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Rationale for New Source Performance Standards: Starch Production Plants

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RATIONALE FOR NEW SOURCE PERFORMANCE STANDARDS:

STARCH PRODUCTION PLANTS

U.S. ENVIRONMENTAL PROTECTION AGENCY
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1 BACKGROUND

1.1 New Source Performance Standards--General.

New source performance standards (NSPS) implement section 111 of the Clean Air Act, as amended (the Act). The NSPS are issued for categories of sources which the Administrator determines cause, or contribute significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare.

The NSPS apply to new stationary sources of emissions (i.e., sources whose construction, reconstruction, or modification begins after a standard for them is proposed). In this instance, the NSPS apply to new, modified, and reconstructed starch production plants for which construction is commenced after the date of proposal. The NSPS established under section 111 of the Act are to reflect the application of the best technological system of continuous emission reduction which (taking into account the cost of achieving such reduction, and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated. This level of control is commonly referred to as best demonstrated technology (BDT).

Section 111(b)(1)(B) of the Act mandates that this regulation be reviewed 8 years from the date of promulgation of the NSPS unless the Administrator determines that review is not appropriate in light of readily available information on the efficacy of the standard. The review will include an assessment of the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements.

1.2 Selection of Source Category.

The Environmental Protection Agency (EPA) previously determined that starch production plants are major contributors to air pollution that may reasonably be anticipated to endanger public health or welfare and, thus, constitute a major source category for the purposes of section 111. This category ("starch") was included on the priority list of major source categories (priority list), published in 40 CFR 60.16 (January 8, 1982, as amended), for which NSPS were to be developed under section 111.[1] The inclusion of "starch" on the priority list is not subject to comment or review at this time.

The 1990 Amendments to the Act (1990 Amendments) established a further requirement (section 111(f)(1)) for the EPA to

establish NSPS for those source categories appearing on the priority list for which the EPA had not proposed standards by November 15, 1990. A partial consent decree was lodged with the court on July 22, 1993.[2] This decree mandated that NSPS be proposed for at least three of the unregulated categories of major stationary sources from the priority list on or before August 31, 1994, with the Agency having the discretion of selecting the specific source categories.

The "starch" category was listed number 53 of 59 source categories on the priority list and was one of 19 source categories for which no NSPS had been developed by November 15, 1990. Starch production plants are among the source categories selected for proposal of NSPS by August 31, 1994 pursuant to the consent decree.

2 RATIONALE FOR THE PROPOSED STANDARDS

2.1 Source Category to be Regulated.

The proposed standards would set emission limits for affected facilities at starch production plants. The source category includes those facilities processing dry starch (including modified starches) derived from corn, wheat, potatoes, tapioca or other vegetable source, and facilities drying starch extracted from the wastewater at snack food production facilities (e.g., potato chips, french fries).

Typically, starch production plants are components of larger facilities that prepare a variety of products. For example, a corn wet milling facility will normally produce a range of products that can include animal feed, corn gluten, corn germ, germ meal, corn oil, starch, and starch derivatives. Starch derivatives can include modified specialty starches, dextrins, dextrose, corn syrup, high fructose corn syrup, ethanol, and a variety of sweeteners. Similar ranges of products may be derived from wheat, potatoes, or tapioca.

The manufacture of vegetable oils (e.g., corn oil), a process performed at some corn wet milling facilities, is also considered to be a source category within the context of section 111 and is on the priority list. Manufacture of vegetable oils is not, however, subject to the provisions of the NSPS for starch production plants.

2.2 Pollutant to be Regulated.

Particulate matter (PM) is the only criteria pollutant emitted from starch production plants. Therefore, the proposed standards would limit emissions of PM from new, modified, and reconstructed starch dryers, dextrin roasters, and starch transfer, storage, and loading facilities.

2.3 Affected Facilities.

The affected facilities to be regulated are starch dryers, dextrin roasters, and starch transfer, storage, and loading facilities for which construction, modification, or reconstruction is commenced after the date of proposal. The plants processing the raw materials noted above may utilize several different types of processing lines in the production of starch. In covering all types of starch production, the EPA recognized that the plants employed the same types of process equipment to dry and handle starch. Also, the EPA recognized

that all have the potential to emit substantial amounts of PM and that the emission control options for each are the same.

In particular, the components of starch production plants of interest to the EPA are starch dryers, dextrin roasters, and starch transfer, storage, and loading facilities. A starch dryer is the equipment used to remove uncombined (free) water from starch slurry through direct or indirect heating. A dextrin roaster is a reactor vessel, or a series of vessels, in which starch is reacted, through the addition of heat and/or chemicals, to form the modified starch "dextrin" (or "polydextrin"). Starch transfer, storage, and loading facilities include any facility used to blend, mix, mill, grind, screen, convey, transfer, store, or load for shipment (into any container for shipment, including, but not limited to, bag, truck, and rail car), dry starch. This also includes the bag dumping of dry additives into the starch for the purpose of producing modified starches. These components will be affected facilities upon promulgation of NSPS.

There are several types of dryers used at starch production plants, including ring (also known as loop) flash dryers, single-pass (also known as one-pass) flash dryers, spray dryers, drum dryers, and belt (also known as conveyor, tunnel, or apron) dryers. Drum dryers having a manufacturer's rated dry starch capacity of 907 kilograms per hour (kg/hr) (2,000 pounds per hour [lb/hr]) or less will not be subject to any provisions of the standards. Similarly, starch dryers, dextrin roasters, and starch transfer, storage, and loading facilities at snack food production facilities will be exempt from all provisions of the standards if the manufacturer's rated dry starch capacity of the dryer used is 907 kg/hr (2,000 lb/hr) or less. These exemptions are being made due to the low level of emissions from these facilities, and will include exemption from the notification requirements.

2.4 Selection of Best Demonstrated Technology.

In developing NSPS, the Agency generally evaluates varying levels of control, beginning with that level of control found within the industry in the absence of additional Federal regulation. This level of control is termed "baseline" and is the level against which more stringent levels are compared. Most facilities for which EPA has information collect PM from the exhaust ducts or vents of the affected facilities. This is done because the PM collected is starch, which is the final product of the production plant. Available information shows that most existing starch dryers are equipped with simple cyclonic collectors, at a minimum. Newer starch dryers are equipped with low energy wet scrubbers or fabric filters, either alone or in combination with one or more cyclones. Waste water from the scrubbers and collected dust from the fabric filters are returned

to the process and not sent to disposal. Industry representatives indicate that highly effective dust collection systems are mandated by the highly competitive nature of the industry.[3] Thus, new plants, which must function efficiently to compete with existing facilities, are installing either wet scrubbers or fabric filters to reduce the amount of starch lost in the dryer exhaust gases. For the starch production industry, this level of control was selected as the baseline for development of NSPS for most starch dryers.

There are two cases, however, where the dryer baseline does not represent the level of control exhibited by wet scrubbers or fabric filters. There are no known cases where a drum dryer or a dryer at a snack food production facility utilizes control beyond the product recovery cyclone. Thus, baseline for these two cases is the level of control exhibited by the product recovery cyclone.

Dextrin roasters and starch transfer, storage, and loading facilities employ fabric filters to recover starch emissions in dry form for immediate recycle to the process. This level of control was selected as the baseline for development of NSPS for dextrin roasters and starch transfer, storage, and loading facilities.

Review of available data shows no cases where control technology beyond the baseline is employed. Therefore the baseline level of control was selected as BDT for most starch dryers, as well as for dextrin roasters and starch transfer, storage, and loading facilities. The scope of BDT for starch production plants is sufficiently broad to include all types of wet and dry control devices and to allow for the introduction of other devices, beyond the traditional wet scrubber and fabric filter, that would be able to meet the emission limit.

There is no technical reason why additional control could not be applied to drum dryers and the dryers at snack food production facilities. Therefore, the level of control exhibited by wet scrubbers or fabric filters is considered to be BDT for these dryers. (However, there are no known cases where these two dryer types exceed the de minimis level noted above.)

Since the pollutant is also the product, source reduction cannot be practiced in this industry (i.e., nothing can replace the starch). However, pollution prevention is exhibited in the industry through the total use of the scrubber and fabric filter "waste" streams in in-process recycling and the loading of trucks and railcars using vacuum pressure systems. No further methods of pollution prevention appear available and none were analyzed in developing the NSPS.

2.5 Part 70 Permits.

Under the operating permit regulations codified at 40 CFR 70.3, any source that is a major source under the Act, or any nonmajor source subject to a standard under sections 111 or 112 after July 21, 1992, must obtain an operating permit. Section 70.3(b) further provides that, for nonmajor sources "...the Administrator will determine whether to exempt any or all such applicable sources from the requirements to obtain a part 70 permit at the time that the new standard is promulgated."

Today's proposed starch production plant rule does not exempt nonmajor affected starch facilities from permitting requirements because the number of nonmajor sources subject to part 70 permitting requirements is not so great as to cause a significant administrative burden on the permitting authority. In addition, nonmajor sources at starch production plants are not likely to require significant additional technical assistance from permitting authorities. The EPA believes that permitting these nonmajor sources will enhance the implementation and enforcement of the rule by clarifying how the rule applies to a particular nonmajor source.

However, under the existing provisions of part 70, States may choose to defer the obligation of all nonmajor sources to obtain a permit until the EPA "completes a rulemaking to determine how the program should be structured for nonmajor sources and the appropriateness of any permanent exemptions..." In promulgating the permits rule, the EPA committed to complete that rulemaking within 5 years after the approval of the first State part 70 program that defers permitting of nonmajor sources (57 Federal Register 32250, 32259 (July 21, 1992)).

3 PROPOSED STANDARDS

3.1 Particulate Matter and Visible Emissions Standards.

Section 111(b)(2) of the Act allows the Agency to distinguish among classes, types, and sizes within categories of new sources for the purpose of establishing NSPS. Based upon an analysis of the available test data, it was necessary to establish separate standards for ring flash dryers and drum dryers, single-pass dryers, and spray and belt dryers, as well as for dextrin roasters and the starch transfer, storage, and loading facilities. The requirements of the proposed standards are summarized in Tables 1, 2, and 3 for starch dryers, dextrin roasters, and starch transfer, storage, and loading facilities.

Emission test data were solicited through the industry trade associations, the States and local regulatory agencies, and the individual members of the industry. In addition, four starch production plants were surveyed to gather information. Contact was made with the majority of the States known to contain starch production facilities as well as with the three applicable industry trade associations, and many of the starch production companies themselves.

A total of 29 emission test reports or summaries comprise the data base.[4] Of these 29 reports, 19 represent tests that were performed on flash dryers, 3 tests each on belt dryers and drum dryers, and 1 test on a spray dryer. Results of tests on one storage bin and two bulk loadout vents were also collected. Only two data sets were available for visible emissions (VE) tests on starch dryers. These data are all believed to come from emission tests to show compliance with State and local regulations and reflect use of the EPA Method 5 sampling train (incorporating both front and back halves of the recovered sample in the analyses). The tested belt dryers and the potato starch ring and single-pass flash dryers were uncontrolled (13 tests total). The tested belt dryers (3 tests total) were also uncontrolled although the most recently installed belt dryers have been controlled with either wet scrubbers or fabric filters. All other tested processes were controlled by either wet scrubbers or fabric filters.

Analysis of this available compliance test information leads the EPA to conclude that the following emission levels are achievable by starch dryers employing BDT:

(a) 45 milligrams per dry standard cubic meters (mg/dscm) (0.02 grains per dry standard cubic feet [gr/dscf]) for new ring (or loop) flash dryers;

Table 1. Summary of Proposed NSPS Requirements-Starch Dryers

Parameter	Requirement
Emission limit	Particulate matter: Ring flash dryer . . . . . 0.02 gr/dscf Single-pass flash dryer . . 0.01 gr/dscf Spray, drum, or belt dryer . 0.005 gr/dscf
Monitoring	Wet control device: Continuous measurement and recording of pressure drop across, and liquid flow rate to, the control device with semiannual calibration Failure to continuously monitor and record the pressure drop and liquid flow rate, and exceedances of the operating limits will be violations of the PM standard Dry control device or uncontrolled: Method 9 opacity observation for 1 18-minute period per week during period of dryer operation Exceedance of 3% opacity will be a violation of the PM standard All control devices: Implementation of inspection and logging procedure to include some or all of (1) daily check to ensure that dust is being removed from the system; (2) weekly inspection for proper cleaner functioning and cycling; (3) monthly inspection for wear, material buildup, and corrosion; (4) logging of broken bags by location in order to identify installation or operational problems; and (5) monthly inspection of pressure drop and liquid flow rate devices (as appropriate) Failure to inspect and log will be a violation of the PM standard
Reporting	Wet control device: Quarterly reports of exceedances (<90% of either pressure drop or liquid flow rate established during initial PM compliance test) Dry control device or uncontrolled: Quarterly reports of exceedances (>3% opacity)
Test methods and procedures	Wet control device: Method 5 for PM standard Dry control device or uncontrolled: Method 5 for PM standard Method 9 for opacity standard

Table 2. Summary of Proposed NSPS Requirements-Dextrin Roasters

Parameter	Requirement
Emission limit	Particulate matter: . . . . . None Opacity: 0%
Monitoring	Method 9 opacity observation for 1 18-minute period per week during period of roaster operation Exceedance of opacity standard will be a violation of the VE standard All dry control devices (e.g., fabric filters): Implementation of inspection and logging procedure to include (1) daily check to ensure that dust is being removed from the system; (2) weekly inspection for proper cleaner functioning and cycling; (3) monthly inspection for wear, material buildup, and corrosion; (4) logging of broken bags by location in order to identify installation or operational problems Failure to inspect and log will be a violation of the VE standard
Reporting	Dry control device or uncontrolled: Quarterly reports of exceedances (>0% opacity)
Test methods and procedures	Dry control device or uncontrolled: Method 9 for opacity standard

Table 3. Summary of Proposed NSPS Requirements-Starch Transfer, Storage, and Handling Facilities

Parameter	Requirement
Emission limit	Particulate matter: . . . . . None Opacity: . . . . . 0% Visible Emissions . No visible emissions
Monitoring	Method 9 opacity observation of stack or vent for 1 18-minute period per week during period of facility operation Exceedance of opacity standard will be a violation of the VE standard Method 22 opacity observation of affected facility for 1 18-minute period per week Exceedance of the no visible emission standard will be a violation of the VE standard All dry control devices (e.g., fabric filters): Implementation of inspection and logging procedure to include (1) daily check to ensure that dust is being removed from the system; (2) weekly inspection for proper cleaner functioning and cycling; (3) monthly inspection for wear, material buildup, and corrosion; (4) logging of broken bags by location in order to identify installation or operational problems Failure to inspect and log will be a violation of the VE standard
Reporting	Dry control device or uncontrolled: Quarterly reports of exceedances (>0% opacity) Affected facility: Quarterly reports of exceedances (any visible emissions)
Test methods and procedures	Dry control device or uncontrolled: Method 9 for opacity standard Affected facility: Method 22 for visible emission standard

(b) 25 mg/dscm (0.01 gr/dscf) for new single-pass (or one-pass) flash dryers; and

(c) 10 mg/dscm (0.005 gr/dscf) for new spray dryers, drum dryers, and new belt (or conveyor, tunnel, or apron) dryers.[5]

In addition, VE from the stacks of new starch dryers with dry control devices can be limited to 3 percent opacity, or less, based on a 6-minute average.

The available data indicate that ring flash dryers utilized on potato starch may meet the NSPS without the use of wet scrubbers or fabric filters. The NSPS would not require the installation of any control device; rather, it merely requires that the emission level be achieved by any means chosen by the owner or operator.

The starch transfer, storage, and loading facilities visited during development of the standard were all controlled by fabric filters. Although emission test data were received for these sources, the EPA believes that, due to the low level of emissions, these sources are difficult to test because the exhaust streams are intermittent with low flow rates. The EPA has elected to limit VE from the stacks or vents of new starch transfer, storage, and loading facilities to 0 percent opacity, based on a 6-minute average, while visible fugitive emissions from such facilities would be limited to no VE.

No emission test data were obtained for dextrin roasters. However, the fabric filters utilized on roasters are similar in nature to those used on starch transfer, storage, and loading facilities. In addition, dextrin roasting is also done in a batch mode, or series of batch modes, with low emission levels and intermittent exhaust streams with low flow rates. Therefore, for the reasons noted above, the EPA has elected to limit VE from the stacks of new dextrin roasters to 0 percent opacity, based on a 6-minute average.

The available data indicate that drum dryers and single-pass flash dryers used in the process of extracting starch from the wastewater at snack food production facilities have the potential to emit less than 1 ton of PM per year. This level of emissions, coupled with the costs of adding emission controls noted later for these two dryer types, result in cost effectiveness values of approximately $27,000 per ton of PM removed for drum dryers and $43,000 per ton for the snack food dryers. Therefore, as these values are considered unreasonable, drum dryers having dry starch capacities of 907 kg/hr (2,000 lb/hr) or less are not being made subject to the provisions of this rule. Similarly, starch dryers used in the process of extracting starch from the wastewater

generated at snack food production facilities are not subject to the provisions of this rule, providing the dryer dry starch capacity is 907 kg/hr (2,000 lb/hr) or less. In addition, dextrin roasters, and starch transfer, storage, and loading facilities used in the process of extracting starch from the wastewater generated at snack food production facilities are not subject to the provisions of this rule, providing the dryer dry starch capacity is 454 kg/hr (1,000 lb/hr) or less.

3.2 Monitoring and Compliance Requirements.

The EPA is proposing that sources subject to NSPS be required to demonstrate continuous compliance with the NSPS by passing an initial performance test using EPA Method 5 for PM, Method 9 for VE, and Method 22 for visible fugitive emissions; and by continuously monitoring control device operating parameters and weekly observations of the opacity using both Methods 9 and 22.[6] These requirements are meant to fulfill the mandate of section 114(a)(3) of the Act, as amended, commonly referred to as "enhanced monitoring" which is required for major stationary sources and may be required for other sources. The enhanced monitoring protocol data would be used to determine compliance for purposes of a compliance certification submitted pursuant to the 40 CFR part 70 operating permit regulations. The records of the measurements and observations required would be retained by the facility for at least 5 years.

Each owner or operator of an affected starch dryer, dextrin roaster, or transfer, storage, and loading facility would be required to institute an inspection and logging procedure for all dry control devices (e.g., fabric filters) that are used to control process or fugitive PM emissions. Failure to perform the required inspections and logging will constitute a violation of the PM and opacity standards. The inspection and logging procedure must, at a minimum, include the following:

1. Daily check to ensure that dust is being removed from the system;

2. Weekly inspection for proper cleaner functioning and cycling;

3. Monthly inspection of the control device, fans, and all moving parts for wear, material buildup, and corrosion; and

4. Logging of broken bags by location in order to identify installation or equipment problems.

Each owner or operator of an affected starch dryer would be required to institute a similar inspection and logging procedure for all wet control devices (e.g., wet scrubbers) that are used

to control process PM emissions. Failure to perform the required inspections and logging will constitute a violation of the PM standards. The inspection and logging procedure must, at a minimum, include the following:

1. Monthly inspection of the control device, fans, and all moving parts for wear, material buildup, and corrosion; and

2. Monthly inspection of the device for the continuous measurement of the pressure loss of the gas stream through the wet control device and of the device for the continuous measurement of the liquid flow rate through the wet control device for plugging and proper operation.

It should be noted that many starch production plants already undertake monitoring similar to that being proposed to comply with local and State regulatory requirements. This existing monitoring ranges from regular emission tests to the installation of monitoring devices and the recording of control device pressure drops, and the like to the observation of exhaust gas opacity. Thus, the monitoring requirements being proposed may not cause the facility to do anything different than that already being done at many facilities.

3.2.1 Starch dryers. For starch dryers, demonstration of compliance would be made by an initial performance test using EPA Reference Method 5. This would be followed by weekly recording of VE (using Method 9) for uncontrolled and dry-controlled dryers and control device operating parameters, such as pressure drop and wet control device liquid flow rate, for wet-controlled dryers.

During the initial performance test of a starch dryer, EPA Method 5 would be used to determine compliance with the PM standard. The sampling time and sampling volume for each test run would be at least 2 hours and 1.70 dry standard cubic meters (dscm) (60 dry standard cubic feet [dscf]).

Dryers utilizing wet control devices would be required to have installed, calibrated, maintained, and operated two devices for the continuous measurement of the pressure loss of the gas stream through the wet control device and the liquid flow rate to the wet control device. The pressure loss monitoring device must be certified by the manufacturer to be accurate within +/- 250 pascals (+/-1 inch water gauge pressure) and must be calibrated on a semiannual basis in accordance with the manufacturer's instructions. The device monitoring the scrubbing liquid flow rate to the wet control device must be certified by the manufacturer to be accurate within +/- 5 percent of design liquid flow rate and must be calibrated on a semiannual basis in accordance with the manufacturer's instructions. Failure to

continuously record the pressure loss and liquid flow rate would constitute a violation of the PM standard.

During the initial performance test of a wet control device, the owner or operator would use these monitoring devices to determine the average change in pressure of the gas stream across the wet control device and the average flowrate of the wet control device liquid during each of the PM runs. The arithmetic average of the three runs would be used as the baseline average values against which subsequent readings were compared for compliance purposes. This arithmetic average would constitute the demonstrated compliance parameter level (DCPL) for the wet control device.

For continuous compliance of the PM standards, the exhaust gas stream(s) from uncontrolled starch dryers and from starch dryers utilizing dry control devices would be observed one time per week for 18 consecutive minutes using EPA Method 9 and the procedures in section 60.11.[7] These observations would be recorded weekly. An "exceedance" of the PM NSPS (failure to comply with the requirements) for starch dryers utilizing dry control devices would be each VE in excess of 3 percent opacity. For starch dryers utilizing wet control devices, continuous compliance would be determined by comparing the continuous wet control device pressure drop and liquid flow rate readings with the arithmetic averages determined during the most recent PM performance test. Each wet control device pressure drop or liquid flow rate that was less than 90 percent of the value recorded during the most recent PM performance test that demonstrated compliance with the PM standard would be considered an exceedance of the PM standard. Written reports of exceedances would be submitted to the appropriate regulatory agency (State, local, or Federal Regional office) quarterly.

3.2.2 Dextrin roasters. For dextrin roasters, demonstration of compliance with the NSPS would be made by an initial performance test using EPA Method 9 followed by weekly observations of VE using Method 9.

During the initial performance test of a dextrin roaster stack, EPA Method 9 and the procedures in section 60.11 would be used to determine compliance with the VE standards.[7] The performance test for VE would be conducted such that the duration of the test coincides with the length of a complete operational batch cycle and is of at least one hour duration, even if more than one batch cycle must be covered.

For continuous compliance, the stacks from a dextrin roaster would be observed one time per week for 18 consecutive minutes using EPA Method 9 and the procedures in section 60.11 for the determination of compliance with the VE standards. These

observations would be recorded weekly. An exceedance of the NSPS would be each VE in excess of 0 percent opacity.

Written reports of exceedances would be submitted to the appropriate regulatory agency (State, local, or Federal Regional office) quarterly. In adopting this approach, the EPA believes that the intent of the Act will be achieved at minimal cost (i.e., no manual test for PM will be required on dextrin roasters).

3.2.3 Starch transfer, storage, and loading facilities. For starch transfer, storage, and loading facilities, demonstration of compliance with the NSPS would be made by an initial performance test using EPA Methods 9 and 22 followed by weekly observations of VE using Methods 9 and 22.

During the initial performance test of a starch transfer, storage, or loading facility stack or vent, EPA Method 9 and the procedures in section 60.11 would be used to determine compliance with the VE standards.[7] The performance test for VE would be conducted such that the duration of the test coincides with the length of a complete operational batch cycle and is of at least one hour duration, even if more than one batch cycle must be covered.

For starch transfer, storage, or loading facilities that are enclosed in a building, the NSPS requires that there be no visible fugitive emissions. The initial performance test would be conducted while all affected facilities inside the building were operating. The performance test, using EPA Method 22, for each affected facility would be at least one hour in duration, with each emission point exhibiting visible fugitive emissions being directly observed. More than one operational batch cycle may need to be observed.

For continuous compliance, the stacks and vents from a starch transfer, storage, or loading facility would be observed one time per week for 18 consecutive minutes using EPA Method 9 and the procedures in section 60.11 for the determination of compliance with the VE standards. These observations would be recorded weekly. An exceedance of the NSPS would be each VE in excess of 0 percent opacity.

For continuous compliance of the visible fugitive emissions standard for starch transfer, storage, or loading facilities, observations would be made one time per week to determine compliance with the visible fugitive emission standard. Each observation would be for 18 consecutive minutes and cover any affected facility emission point exhibiting visible fugitive emissions. These observations would be recorded weekly.

Exceedances would be considered as each observation of visible fugitive emissions.

Written reports of exceedances would be submitted to the appropriate regulatory agency (State, local, or Federal Regional office) quarterly. In adopting this approach, the EPA believes that the intent of the Act will be achieved at minimal cost (i.e., no manual test for PM will be required on starch transfer, storage, and loading facilities).

3.3 Reporting Requirements.

The records and measurements noted above would be required to be retained by the owner or operator for at least 5 years. Reports of the initial performance tests, and the recordings made during the tests, would be reported to the Administrator and retained by the owner or operator for at least 5 years. Maintenance of the records for 5 years is being required to be consistent with the requirements of 40 CFR part 70.

The EPA requires that sources report deviations of standards on at least a quarterly basis. This frequency of reporting provides benefits to both the enforcement authority and the regulated community. By requiring sources to report deviations on a quarterly basis, the enforcement authority is able to identify potential violations in a timely manner. Since penalties are calculated per day per violation, the timely identification of violations reduces a source's liability. In addition, identifying potential violations on a quarterly basis allows the EPA to use efficient enforcement tools, such as the Administrative enforcement process. Administrative enforcement can be used where penalties are less than $200,000 and violations are less than 1 year old. Less frequent reporting would prevent the Agency from identifying violations in a timely manner and may preclude the use of Administrative enforcement due to the one year deadline.

Each quarterly monitoring report would include the following:

1. A summary of the number and duration of deviations or exceedances occurring during the reporting period, classified by reason, including known causes for which a Federally-approved or promulgated exemption from an emission limitation or standard may apply.

2. Identification of the data availability achieved during the reporting period, including a summary of the number and total duration of incidents that monitoring was not performed in accordance with the mandate of the NSPS or produced data that did

not meet minimum data accuracy and precision requirements, classified by reason.

3. All records that the source is required to maintain as described in section 60.760 that pertain to the periods during which a deviation resulting from a known cause for which no Federally-approved or promulgated exemption applies. In addition, the following must be reported:

a. the magnitude of each deviation,

b. the reason for each deviation,

c. a description of the corrective action taken for each deviation, including action taken to minimize each deviation and action taken to prevent recurrence, and

d. all quality assurance activities performed under section 60.763 of the NSPS.

4. Identification of the compliance status as of the last day of the reporting period and whether compliance was continuous or intermittent during the reporting period.

5. The most recently established DCPLs (for wet control devices).

4 SUMMARY OF COST, ENVIRONMENTAL, ENERGY, AND ECONOMIC IMPACTS

Currently, there are 47 known facilities, owned by 17 companies, that produce starch (and modified starches) in the U.S.[8] Of these facilities, 20 produce starch from corn, 3 produce starch from wheat, 21 produce starch from potatoes, 1 produces starch from tapioca, and 2 produce starch from other vegetable sources. This number also includes those facilities that extract and dry starch from their wastewater (primarily snack food producers). These facilities are concentrated in the midwestern U.S. but are found across the country.

Based on analysis of historic trends, the EPA projects the construction of three new starch production plants within the 3 years following proposal of the NSPS. In addition, expansion at several existing plants may also be expected. To analyze the impacts of this growth, the EPA developed eight model "plants" to represent the various sizes of process units expected.[9] Three of these are new plants and five represent expansions at existing facilities. The new facilities would also include such ancillary processes as mills, storage bins, and loading systems, which have been included in the model plants. These model plants are not meant to replicate any specific facility but to be representative of the facilities that could be built.

4.1 Cost Impacts.

Even though new facilities are expected to install BDT even in the absence of NSPS because starch, the pollutant, is of value to the plant, the costs of controls on some model facilities that in the past have been uncontrolled have been estimated (but without factoring in any recovery credits).[10] As noted above, certain dryers in some applications may not require the installation of wet or dry control devices to meet the NSPS. Thus, the control equipment costs below are presented for information only as it is not expected that the NSPS will cause the facilities to incur any additional control costs, beyond those of compliance monitoring.

Costs for both fabric filters and wet scrubbers were estimated. However, as the costs of the wet scrubbers were lower, they are reported here. Capital costs for installing a wet scrubber on model starch dryers are estimated to range from approximately $37,100 to $264,700. Estimated annual costs (including, but not limited to, operation, maintenance, and monitoring) for these scrubbers range from $16,600 to $125,100. Capital costs for installing a fabric filter on model starch transfer, storage, and loading facilities are estimated to range

from approximately $127,000 to $142,200. Estimated annual costs for these fabric filters range from $21,600 to $40,600.

In addition, even though new facilities are expected to monitor the performance of the installed control devices even in the absence of NSPS, the costs of compliance have been estimated, including those of the initial performance test as well as those of enhanced monitoring.[11] The cost of the initial performance test is estimated to be approximately $6,000. Instrument costs for the two recording devices required on starch dryers utilizing wet control devices are projected to be approximately $1,500. Annual costs for the required observations using Methods 9 and 22 are estimated to be approximately $25,000 for the first year, and $22,500 for each succeeding year.

Annual costs for enhanced monitoring were estimated for three general "levels" of monitoring.[12] The three levels are presented in Table 4. The resulting enhanced monitoring costs for each model affected facility are summarized in Table 5 and in Table 6 for each model plant. Based on the high cost of continuous opacity monitoring (COM) and daily manual monitoring relative to the total cost of control, weekly monitoring using Methods 9 and 22 was selected to serve as the enhanced monitoring program for the starch NSPS.

4.2 Environmental Impacts.

The primary environmental impacts resulting from the proposed PM standards are reductions in the quantity of PM emitted from those facilities subject to NSPS. The emissions reductions that will result will occur because of the improved operation and maintenance that results from enhanced monitoring. Available information is insufficient to allow for the quantification of the projected PM reductions.

There are no solid or liquid waste impacts associated with the proposed standards. This is because all PM recovered by control devices as well as all water used in wet scrubbers is typically recycled back into plant processes at affected facilities.

4.3 Energy Impacts.

There are no additional energy requirements associated with the proposed NSPS. No additional or different controls other than those that would have been used in the absence of an NSPS are expected to be used that would alter the existing energy requirements.

Table 4. Summary of Enhanced Monitoring Options

	Dryer-dry control	Dryer-wet control	Transfer, storage, and loading-dry control
Level 1	COM	Continuous monitoring of Δp and liquid flow rate	COM; daily Method 22 observations
Level 2	Daily Method 9 observations	None	Daily Method 9 and Method 22 observations
Level 3	Weekly Method 9 observations	None	Weekly Method 9 and Method 22 observations

Table 5. Summary of Enhanced Monitoring Annual Costs (percent of total annual costs)

	Dryer-dry control	Dryer-wet control	Transfer, storage, and loading-dry control
Level 1	$16,500 (37.2%)	0	$38,400 (48.6 - 64.0%)
Level 2	$22,500 (50.7%)	0	$44,400 (52.2 - 67.3%)
Level 3	$3,420 (7.7%)	0	$6,540 (13.9 - 23.2%)

Table 6. Summary of Enhanced Monitoring Annual Costs--Model Plant Basis (percent of total annual costs)

	Plant with dry control on dryer	Plant with wet control on dryer
Level 1	$71,400 (38.1%)	$38,400 - 104,400 (17.6 - 49.6%)
Level 2	$44,400 (27.6%)	$44,400 - 66,300 (19.8 - 53.2%)
Level 3	$6,540 (5.3%)	$6,540 - 9,660 (3.5 - 14.3%)

4.4 Economic Impacts.

In analyzing the national cost impacts of the standards, the costs resulting from the implementation of the proposed standards have been considered in this rulemaking. On a national basis, the proposed standards would not increase the capital cost for starch production plants because new plants would in all likelihood install controls equivalent to BDT under the NSPS even if the NSPS were not promulgated. The only additional costs expected to result from the standards would, therefore, be for the enhanced recordkeeping and reporting.

The proposed standards do not add requirements for installation of emissions controls beyond what is being achieved today. Rather, they would codify the level of emissions control already being achieved by newer facilities. The only additional requirements being proposed are for testing, monitoring, and reporting (i.e., "enhanced monitoring"). Because the level of control being used as the basis of the standards is unchanged from current industry practices and the cost of complying with the standards is small, the cost of the proposed standards have been determined to be unsubstantial. The EPA has not subjected the proposed NSPS to a rigorous quantitative analysis of economic impacts because costs (capital and annual) are minimal and, without further detailed information, emissions reductions cannot be quantified.

5 REFERENCES

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16. ABSTRACT

Rationale for the new source performance standards for starch dryers, dextrin roasters, and starch transfer, storage, and loading facilities at starch production plants under the provisions of section 111 of the Clean Air Act, as amended.

17. KEY WORDS AND DOCUMENT ANALYSIS

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