP and ADF wastewater treatment system, the capital cost of that pad will be about \$6.2 million, or about 2.2 percent of the initial cost of the airport.

Therefore, after comparing costs for CDPs and associated treatment systems at small and large airports in comparison to overall airport construction costs and finding that such pads and treatment systems cost from 2.2 percent to 3.3 percent of the cost of building a new airport, EPA has determined that the NSPS in the final rule would not impose a barrier to entry to new sources (DCN AD01260).

*F. Cost and Pollutant Reduction Comparison*

Today's final rule is expected to reduce COD and ammonia loads by 16.4 million pounds at an annualized cost of \$3.5 million, for a cost of \$0.21 per pound of pollutant removed.

TABLE VII-5—POLLUTANT REMOVALS, COSTS AND COST-REASONABLENESS OF BAT OPTIONS FOR AIRPORTS THAT DEICE (WEIGHTED)

Option	Total pollutant removals (million lb)	Total annualized costs (2006 \$ million)	Cost/lb pollutant removed	Incremental cost/lb pollutant removed
1	33.0	\$78.4	\$2.37	\$10.4
2	30.2	49.4	1.64	3.3
3 <sup>a</sup>	16.4	3.50	0.21	0.21

<sup>a</sup> Selected option.

EPA has reviewed the relative cost per pound of pollutants removed in previous effluent guidelines and has found that the cost per pound presented in today's final airport deicing rule is similar to or less expensive than many guidelines promulgated to date including Aluminum Forming (40 CFR part 467), \$2.42/lb; Landfills (40 CFR part 445), \$15.00/lb; and Waste Combustors (40 CFR part 444), \$38.83/lb. EPA notes that the selected option is eight times more cost effective than the next more stringent option based on

average cost/lb removed, and sixteen times more cost effective than the next more stringent option based on incremental cost/lb removed.

*G. Small Business Analysis*

The Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (hereinafter referred to as RFA), acknowledges that small entities have limited resources, and makes it the responsibility of regulating federal agencies to avoid burdening such

entities unnecessarily. The ultimate goal of RFA is to ensure that small entities do not incur disproportionate adverse economic impacts as a result of a regulation. The first step in this process is to determine the number and type of small entities potentially affected by the regulation.

The RFA (5 U.S.C. 601) defines three types of small entities: Small business, small not-for-profit organization, and small governmental jurisdictions. Airport ownership is composed of states, county, city governments, and

<sup>6</sup> EPA notes that NSPS for ADF collection and treatment only applies to airports that have at least 10,000 annual departures. Because Panama City is

the only airport of its size for which EPA has data and because it is close to, but does not exceed, the size cut-off for NSPS applicability, EPA concludes

that new airports with greater than 10,000 annual departures would similarly not experience a barrier to entry.

single and multi-purpose port authorities. Single and multi-purpose port authorities are quasi-governmental agencies created by legislation to maintain and operate airports, shipping ports, and other government-owned facilities such as bridges.

The RFA defines a small government entity as governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than 50,000. After matching each airport-owning

governmental entity with its population, EPA estimates that:

- 72 airports are owned by small government entities.
- 20 airports owned by small government entities are subject to BAT requirements in today's final rule.
- Three airports owned by small government entities and subject to BAT requirements incur costs under the promulgated option in today's final rule. Although many Alaskan airports are relatively small when measured by

service level, most of these airports are owned by the state of Alaska and therefore are not considered small for the purposes of the RFA; 10 of the 11 surveyed Alaskan airports are not small by this standard.

One of the 20 BAT airports owned by small government entities is expected to incur total annualized compliance costs exceeding three percent of airport operating revenues.

TABLE VII-6—FINANCIAL IMPACTS OF BAT OPTIONS ON SMALL AIRPORTS THAT DEICE <sup>a</sup>  
[2006 \$million—20 airports (weighted)]

Option	Total annualized costs	Number of airports with ratio of annualized compliance costs to operating revenues of:			
		Less than 1%	Between 1% and 3%	Greater than 3%	Not analyzed <sup>b</sup>
1 .....	\$0.34	19	0	1	0
2 .....	0.34	19	0	1	0
3 <sup>c</sup> .....	0.31	19	0	1	0

<sup>a</sup> An airport is considered small if the governmental entity that owns the airport serves a region with less than 50,000 people.

<sup>b</sup> Airports incurred compliance costs but financial impacts could not be analyzed due to lack of airport revenue data.

<sup>c</sup> Selected option.

EPA found that 18 airlines that are co-permittees at BAT airports are small by Small Business Administration (SBA) standards; 16 of these airlines had available financial data. Six airlines that are small by SBA standards are co-permittees at BAT airports that incur costs under the promulgated option, and five of these airlines have available financial data. None of the five small co-permittee airlines were projected to incur compliance costs exceeding 1 percent of operating revenues under Option 3. When comparing compliance costs with operating profits and net income, three small airlines had positive baseline operating profits and net income, and none are projected to incur costs exceeding 3 percent of either measure under Option 3. Again, these findings are well short of the 100 percent threshold that would indicate a definitive closure.

One airport with airline co-permittees on its NPDES permit is small by SBA standards. This airport's projected compliance costs exceed 3 percent of airport revenue if it does not share compliance costs with its co-permittee airlines. Its costs do not exceed 3 percent of revenue if it does share compliance costs with its co-permittee airlines.

EPA concludes that small entities are not disproportionately affected by this effluent limitations guideline. Only a fraction of in-scope airports are small by SBA standards, and only one of those airports is projected to incur costs

exceeding 3 percent of operating revenues. Furthermore, this airport is not projected to exceed that threshold if 50 percent of its compliance costs are shared with co-permittee airlines. EPA also concludes that small airlines are not disproportionately affected by the rule. Airlines are only subject to the rule if they are co-permittees on an airport's NPDES permit. Six co-permittee airlines are small by SBA standards; five of these airports have available financial data. As previously described, analysis of these airlines shows that under the assumption of 50:50 costs sharing with affected airports, none come close to a threshold that indicates a significant impact of their financial situation.

**VIII. Environmental Assessment**

*A. Environmental Impacts*

EPA has evaluated environmental impacts associated with the discharge of wastewater from airport deicing activities (Environmental Impact and Benefit Assessment [EIB]). As discussed in Section VI.B, deicing wastewater discharges can increase the loadings of multiple pollutants to receiving surface waters.

The most widely recognized pollutant from deicing activity is oxygen-demanding material, measured as either COD or BOD<sub>5</sub>. All primary ingredients in both aircraft and airfield deicers exert oxygen demand. Propylene glycol and ethylene glycol are the primary ingredients in aircraft deicers. Acetate salts, formate salts, propylene glycol,

ethylene glycol, and urea are the primary ingredients in airfield deicers. Propylene glycol and ethylene glycol, in particular, exert extremely high levels of oxygen demand when they decay in the environment. Acetates, formates, and urea exert lower, though still significant, levels of oxygen demand.

Acetate or formate salts, the primary ingredients in many airfield deicers, also contain potassium or sodium. Potassium and sodium can raise overall salinity levels or cause ion imbalances in surface waters. Urea, another primary airfield deicer ingredient, decomposes in water to produce ammonia, a toxic compound, and nitrates, a nutrient pollutant that can increase the incidence of algal blooms in surface waters.

Aircraft and airfield deicers also contain additives in addition to the primary ingredients. These additives serve a variety of purposes, such as reducing fluid surface tension, thickening, and fire and corrosion inhibition. Because deicer manufacturers consider the identity and quantity of additives in their formulations to be proprietary information, EPA was unable to obtain complete information on the nature and use of these additives.

EPA was able to obtain some limited information through various public sources, and identified several additives with toxic properties. These additives include nonylphenol ethoxylates, alcohol ethoxylates, triazoles, and

polyacrylic acid, among others. Although toxic, these additives directly influence the effectiveness and safety of deicing and anti-icing formulations and are therefore essential components. Because deicer formulations change periodically, some of the additives EPA identified may not be present in current formulations. Deicing fluid manufacturers are also investigating ways to formulate deicing and anti-icing compounds with the use of less toxic, or non-toxic, additives.

Airports in the United States discharge deicing wastewater to a wide variety of water body types, including streams, rivers, lakes and estuaries. Many airports discharge deicing wastewater to small streams with limited waste dilution and assimilation capacities. Impacts from deicing wastewater discharges have been documented in a variety of surface waters adjacent to or downstream of a number of airports in the United States. Some locations experienced acute impact events, whereas other locations have experienced chronically degraded conditions. Observed impacts to surface waters include both physical and biological impacts. Some surface waters have been listed as impaired under section 303(d) of the CWA because they do not meet applicable state water quality standards. Physical impacts include elevated levels of glycol, salinity, ammonia, and other pollutants; depressed oxygen levels; foaming; noxious odors; and discoloration. Biological impacts include reduced organism abundance, fish kills, reduced community composition, and reduced species diversity.

Deicing wastewater discharges have impaired both aquatic community health and human uses of water resources. Available documentation indicates multiple cases of hypoxic conditions and severe reduction in aquatic organism levels in surface waters downstream of deicing wastewater discharge locations. Documented human use impacts include contamination of surface drinking water sources, contamination of groundwater drinking water sources, degraded surface water aesthetics due to noxious odors and discolored water in residential areas and parklands, and degradation of fisheries.

#### B. Environmental Benefits

EPA has evaluated environmental benefits associated with today's final rule to reduce the discharge of pollutants from airport deicing activities. This assessment is described in detail in the EIB. The final rule is expected to decrease COD discharges

associated with airport runway deicing and anti-icing activities by approximately 12.0 million pounds per year. The rule is also estimated to reduce ammonia discharges by 4.4 million pounds. Note these do not count benefits from the NSPS, which were not estimated quantitatively, due to the difficulty of predicting when and where in-scope new airports may be built. However, EPA projects qualifying new airport construction over the next decade to be minimal.

The decline in pollutant loadings will reduce environmental impacts to surface waters adjacent to and downstream of these airports. A variety of surface waters have improved in quality after reductions in deicing pollutant loadings. Documented improvements have included abatement of noxious odors, decline in fish kill frequency, and partial recovery of community species diversity and organism abundance in small water bodies.

Today's final rule will decrease pollutant loadings to multiple surface waters currently listed as impaired under CWA section 303(d). The rule will also reduce pollutant loadings to surface drinking water intakes, parks, and residential areas downstream of airports. Groundwater aquifers will also benefit. See the EIB for additional details.

#### IX. Non-Water Quality Environmental Impacts

Sections 304(b) and 306 of the CWA require EPA to consider non-water-quality environmental impacts (including energy requirements) associated with effluent limitations guidelines and standards. As explained in Section V, EPA evaluated three regulatory options for today's rule. The first two options are based on technologies to control aircraft and airfield deicing discharges and the third option is based on technology to control only airfield deicing discharges. Section V also explains that EPA selected Option 3 as the basis for the final requirements.

To comply with the requirements to consider non-water quality environmental impacts, EPA first performed a formal analysis of the potential impact of the Option 1 technologies on energy consumption, air emissions, and solid waste generation. Because Option 2 is similar to Option 1, but would result in less operational changes at a subset of airports and therefore lead to less non-water quality impacts than Option 1, EPA did not perform a formal analysis of non-water quality impacts associated with Option

2. Instead, EPA concluded that the results for Option 2 will be similar to or less than Option 1. Because Option 3 is based only on technology to control airfield deicing discharges, EPA also analyzed impacts for Option 3. As described below, there are no non-water quality impacts associated with the regulatory option selected for the basis of the final regulation, Option 3. There are no increases in energy usage, air emissions, or solid waste generation associated with substituting one airfield deicing product with another. For a more in-depth discussion of EPA's formal analysis of non-water quality impacts, see the TDD.

#### A. Energy Requirements

##### 1. Options 1 and 2

Net energy consumption associated with Option 1 and Option 2 considers electrical requirements for pumping ADF-contaminated stormwater from collection areas to storage, electrical requirements for operating AFB bioreactors, and fuel requirements for GCVs. There is no net energy consumption associated with product substitution, the technology basis for Option 3.

EPA estimates that the total incremental electrical usage for Option 1 to pump ADF-contaminated stormwater into storage tanks would be approximately 1.2 million kilowatt hours per year (kWh/yr). EPA also developed a relationship between electrical use and COD removal by the AFB bioreactors based on information provided by Albany International (ALB) airport. Using the information from ALB, EPA estimated the electrical requirement for COD removal for Option 1 as approximately 1.3 kWh/lb COD removed. Using this unit rate, EPA estimated total electrical requirements to remove COD for Option 1 to be a maximum additional 22 million kWh/yr.

EPA also analyzed fuel use by GCVs collecting ADF-contaminated stormwater. EPA used Airport Questionnaire data for diesel fuel costs for GCVs, and then estimated an average diesel fuel use based on the unit cost for diesel fuel of \$2.07/gallon.<sup>7</sup> EPA then estimated annual fuel usage per gallon of applied ADF to be 0.08 gallons per gallon of ADF applied. Using this relationship, EPA estimated that the total incremental consumption of No. 2 diesel fuel, at all airports subject to BAT and installing additional collection

<sup>7</sup> This diesel fuel price was the average reported by the Energy Information Administration for the 2004 to 2005 winter season, the same period that EPA is analyzing for airport deicing activity.

equipment, to be 354,500 gallons per year.

EPA compared incremental diesel fuel use by GCVs as a result of Option 1 to diesel fuel use on a national basis. Approximately 25.4 million gallons of No. 2 diesel fuel was consumed per day in the United States in 2005. The diesel fuel requirement associated with Option 1 is less than 0.004 percent of the annual amount of diesel fuel consumed.

EPA also considered qualitatively the potential for Options 1 and 2 to cause flight delays and possibly greater jet fuel use as a result. EPA was not able to quantify this effect, because EPA was not able to project how many flights would be delayed for how long or how much extra fuel use this might entail. However, EPA's selection of Option 3 will also ensure that there are no unacceptable energy impacts associated with increased jet fuel use.

## 2. Option 3

EPA did not identify any additional energy consumption associated with the Option 3 technology. There is no change in energy consumption associated with substituting one airfield deicer with another.

### B. Air Emissions

#### 1. Options 1 and 2

Additional air emissions as a result of Option 1 could be attributed to added diesel fuel combustion by GCVs collecting ADF-contaminated stormwater and from anaerobic treatment of ADF. Emissions from these sources are discussed below. There could also be increases in emissions from aircraft operations associated with Option 1, but EPA was not able to quantify this effect.

#### a. Emissions From GCV Collection

EPA estimated the air emissions from the Option 1 ADF collection requirement. As discussed in Section IX.A above, EPA conservatively estimated that GCVs collecting ADF-contaminated stormwater at airports will consume an additional 354,500 gallons of No. 2 diesel fuel per year. To estimate air emissions related to combustion of No. 2 diesel fuel in the internal combustion engines on GCVs, EPA used published emission factors for internal combustion engines. The Agency selected emission factors for gasoline and diesel industrial engines because EPA assumed this class to be a more representative population of engines. To estimate emissions from the GCVs, EPA first converted the additional 354,500 gallons of diesel fuel to million British thermal units and

then applied the appropriate emission factors. The calculated annual emissions indicate that an additional 4,070 tons per year of CO<sub>2</sub> will be emitted from GCVs combusting additional diesel fuel to comply with the rule. CO<sub>2</sub> is the primary greenhouse gas attributed to climate change, and the 4,070 additional tons per year that would be associated with the rule is very small, as relative to other sources. For example, in 2006, industrial facilities combusting fossil fuels emitted 948 million tons of CO<sub>2</sub> equivalents. An additional 4,070 tons per year from GCVs is less than a 0.0004 percent increase in the overall CO<sub>2</sub> emissions from all industrial sources.

#### b. Emissions From AFB Treatment Systems

Anaerobic digestion of glycols found in ADF-contaminated stormwater generates biogas containing approximately 60 percent methane and 40 percent CO<sub>2</sub>. Airports installing AFBs for treatment of ADF-contaminated stormwater are expected to burn a portion of the gas in onsite boilers in order to maintain reactor temperature. The remainder of gas can be either combusted in a microturbine for electricity generation or flared. Regardless of the combustion technology, nearly all biogas generated by AFBs is converted to CO<sub>2</sub>, the primary greenhouse gas. EPA calculates a maximum 3,730 additional tons per year of CO<sub>2</sub> generation for 40 percent ADF collection, which is very small relative to other sources. For example, in 2006, industrial facilities combusting fossil fuels emitted 948 million tons of CO<sub>2</sub> equivalents. An additional 3,730 tons per year of CO<sub>2</sub> from AFB treatment is less than 0.0004 percent of the annual industrial CO<sub>2</sub> emissions nationwide.

#### 2. Option 3

EPA did not identify any additional air emissions associated with the Option 3 technology. There is no change in air emissions associated with substituting one airfield deicer with another.

### C. Solid Waste Generation

#### 1. Options 1 and 2

AFB bioreactors will generate sludge that will require disposal, probably in an offsite landfill. To estimate annual sludge generation by the AFB bioreactors that may be installed at airports to treat ADF-contaminated stormwater under Option 1, EPA first estimated the potential COD removal for the collection and treatment scenarios and then applied published anaerobic biomass yield information to estimate total sludge generation on a national

basis. The biomass yield calculation, which simply multiplies the COD removal by the yield, is a rough method of estimating sludge generation and does not account for other factors such as degradation or inorganic material (e.g., AFB media) that may be entrained into the sludge. However, this method does provide an order of magnitude estimate of sludge generation that can be compared to other types of common biological treatment systems to determine if AFB sludge generation would be unusually high at airports treating ADF-contaminated stormwater.

To provide some perspective on the potential total amount of biomass produced annually by the AFB biological reactors treating ADF-contaminated stormwater, EPA compared the most conservative biomass generation estimate with its national biosolids estimates for all domestic wastewater treatment plants throughout the United States. Approximately 8.2 million dry tons of biosolids were produced in 2010. EPA estimates that AFB bioreactors treating ADF-contaminated stormwater will increase biosolids generation in the United States by approximately 271 dry tons/year or less than 0.003 percent of dry ton biosolids produced in the United States in 2010.

#### 2. Option 3

EPA did not identify any additional sludge generation associated with the Option 3 technology. There is no change in sludge generation associated with substituting one airfield deicer with another.

## X. Regulatory Implementation

### A. Relation of ELGs and Standards to NPDES Permits

Effluent guidelines act as a primary mechanism to control the discharge of pollutants to waters of the United States. Today's final rule will be applied to airports through incorporation in individual or general NPDES permits issued by EPA or authorized states under section 402 of the Act.

The Agency has developed the limitations for this final rule to cover the discharge of pollutants from this point source category. Those permits issued after this rule is effective must incorporate the effluent limitations guidelines and NSPS in this rule. For airports below the regulatory thresholds in this rule, EPA intends to allow permitting authorities to apply technology-based requirements on a best professional judgment basis. Also, for any airport discharges, under section 510 of the CWA, states may require

effluent limitations under state law as long as they are no less stringent than the requirements of this rule. Finally, in addition to requiring application of the technology-based effluent limitations guidelines and standards in this rule, section 301(b)(1)(C) of CWA requires the permitting authority to impose more stringent effluent limitations on discharges as necessary to meet applicable water quality standards.

For individual permits, ELG provisions are typically incorporated when those permits are renewed, although permit authorities may require modification upon promulgation upon consent of the permittee. EPA will revise its MSGP to include the airport deicing provisions when the permit is renewed, and authorized states will proceed likewise with their respective general permits.

#### B. Effective Date

The effective date for today's final rule is June 15, 2012.

#### C. Compliance With the NSPS Requirement

##### 1. Applicability

The final rule establishes airfield pavement deicing effluent controls for new primary airports with 1,000 non-propeller aircraft departures annually. For a subset of these airports—certain airports located in cold climatic zones—it also establishes ADF effluent controls.

A new airport that opens with less than 1,000 departures would not be subject to today's requirements. However, if the number of departures at this new airport later increases above the departure threshold, then § 449.11 becomes applicable. For the ADF collection and treatment NSPS requirements, if a new airport located in an area that has more than 3,000 annual heating degree days and estimates that within five years of commencing operations it will exceed 10,000 annual departures, EPA expects it to plan during initial construction to be able to install facilities that comply with the ADF collection and treatment requirement should the departure threshold of the ADF collection and treatment threshold be exceeded. If the new airport elects not to do so, it must still meet all applicable ADF collection and discharge requirements in the event it exceeds the departure threshold within five years of construction. During the planning process for a new airport, FAA requires the airport sponsors to prepare long-range aviation forecasts, including estimates of passenger enplanement levels and use of jet aircraft. See FAA Advisory Circular

150/5070–6B, Chapter 7, “Aviation Forecasts.” These forecasts will provide a sufficient basis for a new source airport to estimate if it will be likely to exceed the departure threshold.

##### 2. Demonstrating Compliance With the NSPS Collection Requirement

The NSPS ADF collection requirement differs from end-of-pipe effluent limitations with regard to demonstrating compliance. Compliance with the collection requirement may not always be determined through end-of-pipe sampling and analysis. Additionally, the amount of ADF available for collection can vary depending on the weather and icing conditions at the time of application. As in the proposed rule, today's final rule provides three procedures for selection by the permittee, for demonstrating compliance with the ADF collection requirement.

To use the first procedure, at § 449.20(b), a permittee certifies to the permitting authority that it is operating its collection system in accordance with specifications for the applicable technology. The specifications describe design and operating practices for the technologies. As long as these technologies are operated and maintained as required, the permittee will be deemed in compliance with the associated collection rate. The only reporting requirement for this procedure is for the permitted facilities to certify to the permit authority that it is operating according to the specifications.

Since it is not practical for EPA to provide operating specifications for all potential collection technologies, the procedure at § 449.20(b)(2) allows an airport with an individual permit to propose performing ADF collection with a technology other than those described in the regulations. The permit authority may allow, on a case-by-case basis, an alternative ADF collection technology as the manner in which the permittee must demonstrate compliance with its collection requirement. The Director may also allow alternate operating parameters for one of the technologies listed elsewhere in § 449.20, as requested and demonstrated by the permittee. For example, an airport may operate a CDP, and through more aggressive collection measures, have data to show that 60 percent of available ADF for its aircraft deicing operations as a whole is collected, without necessarily having all flights deiced in the designated collection area(s). Another example would be an airport that uses a technology other than CDPs, with clearly detailed technical specifications

and data demonstrating it achieves 60 percent collection of the available ADF. A third example would be an airport that is unable or unwilling to use a standard set of collection technologies and operating procedures, and instead elects to demonstrate compliance with the ADF collection requirement by regular monitoring of applied and collected ADF. See § 449.20(a)(3). EPA has not published a specific monitoring methodology for a permittee to demonstrate its compliance with the collection requirement, but expects that such a demonstration would involve some type of mass-balance analysis. This procedure would be developed by the permittee, prior to the permitting authority proposing the permit, so that the method would be subject to public comments prior to incorporation into the permit. As long as the permittee is able to demonstrate to the permit authority's satisfaction that the specified technology is designed to achieve the collection requirement as set forth in § 449.11(a)(1), the only reporting requirement for this provision is for the permittee to certify that it is operating and maintaining its technology as required in its permit.

##### 3. P2 Approaches

Several P2 approaches and technologies are described above in Section IV.D.3. Although EPA did not identify any of these technologies as a basis for NSPS, these technologies may be effective at reducing available ADF. Moreover, future P2 technologies may become available to aid in meeting the NSPS requirements. Permittees using P2 technologies that reduce the volume of, or quantity of, pollutants in, available ADF may request a credit to be applied to the ADF collection requirement. Under § 449.20 (b)(2)(ii), a permittee may request a credit by providing documentation of the volumes or loads associated with the available ADF that would be generated in the absence of the P2 approach and the volumes or loads associated with the available ADF reduced through the use of P2. Once the permit authority determines that the reduction values are demonstrated, it will adjust the ADF collection requirement by subtracting the P2-based available ADF reductions from the original ADF collection requirement. The following two examples show how an airport may use the P2 provisions to reduce the amount of ADF that is required for collection.

###### a. P2 Example #1

On average, Airport X uses 600 gallons of Type I ADF and 500 gallons of Type IV ADF per flight and has 1,000



flights during a deicing season. In order to meet the 60 percent collection requirement, the airport must demonstrate the collection and treatment (or equivalent source reduction of) 300,000 gallons of available ADF.

- 600 gallons Type I  $\times$  75% available for collection + 500 gallons  $\times$  10% available for collection = 500 gallons available ADF/flight

- 500 gallons available ADF/flight  $\times$  1,000 flights  $\times$  60 percent collection = 300,000 gallons for collection.

The airport decides to install an IR deicing system and wants to use it in combination with GCVs as the basis for its 60 percent collection requirement. The airport provides data to its permit authority that use of an IR deicing system reduces 90 percent of the available ADF per aircraft and that the new IR facility has the capability of comfortably handling 600 flights per deicing season. This reduction is equivalent to the collection of 270,000 gallons of available ADF as shown below:

- 500 gallons available ADF/flight  $\times$  90 percent reduction in available ADF = 450 gallons ADF reduction per flight
- 600 flights  $\times$  450 gallon reduced = 270,000 gallons ADF reduced.

Therefore, the airport would need to collect an additional 30,000 gallons of available ADF during the deicing season:

- 300,000 gallons of ADF required for control – 270,000 gallons of ADF reduced = 30,000 gallons to collect.

EPA's documentation shows that GCVs collect 20 percent of available ADF. In order to collect the remaining 30,000 gallons, the airport would need to use GCVs when deicing 300 flights during the deicing season.

- 500 gallons of available ADF/flight  $\times$  20 percent collection = 100 gallons of ADF collected per flight.

- 300 flights  $\times$  100 gallons collected per flights = 30,000 gallons of ADF collected.

In this example, for every 1,000 flights where deicing would be appropriate, the airport could use the IR for 600 flights, GCVs for 300 flights, and may elect to collect nothing for 100 flights. More generically, for every one flight deiced with no collection, three flights must be deiced in an area with GCV collection and six flights must be sent through the IR system. The airport would have the flexibility to apply these technologies as appropriate for each event. For example, if the airport was experiencing exceptional delays for a particular event, the airport could forgo collection during that event as long as it had documentation to demonstrate that over

the deicing season the combination of these technologies was applied in a manner to theoretically achieve the required percentage.

#### b. P2 Example #2

On average, Airport Y uses 300 gallons of available ADF per flight and has 8,000 flights during the deicing season. In order to meet the 60 percent collection requirement, the airport must demonstrate the collection and treatment (or equivalent source reduction of) 1,440,000 gallons of available ADF.

- 300 gallons available ADF/flight  $\times$  8,000 flights  $\times$  60 percent collection = 1,440,000 gallons for collection.

Airport Y has recently installed forced air nozzles and covered deicing booms, and has provided data to its permit authority that use of these technologies together reduces 65 percent of the available ADF per aircraft.

Airport Y deices all of its aircraft using these forced air nozzles and covered deicing booms, resulting in a source reduction of 1,560,000 gallons of ADF per deicing season.

- 300 gallons of Available ADF/flight  $\times$  65 percent reduction = 195 gallons of ADF reduced per flight

- 8000 flights  $\times$  195 gallons reduced per flights = 1,560,000 gallons of ADF reduced.

As a result, Airport Y is in compliance with the 60 percent collection requirement simply through the use of the P2 technologies.

#### D. Alternative Compliance Option for Pavement Deicers Containing Urea

While EPA expects that most airports will choose product substitution to meet the pavement deicer requirement in § 449.10(b) or § 449.11(b), airports may continue to use pavement deicers containing urea if they meet the alternative effluent limitation. An airport that chooses this alternative is required to perform an analysis for ammonia in airfield pavement discharges at all locations where pavement deicing with deicers containing urea is occurring and must achieve the numeric limitations for ammonia prior to any dilution or commingling with other non-deicing discharges. The sampling frequency, analytical method, and reporting procedures are determined by the permit authority.

#### E. COD Effluent Monitoring for New Source Direct Dischargers

New source direct dischargers subject to § 449.11(a) are required to sample and analyze the discharges from their treatment system for COD prior to any

dilution or commingling with other non-deicing waters. The sampling frequency, analytical method, and reporting procedures are determined by the permit authority. Permittees must follow the sampling protocol specified in Appendix A of Part 449.

#### F. Best Management Practices

Sections 304(e), 308(a), 402(a), and 501(a) of the CWA authorize the Administrator to prescribe best management practices (BMPs) as part of effluent guidelines and standards or as part of a permit. EPA's BMP regulations are found at 40 CFR 122.44(k). Section 304(e) of the CWA authorizes EPA to include BMPs in effluent limitation guidelines for certain toxic or hazardous pollutants to control "plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage." CWA section 402(a)(1) and NPDES regulations (40 CFR 122.44(k)) also provide for BMPs to control or abate the discharge of pollutants when numeric limitations and standards are infeasible. In addition, CWA section 402(a)(2), read in concert with CWA section 501(a), authorizes EPA to prescribe as wide a range of permit conditions as the Administrator deems appropriate in order to ensure compliance with applicable effluent limitations and standards and such other requirements as the Administrator deems appropriate.

There are no BMPs specified in today's final rule. However, existing NPDES permits for airports include BMP requirements, and some permits may have included, as required BMPs, the technologies that EPA has identified as a basis for BAT or NSPS in today's rule. Other BMPs included in airport permits include dikes, curbs, and other control measures to contain leaks and spills as part of good "housekeeping" practices. Under section 510 of the CWA or section 301(b)(1)(C), a permitting authority on a facility-by-facility basis may choose to incorporate BMPs into the permit. See the TDD for a detailed discussion of P2 and BMPs used by airports and airlines.

#### G. Upset and Bypass Provisions

A "bypass" is an intentional diversion of the streams from any portion of a treatment facility. An "upset" is an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. EPA's regulations concerning bypasses and upsets for direct dischargers are set forth at 40 CFR 122.41(m) and (n). The bypass

provisions could be used to address situations where an emergency application of ADF or pavement deicer was necessary to ensure safe operation of an aircraft or airfield, provided the conditions for its use are met.

#### H. Variances and Modifications

The CWA requires application of effluent limitations established pursuant to Section 301 to all direct dischargers. However, the statute provides for the modification of these national requirements in a limited number of circumstances. The Agency has established administrative mechanisms to provide an opportunity for relief from the application of the national effluent limitations guidelines for categories of existing sources for toxic, conventional, and nonconventional pollutants.

##### 1. Fundamentally Different Factors (FDF) Variance

EPA, with the concurrence of the state, may develop effluent limitations different from the otherwise applicable requirements if an individual discharger is fundamentally different with respect to factors considered in establishing the limitation of standards applicable to the individual discharger. Such a modification is known as an FDF variance. EPA, in its initial implementation of the effluent guidelines program, provided for the FDF modifications in regulations, which were variances from the BCT effluent limitations, BAT limitations for toxic and nonconventional pollutants, and BPT limitations for conventional pollutants for direct dischargers. FDF variances for toxic pollutants were challenged judicially and ultimately sustained by the Supreme Court (*Chemical Manufacturers Association v. Natural Resources Defense Council*, 479 U.S. 116 (1985)).

Subsequently, in the Water Quality Act of 1987, Congress added new CWA Section 301(n). This provision explicitly authorizes modifications of the otherwise applicable BAT effluent limitations, if a discharger is fundamentally different with respect to the factors specified in CWA Section 304 (other than costs) from those considered by EPA in establishing the effluent limitations. CWA Section 301(n) also defined the conditions under which EPA may establish alternative requirements. Under Section 301(n), an application for approval of a FDF variance must be based solely on (1) information submitted during rulemaking raising the factors that are fundamentally different or (2) information the applicant did not have an opportunity to submit. The alternate

limitation must be no less stringent than justified by the difference and must not result in markedly more adverse non-water quality environmental impacts than the national limitation.

EPA regulations at 40 CFR part 125, subpart D, authorizing the regional administrators to establish alternative limitations, further detail the substantive criteria used to evaluate FDF variance requests for direct dischargers. Thus, 40 CFR 125.31(d) identifies six factors (e.g., volume of process wastewater, age and size of a discharger's facility) that may be considered in determining if a discharger is fundamentally different. The Agency must determine whether, based on one or more of these factors, the discharger in question is fundamentally different from the dischargers and factors considered by EPA in developing the nationally applicable effluent guidelines. The regulation also lists four other factors (e.g., inability to install equipment within the time allowed or a discharger's ability to pay) that may not provide a basis for an FDF variance. In addition, under 40 CFR 125.31(b) (3), a request for limitations less stringent than the national limitation may be approved only if compliance with the national limitations would result in either (a) a removal cost wholly out of proportion to the removal cost considered during development of the national limitations, or (b) a non-water quality environmental impact (including energy requirements) fundamentally more adverse than the impact considered during development of the national limits. The legislative history of Section 301(n) underscores the necessity for the FDF variance applicant to establish eligibility for the variance. EPA's regulations at 40 CFR 125.32(b)(1) are explicit in imposing this burden upon the applicant. The applicant must show that the factors relating to the discharge controlled by the applicant's permit which are claimed to be fundamentally different are, in fact, fundamentally different from those factors considered by EPA in establishing the applicable guidelines. In practice, very few FDF variances have been granted for past ELGs. An FDF variance is not available to a new source subject to NSPS.

##### 2. Economic Variances

Section 301(c) of the CWA authorizes a variance from the otherwise applicable BAT effluent guidelines for nonconventional pollutants due to economic factors. The request for a variance from effluent limitations developed from BAT guidelines must

normally be filed by the discharger during the public notice period for the draft permit. Other filing periods may apply, as specified in 40 CFR 122.21(m)(2). Specific guidance for this type of variance is provided in "Draft Guidance for Application and Review of Section 301(c) Variance Requests," dated August 21, 1984, available on EPA's Web site at <http://www.epa.gov/npdes/pubs/OWM0469.pdf>.

##### 3. Water Quality Variances

Section 301(g) of the CWA authorizes a variance from BAT effluent guidelines for certain nonconventional pollutants due to localized environmental factors. These pollutants include ammonia, chlorine, color, iron, and total phenols.

##### I. Information Resources

The Transportation Research Board (TRB), a division of the National Academies of Science, established a research panel to develop fact sheets on deicing practices to assist airports in reducing their deicing chemical usage and discharges. A report was prepared in 2009 under TRB's Airport Cooperative Research Program, titled "Deicing Planning Guidelines and Practices for Stormwater Management Systems." This report (DCN AD01191) and the fact sheets (DCN AD01192) are available in the docket for today's rule.

#### XI. Statutory and Executive Order (EO) Reviews

##### A. EO 12866: Regulatory Planning and Review and EO 13563: Improving Regulation and Regulatory Review

EPA submitted this action to OMB for review under EO 12866 (58 FR 51735, October 4, 1993) and EO 13563 (76 FR 3821, January 21, 2011) and any changes made in response to OMB recommendations have been documented in the docket for this action.

##### B. Paperwork Reduction Act

OMB has approved the information collection requirements contained in this rule under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* and has assigned OMB control number 2040-0285. Section 449.10(a) requires that airports certify annually on the non-use of airfield pavement deicers containing urea (unless they choose to comply with a numeric limit for ammonia instead).

EPA estimates it will take an annual average of 198 hours and \$6,534 for permittees to collect and report the information required by the rule. This estimate is based on average labor rates obtained from EPA's airport questionnaire. EPA estimates that the

time and cost for permit authorities to review the information submitted in response to requirements in the rule is negligible. EPA estimates that there will be no start-up or capital cost associated with the information described above. Burden is defined at 5 CFR 1320(b).

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations in 40 CFR are listed in 40 CFR part 9. In addition, EPA is amending the table in 40 CFR part 9 of currently approved OMB control numbers for various regulations to list the regulatory citations for the information requirements contained in this final rule.

### C. Regulatory Flexibility Act

The RFA generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For the purposes of assessing the impacts of today's final rule on small entities, EPA determined that all airports expected to be subject to BAT requirements are owned by government entities. The RFA defines a small government entity as governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than 50,000 (5 U.S.C. 601 (5)). After considering the economic impact of today's final rule on small entities, including consideration of alternative regulatory approaches, I certify that this action will not have a significant economic impact on a substantial number of small entities. After matching each airport-owning governmental entity with its population, EPA estimates that 20 of 198 airports subject to BAT, or 10 percent, are owned by small government entities. EPA projected impacts on these small airports using the revenue test described in Section VII.C.2.a. EPA found that one of the 20 small BAT airports are expected to incur annualized compliance costs exceeding 3 percent of airport operating revenues.

In general, airlines are not directly subject to the final rule. In a small number of cases, airlines are co-permittees on NPDES permits at certain

airports, and such co-permittee airlines are therefore subject to the final rule. EPA determined that 18 airlines considered small by SBA standards are co-permittees, but based on the analytic approach described in Section VII.C.3, none are expected to be significantly impacted by the rule.

Although this final rule will not have a significant economic impact on a substantial number of small entities, EPA undertook a number of steps to minimize the impact of this rule on small entities. According to the FAA NPIAS (2007–2011), there are almost 3,000 public use general aviation and reliever airports in the United States, some of which have substantial cargo service. Many, if not most, of these airports are likely to be owned by small government entities. Also likely to be owned by small governmental entities are approximately 135 non-primary commercial service airports. EPA has chosen not to regulate any general aviation, reliever, or non-primary commercial service airports under today's final rule. EPA also estimates that in addition to the 20 small government-owned primary commercial airports, another 52 primary commercial airports are owned by small government entities, but will be out-of-scope of the regulation because little or no ADF is used at those airports.

### D. Unfunded Mandates Reform Act (UMRA)

This rule does not contain a federal mandate that may result in expenditures of \$100 million or more for state, local, and tribal governments, in the aggregate, or the private sector in any one year. As explained in Section VII and the TDD, the annual cost of the rule is \$3.5 million. Thus, this rule is not subject to the requirements of sections 202 or 205 of UMRA.

By statute, a small government jurisdiction is defined as a government with a population less than 50,000 (5 U.S.C. 601). Because all in-scope airports are owned by a government or governmental agency, the definition for a small airport is identical for the purposes of both UMRA and SBREFA. If the rule exceeds annual compliance costs of \$100 million in aggregate, all provisions of UMRA will need to be met. If the rule does not exceed \$100 million in aggregate costs, but small airports are significantly or uniquely affected by the rule, EPA will be required to develop the small government agency plan required under section 203 of UMRA because these airports are owned by small governments.

This rule is also not subject to the requirements of section 203 of UMRA because it contains no regulatory requirements that might significantly or uniquely affect small governments. The scope of the rule focuses on the airports that are the largest users of ADF. The rule is not projected to exceed \$100 million in aggregate annual compliance costs. Further, as discussed in Section XI.C, EPA has determined the rule will not have significant economic impact on a substantial number of small entities.

### E. EO 13132: Federalism

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government, as specified in EO 13132 (64 FR 43255, August 10, 1999). Today's final rule requires airports to implement water pollution control requirements through a long-established regulatory mechanism (*i.e.*, NPDES) which is jointly administered by EPA and states. EPA expects the rule will have little effect on the relationship between, or the distribution of power and responsibilities among, the federal and state governments. Thus, EO 13132 does not apply to this action. In the spirit of EO 13132 and consistent with EPA policy to promote communications between EPA and state and local governments, EPA specifically solicited comment on the proposed action from state and local officials, however, none were received on the topic of federalism.

### F. EO 13175: Consultation and Coordination With Indian Tribal Governments

This rule does not have tribal implications, as specified in EO 13175 (65 FR 67249, November 6, 2000). It will not have substantial direct effects on tribal governments, on the relationship between the federal government and Indian tribes, or on the distribution of power and responsibilities between the federal government and Indian tribes. Today's rule contains no federal mandates for tribal governments and does not impose any enforceable duties on tribal governments. Thus, EO 13175 does not apply to this rule. In the spirit of EO 13175 and consistent with EPA policy to promote communications between EPA and tribal governments, EPA specifically solicited comment on the proposed rule on tribal impacts. No comments were received on this topic.

*G. EO 13045: Protection of Children From Environmental Health and Safety Risks*

This rule is not subject to EO 13045 (62 FR 19885, April 23, 1997) because it is not an economically significant rule pursuant to EO 12866.

*H. EO 13211: Energy Effects*

This rule is not a “significant energy action” as defined in EO 13211, “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use” (66 FR 28355, May 22, 2001) because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. As explained in Section IX.A, EPA determined that today’s final rule will not require any additional energy usage.

*I. National Technology Transfer Advancement Act (NTTAA)*

Section 12(d) of the NTTAA of 1995, (Pub. L. 104–113, sec. 12(d); 15 U.S.C. 272) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (*e.g.*, materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standard bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

The rulemaking involves technical standards. Therefore, the Agency conducted a search to identify potentially applicable voluntary consensus standards. However, EPA identified no such standards, and none were brought to EPA’s attention in comments. Therefore, EPA decided to use the technology-based controls for aircraft and airfield pavement deicing discharges described in Section V.

*J. EO 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations*

EO 12898 (59 FR 7629, February 16, 1994) establishes federal executive policy on environmental justice. Its main provision directs federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority

populations and low-income populations in the United States.

EPA has determined that this final rule will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it increases the level of environmental protection for all affected populations without having any disproportionately high and adverse human health or environmental effects on any population, including any minority or low-income population. The rule will reduce the negative effects of discharges from airports to the nation’s waters, to benefit all of society, including minority communities.

*K. Congressional Review Act*

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the FR. A major rule cannot take effect until 60 days after it is published in the FR. This action is not a “major rule” as defined by 5 U.S.C. 804(2). This rule will be effective June 15, 2012.

**Appendix A to the Preamble: Abbreviations and Definitions Used in This Document**

AAIA: Airport and Airway Improvement Act  
 ACI-NA: Airports Council International—North America  
 ADF: Aircraft deicing fluid (includes anti-icing fluid)  
 AFB: Anaerobic fluidized bed  
 AIP: Airport Improvement Program  
 ALB: Albany International Airport  
 ATA: Air Transport Association  
 BADCT: Best available demonstrated control technology  
 BAT: Best available technology economically achievable, as defined by sec. 301(b)(2)(A) and sec. 304(b)(2)(B) of the CWA  
 BCT: Best conventional pollutant control technology  
 BMP: Best management practice  
 BOD<sub>5</sub>: Biochemical oxygen demand  
 BPJ: Best Professional Judgment  
 BPT: Best conventional pollutant control technology  
 CBI: Confidential Business Information  
 CDP: Centralized deicing pad  
 CO<sub>2</sub>: Carbon dioxide  
 COD: Chemical oxygen demand  
 CWA: Clean Water Act  
 CWT: Centralized waste treatment

DIA: Denver International Airport  
 DSCR: Debt service coverage ratio  
 EA: Economic Analysis  
 EIB: Environmental Impact and Benefit  
 EO: Executive Order  
 EPA: U.S. Environmental Protection Agency  
 ELG: Effluent limitation guideline  
 FAA: Federal Aviation Administration  
 FDF: Fundamentally different factor  
 GARB: General airport revenue bonds  
 HDD: Heating degree day  
 IR: Infrared  
 GCV: Glycol collection vehicle  
 MSGP: Multi-Sector General Permit  
 Net income: Operating profit minus interest, taxes, depreciation, and non-operating profits and losses  
 NOAA: National Oceanic and Atmospheric Administration  
 NOI: Notice of Intent to discharge under a general permit (40 CFR 122.28(b)(2))  
 Normalized ADF: ADF less any water added by the manufacturer or customer before ADF application.  
 NPDES: National Pollutant Discharge Elimination System, as defined by sec. 402 of the CWA  
 NPIAS: National Plan of Integrated Airport Systems  
 NSPS: New Source Performance Standards, as defined by sec. 306 of the CWA  
 NTTAA: National Technology Transfer Advancement Act  
 O&M: Operations and maintenance  
 Operating profit: Revenues minus cost of providing those services  
 P2: Pollution prevention  
 PFC: Passenger Facility Charges  
 POTW: Publicly owned treatment works  
 PSES: Pretreatment standards for existing sources  
 PSNS: Pretreatment standards for new sources  
 PV: Present value  
 RAS: Rural Aviation System  
 Revenues: Money received for services rendered  
 RFA: Regulatory Flexibility Act  
 SBA: Small Business Administration  
 TDD: Technical Development Document  
 ThOD: Theoretical oxygen demand  
 TRB: Transportation Research Board  
 UMRA: Unfunded Mandates Reform Act  
 U.S.C.: United States Code

**List of Subjects**

*40 CFR Part 9*

Reporting and recordkeeping requirements.

*40 CFR Part 449*

Environmental protection, Airline, Airport deicing, Airports, Waste treatment and disposal, Water pollution control.

Dated: April 25, 2012.

**Lisa P. Jackson,**  
*Administrator.*

For the reasons set out in the preamble, 40 CFR chapter I is amended as follows:

**PART 9—[AMENDED]**

■ 1. The authority citation for part 9 continues to read as follows:

**Authority:** 7 United States Code (U.S.C.) 135 *et seq.*, 136–136y; 15 U.S.C. 2001, 2003, 2005, 2006, 2601–2671; 21 U.S.C. 331j, 346a, 348; 31 U.S.C. 9701; 33 U.S.C. 1251 *et seq.*, 1311, 1313d, 1314, 1318, 1321, 1326, 1330, 1342, 1344, 1345 (d) and (e), 1361; E.O. 11735, 38 FR 21243, 3 CFR, 1971–1975 Comp. p. 973; 42 U.S.C. 241, 242b, 243, 246, 300f, 300g, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–1, 300j–2, 300j–3, 300j–4, 300j–9, 1857 *et seq.*, 6901–6992k, 7401–7671q, 7542, 9601–9657, 11023, 11048.

■ 2. In § 9.1, the table is amended by adding a new heading and entry to read as follows:

**§ 9.1 OMB approvals under the Paperwork Reduction Act.**

40 CFR citation	OMB control No.
* * * * *	
<i>Airport Deicing Point Source Category</i>	
449.10(a) .....	2040–0285
* * * * *	

■ 3. Part 449 is added to read as follows:

**PART 449—AIRPORT DEICING POINT SOURCE CATEGORY**

**Subpart A—Airport Deicing Category**

- Sec.
- 449.1 Applicability.
- 449.2 General definitions.
- 449.10 Effluent limitations representing the best available technology economically achievable (BAT).
- 449.11 New source performance standards (NSPS).
- 449.20 Monitoring, reporting and recordkeeping requirements.

**Subpart B—[Reserved]**

Appendix A to Part 449—Sampling Protocol for Soluble COD

**Authority:** 33 U.S.C. 1311, 1314, 1316, 1318, 1342, 1361 and 1370.

**Subpart A—Airport Deicing Category**

**§ 449.1 Applicability.**

This part applies to discharges of pollutants from deicing operations at Primary Airports.

**§ 449.2 General definitions.**

The following definitions apply to this part:

*Aircraft deicing fluid (ADF)* means a fluid (other than hot water) applied to aircraft to remove or prevent any accumulation of snow or ice on the aircraft. This includes deicing and anti-icing fluids.

*Airfield pavement* means all paved surfaces on the airside of an airport.

*Airside* means the part of an airport directly involved in the arrival and departure of aircraft, including runways, taxiways, aprons, and ramps.

*Annual non-propeller aircraft departures* means the average number of commercial turbine-engine aircraft that are propelled by jet, *i.e.*, turbojet or turbofan, that take off from an airport on an annual basis, as tabulated by the Federal Aviation Administration (FAA).

*Available ADF* means 75 percent of the normalized Type I aircraft deicing fluid and 10 percent of the normalized Type IV aircraft deicing fluid, excluding aircraft deicing fluids used for defrosting or deicing for safe taxiing.

*Centralized deicing pad* means a facility on an airfield designed for aircraft deicing operations, typically constructed with a drainage system separate from the airport main storm drain system.

*COD* means Chemical Oxygen Demand.

*Collection requirement* means the requirement in § 449.11 for the permittee to collect available ADF.

*Defrosting* means the removal of frost contamination from an aircraft when there has been no active precipitation.

*Deicing* mean procedures and practices to remove or prevent any accumulation of snow or ice on:

- (1) An aircraft; or
- (2) Airfield pavement.

*Deicing for safe taxiing* means the application of ADF necessary to remove snow or ice to prevent damage to a taxiing aircraft.

*FAA Advisory Circular* means a guidance document issued by the FAA on methods, procedures, or facility design.

*Heating degree day* means the number of degrees per day the daily average temperature is below 65 degrees Fahrenheit. The daily average temperature is the mean of the maximum and minimum temperature for a 24-hour period. The annual heating degree day value is derived by summing the daily heating degree days over a calendar year period.

*Normalized Type I or Type IV aircraft deicing fluid* means ADF less any water added by the manufacturer or customer before ADF application.

*Primary Airport* means an airport defined at 49 U.S.C. 47102 (15).

**§ 449.10 Effluent limitations representing the best available technology economically achievable (BAT).**

Except as provided in 40 CFR 125.30 through 125.32, any existing point source with at least 1,000 annual non-propeller aircraft departures must comply with the following requirements representing the degree of effluent reduction attainable by the application of BAT. The BAT requirements for point sources with less than 1,000 annual non-propeller aircraft departures are beyond the scope of this regulation and shall be determined by the permit authority on a site-specific basis.

(a) *Airfield pavement deicing.* There shall be no discharge of airfield pavement deicers containing urea. To comply with this limitation, any existing point source must certify annually that it does not use airfield deicing products that contain urea or alternatively, airfield pavement discharges at every discharge point must achieve the numeric limitations for ammonia in Table I, prior to any dilution or commingling with any non-deicing discharge.

TABLE I—BAT LIMITATIONS

Wastestream	Pollutant	Daily maximum
Airfield Pavement Deicing .....	Ammonia as Nitrogen .....	14.7 mg/L.

(b) [Reserved]

**§ 449.11 New source performance standards (NSPS).**

New sources with at least 1,000 annual non-propeller aircraft departures must achieve the following new source

performance standards. The new source performance standards for point sources with less than 1,000 annual non-propeller aircraft departures are beyond the scope of this part and shall be

determined by the permit authority on a site-specific basis.

(a) *Aircraft deicing.* Except for new airports located in Alaska, all new sources located in an area that, at the time of construction, had more than

3,000 annual heating degree days, and are estimated, within five years of commencing operations, to exceed 10,000 annual departures, must comply with the following requirements upon the date the facility exceeds 10,000 annual departures. New source performance standards that apply prior to that date, new source performance standards for sources that project they will not exceed 10,000 annual

departures within five years of commencing operations, and new performance standards for airports in Alaska, are beyond the scope of this regulation and shall be determined by the permit authority on a site-specific basis.

(1) *Collection requirement.* The new source must collect at least 60 percent of available ADF.

(2) *Numerical effluent limitation.* The new source must achieve the performance standards in Table II for available ADF collected pursuant to paragraph (a)(1) of this section. The limitation must be met at the location where the effluent leaves the onsite treatment system utilized for meeting these requirements and before commingling with any non-deicing discharge.

TABLE II—NSPS

Wastestream	Pollutant	Daily maximum	Weekly average
Aircraft Deicing .....	COD .....	271 mg/L .....	154 mg/L.

(b) *Airfield pavement deicing.* There shall be no discharge of airfield pavement deicers containing urea. To comply with this limitation, any new

source must certify annually that it does not use airfield deicing products that contain urea or alternatively, airfield pavement discharges at every discharge

point must achieve the numeric limitations for ammonia in Table III, prior to any dilution or commingling with any non-deicing discharge.

TABLE III—NSPS

Wastestream	Pollutant	Daily maximum
Airfield Pavement Deicing .....	Ammonia as Nitrogen .....	14.7 mg/L.

**§ 449.20 Monitoring, reporting and recordkeeping requirements.**

(a) *Demonstrating compliance with the ADF collection requirement for dischargers subject to NSPS collection requirements in § 449.11.* Except as provided in 40 CFR 125.30 through 125.32, an individual permittee shall select a procedure under either paragraphs (a)(1), (2), or (3) of this section in its permit application as the procedure for the permittee to demonstrate compliance with the applicable collection, reporting and recordkeeping requirements of this Part. A procedure selected by the permittee under paragraph (a)(2) of this section may be included in the permit only with the Director's approval, as described in paragraph (a)(2) of this section. For general permits, use of alternative methods for determining compliance with the ADF collection requirement for dischargers subject to NSPS collection requirements in this part will be at the discretion of the Director.

(1) The permittee shall maintain records to demonstrate, and certify annually, that it is operating and maintaining one or more centralized deicing pads. This technology shall be operated and maintained according to the technical specifications set forth in paragraphs (a)(1)(i) through (iv) of this section. For both individual and general permits, these technical specifications shall be expressly set forth as requirements in the permit. The

permittee's demonstration and valid certification are sufficient to meet the applicable NSPS collection requirement without the permittee having to determine the numeric percentage of available ADF collected.

(i) Each centralized deicing pad shall be sized and sited in accordance with all applicable FAA advisory circulars.

(ii) Drainage valves associated with the centralized deicing pad shall be activated before deicing activities commence, to collect available ADF.

(iii) The centralized deicing pad and associated collection equipment shall be installed and maintained per any applicable manufacturers' instructions, and shall be inspected, at a minimum, at the beginning of each deicing season to ensure that the pad and associated equipment are in working condition.

(iv) All aircraft deicing shall take place on a centralized deicing pad, with the exception of defrosting and deicing for safe taxiing.

(2) *Alternative technology or specifications.* (i) An individual permit (or a general permit at the discretion of the Director) may allow one of the following alternative procedures for demonstrating compliance with its collection requirement, instead of the procedure in paragraph (a)(1) of this section. The permittee must submit all information and documentation necessary to support this request. An individual permittee may request this alternative procedure in its initial

permit application or permit renewal application. During the term of an individual permit, the permittee may also request this alternative procedure as a permit modification, subject to the requirements and procedures at 40 CFR 122.62 and 40 CFR part 124. If the Director determines, in his or her discretion, that the requested alternative procedure will achieve the collection requirement in the permit, the Director shall approve the request:

(A) The use of a different ADF collection technology from the centralized deicing pad technology specified in paragraph (a)(1) of this section; or

(B) The use of the same ADF collection technology, but with different specifications for operation and/or maintenance.

(ii) *Pollution prevention credit.* A permittee may apply for, and obtain, full or partial credit towards compliance with the available ADF collection requirement. To obtain credit the permittee must demonstrate to the Director's satisfaction that it employs a pollution prevention technique that reduces the volume of, or quantity of, pollutants in, available ADF. The credit shall be equivalent to the demonstrated reduction, as determined by the Director.

(iii) The Director shall set forth technical specifications for proper operation and maintenance of the chosen collection technology, as

appropriate, and compliance with these technical specifications must be required by the permit. The permit shall also require the permittee to maintain records sufficient to demonstrate compliance with these requirements. This demonstration constitutes compliance by the permittee with the percent capture requirement without the permittee having to determine the numeric percentage of ADF that it has collected. Before the Director may approve an alternate technology under this subsection, the permittee must demonstrate to the Director's satisfaction that the alternate technology will achieve the applicable percent capture requirement.

(3) The permittee shall maintain records, by means deemed acceptable by the Director, and report at a frequency determined by the Director, on the volume of ADF sprayed and the amount of available ADF collected in order to determine the compliance with the collection requirement.

(b) *Monitoring requirements*—(1) *COD limitation*. Permittees subject to the ADF collection and discharge requirements specified in § 449.11 must conduct effluent monitoring to demonstrate compliance with the COD limitation for all ADF that is collected. Compliance must be demonstrated at the location where the effluent leaves the on-site treatment system utilized for meeting these requirements and before commingling with any non-deicing discharge. Effluent samples must be collected following the protocol in Appendix A to this part.

(2) *Ammonia limitation*. If a permittee chooses to comply with the compliance alternative specified in § 449.10(a) or § 449.11(b), the permittee must conduct effluent monitoring at all locations where pavement deicing with a product that contains urea is occurring, prior to any dilution or commingling with any non-deicing discharge.

(c) *Recordkeeping*. (1) The permit shall provide that the permittee must maintain on site, during the term of the permit, up to five years, records

documenting compliance with paragraphs (a) through (b) of this section. These records include, but are not limited to, documentation of wastewater samples collected and analyzed, certifications, and equipment maintenance schedules and agreements.

(2) At the Director's discretion, a requirement may be included in the permit for the permittee to collect, and maintain on site during the term of the permit, up to five (5) years of data on the annual volume of ADF used.

#### Subpart B—[Reserved]

#### Appendix A to Part 449—Sampling Protocol for Soluble COD

This sampling protocol applies only to samples collected for use in measurement of COD when demonstrating compliance with the regulations set forth in this part. Collect a representative sample of the effluent from the airport deicing treatment system, based on the discharge permit requirements (*e.g.*, a grab sample or a composite sample). Because only the COD sample is filtered, do not use in-line filters if collecting a sample with a compositing device.

##### A. Grab Samples

1. Cap the container and shake the grab sample vigorously to mix it. Remove the plunger from a 10-milliliter (mL) or larger Luer-lock plastic syringe equipped with an Acrodisc Luer-lock filter containing a 1.5- $\mu$ m glass fiber filter (Whatman 934-AH, or equivalent), and fill the syringe body with sample.

2. Replace the plunger and filter the sample into a clean 50-mL screw-cap glass, plastic, or fluoropolymer bottle.

Note: If testing is being done in the field, or with a test kit product (*e.g.*, Hach Method 8000), the filtrate may be collected in the test kit vial or container.

3. Additional 10-mL volumes of sample may be filtered and the filtrate added to the same sample bottle. This additional volume may be used to repeat sample analyses or to prepare Quality Control (QC) samples, as needed.

4. Unless the filtered sample will be analyzed within 15 minutes, preserve the filtered sample with H<sub>2</sub>SO<sub>4</sub> to pH <2. Cap the bottle and label with the sample number. Place in a cooler on ice prior to shipping.

5. Once at the analytical laboratory, the sample must be stored at  $\leq 6$  degrees Celsius

and analyzed within 28 days of collection (see the requirements for COD in Table II at 40 CFR part 136).

6. Analyze the sample using a method approved for COD in Table IB at 40 CFR part 136.

Note: Because this procedure is specific to this point source category, it does not appear by name in 40 CFR part 136.

7. Report the sample results as Soluble COD in units of milligrams per liter (mg/L). There is no Chemical Abstracts Service (CAS) Registry Number for soluble COD.

##### B. Composite Samples

1. If the sample will be analyzed in a fixed laboratory (as opposed to field testing), transfer at least 50 mL of well-mixed sample from the compositing device into a clean 50-mL screw-cap glass, plastic, or fluoropolymer bottle. Preserve the sample with H<sub>2</sub>SO<sub>4</sub> to pH <2. Cap the bottle and label with the sample number. Place in a cooler on ice prior to shipping.

2. Once at the analytical laboratory, the sample must be stored at  $\leq 6$  degrees Celsius and analyzed within 28 days of collection (see the requirements for COD in Table II at 40 CFR part 136).

3. Prior to analysis, remove the sample from cold storage and allow it to warm to room temperature. Shake the sample vigorously to mix it.

4. Remove the plunger from a 10-mL or larger Luer-lock plastic syringe equipped with an Acrodisc Luer-lock filter containing a 1.5- $\mu$ m glass fiber filter (Whatman 934-AH, or equivalent), and fill the syringe body with sample.

5. Replace the plunger and filter the sample into a clean COD vial or other suitable container.

6. Additional 10-mL volumes of sample may be filtered and the filtrate added to separate containers, as needed, to provide samples for repeat analyses or to prepare QC samples.

7. Analyze the sample using a method approved for COD in Table 1B at 40 CFR part 136.

Note: Because this procedure is specific to this point source category, it does not appear by name in 40 CFR part 136.

8. Report the sample results as Soluble COD in units of mg/L. There is no CAS Registry Number for soluble COD.

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