

tight-fitting face-piece (either half-face or full-face) and HEPA filters; or

(E) NIOSH-certified supplied-air respirator operated in pressure demand or continuous flow mode and equipped with a hood or helmet, or tight-fitting face-piece (either half-face or full-face).

(1) As an alternative to the respiratory requirements listed in paragraph (a)(2)(i), a manufacturer, importer, or processor may choose to follow the new chemical exposure limit (NCEL) provisions listed in the TSCA section 5(e) consent order for this substance. The NCEL is 2.4 mg/m³ as an 8-hour time-weighted-average for this substance (PMN P-06-37; CAS No. 389623-07-8) and the substance referred to in 40 CFR 721.10230 (PMN P-06-36; CAS No. 389623-01-2) combined. Persons who wish to pursue NCELs as an alternative to the § 721.63 respirator requirements may request to do so under § 721.30. Persons whose § 721.30 requests to use the NCELs approach are approved by EPA will receive NCELs provisions comparable to those contained in the corresponding section 5(e) consent order.

(2) [Reserved]

(ii) *Hazard communication program.* Requirements as specified in § 721.72(a), (b), (c), (d), (e) (concentration set at 1.0 percent), (f), (g)(1)(ii), (g)(2)(ii), (g)(2)(iv) (use respiratory protection or maintain workplace airborne concentrations at or below an 8-hour time-weighted average of 2.4 mg/m³), and (g)(5).

(iii) *Industrial, commercial, and consumer activities.* Requirements as specified in § 721.80(k) (manufacture of the substance with a particle size less than 100 nanometers, where d₁₀ particle size presents the particle size, as determined by laser light scattering, at which 10 percent by weight of the substance measured is smaller).

(b) *Specific requirements.* The provisions of subpart A of this part apply to this section except as modified by this paragraph.

(1) *Recordkeeping.* Recordkeeping requirements as specified in § 721.125(a), (b), (c), (d), (f), (g), (h), and (i) are applicable to manufacturers, importers, and processors of this substance.

(2) *Limitations or revocation of certain notification requirements.* The provisions of § 721.185 apply to this section.

[FR Doc. 2012-17895 Filed 7-20-12; 8:45 am]

BILLING CODE 6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 52

[EPA-R04-OAR-2011-0353; FRL-9699-5]

Approval and Promulgation of Implementation Plans; Tennessee; 110(a)(1) and (2) Infrastructure Requirements for the 1997 8-Hour Ozone National Ambient Air Quality Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: EPA is taking final action to approve in part, and conditionally approve in part, the State Implementation Plan (SIP) submission, submitted by the State of Tennessee, through the Tennessee Department of Environment and Conservation (TDEC), to demonstrate that the State meets the requirements of sections 110(a)(1) and (2) of the Clean Air Act (CAA or Act) for the 1997 8-hour ozone national ambient air quality standards (NAAQS). Section 110(a) of the CAA requires that each state adopt and submit a SIP for the implementation, maintenance, and enforcement of each NAAQS promulgated by EPA, which is commonly referred to as an “infrastructure” SIP. TDEC certified that the Tennessee SIP contains provisions that ensure the 1997 8-hour ozone NAAQS are implemented, enforced, and maintained in Tennessee (hereafter referred to as “infrastructure submission”). With the exception of sub-element 110(a)(2)(E)(ii), which pertains to the requirements of section 128(a)(1) of the CAA, Tennessee’s infrastructure submission, provided to EPA on December 14, 2007, addresses all the required infrastructure elements for the 1997 8-hour ozone NAAQS.

DATES: *Effective Date:* This rule will be effective August 22, 2012.

ADDRESSES: EPA has established a docket for this action under Docket Identification No. EPA-R04-OAR-2011-0353. All documents in the docket are listed on the www.regulations.gov Web site. Although listed in the index, some information is not publicly available, i.e., Confidential Business Information 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 electronically through www.regulations.gov or in hard copy at

the Regulatory Development Section, Air Planning Branch, Air, Pesticides and Toxics Management Division, U.S. Environmental Protection Agency, Region 4, 61 Forsyth Street SW., Atlanta, Georgia 30303-8960. EPA requests that if at all possible, you contact the person listed in the **FOR FURTHER INFORMATION CONTACT** section to schedule your inspection. The Regional Office’s official hours of business are Monday through Friday, 8:30 to 4:30 excluding Federal holidays.

FOR FURTHER INFORMATION CONTACT:

Nacosta C. Ward, Regulatory Development Section, Air Planning Branch, Air, Pesticides and Toxics Management Division, U.S. Environmental Protection Agency, Region 4, 61 Forsyth Street SW., Atlanta, Georgia 30303-8960. The telephone number is (404) 562-9140. Ms. Ward can be reached via electronic mail at ward.nacosta@epa.gov.

SUPPLEMENTARY INFORMATION:

Table of Contents

- I. Background
- II. This Action
- III. Final Action
- IV. Statutory and Executive Order Reviews

I. Background

Upon promulgation of a new or revised NAAQS, sections 110(a)(1) and (2) of the CAA require states to address basic SIP requirements, including emissions inventories, monitoring, and modeling to assure attainment and maintenance for that new NAAQS.

Section 110(a) of the CAA requires states to submit SIPs to provide for the implementation, maintenance, and enforcement of a new or revised NAAQS within three years following the promulgation of such NAAQS, or within such shorter period as EPA may prescribe. Section 110(a) imposes the obligation upon states to make a SIP submission to EPA for a new or revised NAAQS, but the contents of that submission may vary depending upon the facts and circumstances. In particular, the data and analytical tools available at the time the state develops and submits the SIP for a new or revised NAAQS affects the content of the submission. The contents of such SIP submissions may also vary depending upon what provisions the state’s existing SIP already contains. In the case of the 1997 8-hour ozone NAAQS, states typically have met the basic program elements required in section 110(a)(2) through earlier SIP submissions in connection with previous ozone NAAQS.

More specifically, section 110(a)(1) provides the procedural and timing

requirements for SIPs. Section 110(a)(2) lists specific elements that states must meet for “infrastructure” SIP requirements related to a newly established or revised NAAQS. As already mentioned, these requirements include SIP infrastructure elements such as modeling, monitoring, and emissions inventories that are designed to assure attainment and maintenance of the NAAQS. The requirements that are the subject of this final rulemaking are listed below¹ and in EPA’s October 2, 2007, memorandum entitled “Guidance on SIP Elements Required Under Section 110(a)(1) and (2) for the 1997 8-Hour Ozone and PM_{2.5} National Ambient Air Quality Standards.”

- 110(a)(2)(A): Emission limits and other control measures.
- 110(a)(2)(B): Ambient air quality monitoring/data system.
- 110(a)(2)(C): Program for enforcement of control measures.²
- 110(a)(2)(D): Interstate transport.³
- 110(a)(2)(E): Adequate resources.
- 110(a)(2)(F): Stationary source monitoring system.
- 110(a)(2)(G): Emergency power.
- 110(a)(2)(H): Future SIP revisions.

¹ Two elements identified in section 110(a)(2) are not governed by the three year submission deadline of section 110(a)(1) because SIPs incorporating necessary local nonattainment area controls are not due within three years after promulgation of a new or revised NAAQS, but rather are due at the time the nonattainment area plan requirements are due pursuant to section 172. These requirements are: (1) submissions required by section 110(a)(2)(C) to the extent that subsection refers to a permit program as required in part D Title I of the CAA, and (2) submissions required by section 110(a)(2)(I) which pertain to the nonattainment planning requirements of part D, Title I of the CAA. Today’s final rulemaking does not address infrastructure elements related to section 110(a)(2)(I) or (C). In a March 14, 2012, final rulemaking, EPA addressed the section 110(a)(2)(C) requirements for Tennessee. See 77 FR 14976.

² This rulemaking only addresses requirements for this element as they relate to attainment areas.

³ Today’s final rule does not address element 110(a)(2)(D)(i) (Interstate Transport) for the 1997 8-hour ozone NAAQS. Interstate transport requirements were formerly addressed by Tennessee consistent with the Clean Air Interstate Rule (CAIR). On December 23, 2008, CAIR was remanded by the D.C. Circuit Court of Appeals, without vacatur, back to EPA. See *North Carolina v. EPA*, 531 F.3d 896 (D.C. Cir. 2008). Prior to this remand, EPA took final action to approve Tennessee’s SIP revision, which was submitted to comply with CAIR. See 72 FR 46388 (August 20, 2007). In so doing, Tennessee’s CAIR SIP revision addressed the interstate transport provisions in section 110(a)(2)(D)(i) for the 1997 8-hour ozone NAAQS. In response to the remand of CAIR, EPA has promulgated a new rule to address interstate transport. See 76 FR 48208 (August 8, 2011) (“the Transport Rule”). That rule was recently stayed by the D.C. Circuit Court of Appeals. EPA’s action on element 110(a)(2)(D)(i) will be addressed in a separate action.

- 110(a)(2)(I): Areas designated nonattainment and meet the applicable requirements of part D.⁴

- 110(a)(2)(J): Consultation with government officials; public notification; and PSD and visibility protection.

- 110(a)(2)(K): Air quality modeling/data.

- 110(a)(2)(L): Permitting fees.

- 110(a)(2)(M): Consultation/participation by affected local entities.

On July 18, 1997, EPA promulgated a new NAAQS for ozone based on 8-hour average concentrations, thus states were required to provide submissions to address sections 110(a)(1) and (2) of the CAA for this new NAAQS. Tennessee provided its infrastructure submission for the 1997 8-hour ozone NAAQS on December 14, 2007. On March 27, 2008, Tennessee was among other states that received a finding of failure to submit because its infrastructure submission was deemed incomplete for elements 110(a)(2)(C) and (J) for the 1997 8-hour ozone NAAQS by March 1, 2008. See 73 FR 16205. Infrastructure elements 110(a)(2)(C) and (J) relate to a SIP addressing changes to its part C prevention of significant deterioration (PSD) permit program as required by the 1997 8-Hour Ozone NAAQS Implementation Rule New Source Review (NSR) Update—Phase 2 Rule (hereafter referred to as the Ozone Implementation NSR Update) recognizing nitrogen oxides as a precursor for ozone in 40 CFR 51.166 and 40 CFR 52.21, among other requirements. See 70 FR 71612, (November 29, 2005). Tennessee has since met the completeness requirements for 110(a)(2)(C) and (J) and these infrastructure elements were federally approved on March 14, 2012. See 77 FR 14976.

On April 16, 2012, EPA proposed to approve Tennessee’s December 14, 2007, infrastructure submission and proposed to approve in part, and conditionally approve in part, infrastructure sub-element 110(a)(2)(E)(ii) for the 1997 8-hour ozone NAAQS. See 77 FR 22533. CAA section 110(a)(2)(E)(ii), pertaining to section 128 State Board requirements, requires at subsection (a)(1) that each SIP shall contain requirements that any board or body which approves permits or enforcement orders be subject to the described public interest and income

⁴ This requirement was inadvertently omitted from EPA’s October 2, 2007, memorandum entitled “Guidance on SIP Elements Required Under Section 110(a)(1) and (2) for the 1997 8-Hour Ozone and PM_{2.5} National Ambient Air Quality Standards,” but as mentioned above is not relevant to today’s proposed rulemaking.

restrictions. It further requires at subsection (a)(2) that any board or body, or the head of an executive agency with similar power to approve permits or enforcement orders under the CAA, shall also be subject to conflict of interest disclosure requirements. In this action, EPA is taking two actions regarding the section 110(a)(2)(E)(ii) requirements. First, EPA is finalizing its conditional approval for part of Tennessee’s infrastructure SIP for element 110(a)(2)(E)(ii) with respect to the applicable section 128(a)(1) requirements. Second, EPA is approving the remaining part Tennessee’s infrastructure SIP for element 110(a)(2)(E)(ii) with respect to the applicable section 128(a)(2) requirements.

On March 28, 2012, Tennessee submitted a letter of commitment to EPA to adopt specific enforceable measures related to 128(a)(1) to address current deficiencies in the Tennessee SIP as outlined in EPA’s April 16, 2012, proposed rulemaking. This letter of commitment meets the requirements of section 110(k)(4) of the CAA. Failure to adopt these provisions into the Tennessee SIP within one year (by July 23, 2013) will result in today’s conditional approval becoming a disapproval. Tennessee’s March 28, 2012, letter can be accessed at www.regulations.gov using Docket ID No. EPA–R04–OAR–2011–0353. A summary of the background for today’s final action is provided below. See EPA’s April 16, 2012, proposed rulemaking at 77 FR 22533 for more detail.

II. This Action

EPA is taking final action to approve Tennessee’s infrastructure submission as demonstrating that the State meets the applicable requirements of sections 110(a)(1) and (2) of the CAA for the 1997 8-hour ozone NAAQS, with the exception of one portion of CAA section 110(a)(2)(E)(ii) specifically pertaining to section 128(a)(1) requirements. EPA is taking final action to conditionally approve, sub-element 110(a)(2)(E)(ii) as it pertains to section 128(a)(1). Section 110(a) of the CAA requires that each state adopt and submit a SIP for the implementation, maintenance, and enforcement of each NAAQS promulgated by the EPA, which is commonly referred to as an “infrastructure” SIP. Tennessee, through TDEC, certified that the Tennessee SIP contains provisions that ensure the 1997 8-hour ozone NAAQS is implemented, enforced, and maintained in Tennessee. EPA received no adverse comments on its April 16,

2012, proposed approval of Tennessee's December 14, 2007, infrastructure submission and proposed conditional approval of one portion of section 110(a)(2)(E)(ii).

Tennessee's infrastructure submission, provided to EPA on December 14, 2007, addresses all the required infrastructure elements for the 1997 8-hour ozone NAAQS, with the exception of CAA section 110(a)(2)(E)(ii), pertaining to section 128(a)(1) requirements. EPA has determined that Tennessee's December 14, 2007, submission is consistent with section 110 of the CAA, with the exception of the CAA section 128(a)(1) requirements of section 110(a)(2)(E)(ii).

On March 28, 2012, Tennessee submitted a letter of commitment to EPA to adopt specific enforceable measures related to CAA section 128(a)(1) to address the current deficiencies in the Tennessee SIP related to CAA section 110(a)(2)(E)(ii) as outlined in EPA's April 16, 2012, proposed rulemaking. As a result of Tennessee's March 28, 2012, submission, EPA has determined that conditional approval, specifically pertaining to the requirements of 128(a)(1), is appropriate because the State has explicitly committed to address current deficiencies in the Tennessee SIP related to sub-element 110(a)(2)(E)(ii) consistent with the requirements of CAA section 110(k)(4).

EPA is conditionally approving the March 28, 2012, submittal with respect to the CAA requirement of sub-element 110(a)(2)(E)(ii) and section 128(a)(1). Tennessee must submit to EPA by July 23, 2013, a SIP revision adopting specific enforceable measures related to CAA section 128(a)(1) as described in the State's letter of commitment described above. If the State fails to actually submit these revisions by July 23, 2013, today's conditional approval will automatically become a disapproval on that date and EPA will issue a finding of disapproval. EPA is not required to propose the finding of disapproval. If the conditional approval is converted to a disapproval, the final disapproval triggers the Federal Implementation Plan requirement under section 110(c). However, if the State meets its commitment within the applicable timeframe, the conditionally approved submission will remain a part of the SIP until EPA takes final action approving or disapproving the new submittal. If EPA disapproves the new submittal, today's conditionally approved submittal will also be disapproved at that time. If EPA approves the new submittal, Tennessee's infrastructure SIP will be

fully approved in its entirety and replace the conditionally approved element in the SIP.

III. Final Action

EPA is taking final action to approve Tennessee's December 14, 2007, submission for the 1997 8-hour ozone NAAQS and conditionally approve in part, Tennessee's March 28, 2012, submission because these submissions are consistent with section 110 of the CAA. With the exception of section 110(a)(2)(E)(ii) pertaining to the section 128(a)(1) requirements, TDEC has addressed the elements of the CAA 110(a)(1) and (2) SIP requirements pursuant to EPA's October 2, 2007, guidance to ensure that the 1997 8-hour ozone NAAQS are implemented, enforced, and maintained in Tennessee.

IV. Statutory and Executive Order Reviews

Under the CAA, the Administrator is required to approve a SIP submission that complies with the provisions of the Act and applicable Federal regulations. 42 U.S.C. 7410(k); 40 CFR 52.02(a). Thus, in reviewing SIP submissions, EPA's role is to approve state choices, provided that they meet the criteria of the CAA. Accordingly, this action merely approves state law as meeting Federal requirements and does not impose additional requirements beyond those imposed by state law. For that reason, this action:

- Is not a "significant regulatory action" subject to review by the Office of Management and Budget under Executive Order 12866 (58 FR 51735, October 4, 1993);
- Does not impose an information collection burden under the provisions of the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*);
- Is certified as not having a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*);
- Does not contain any unfunded mandate or significantly or uniquely affect small governments, as described in the Unfunded Mandates Reform Act of 1995 (Pub. L. 104-4);
- Does not have Federalism implications as specified in Executive Order 13132 (64 FR 43255, August 10, 1999);
- Is not an economically significant regulatory action based on health or safety risks subject to Executive Order 13045 (62 FR 19885, April 23, 1997);
- Is not a significant regulatory action subject to Executive Order 13211 (66 FR 28355, May 22, 2001);

- Is not subject to requirements of Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) because application of those requirements would be inconsistent with the CAA; and

- Does not provide EPA with the discretionary authority to address, as appropriate, disproportionate human health or environmental effects, using practicable and legally permissible methods, under Executive Order 12898 (59 FR 7629, February 16, 1994).

In addition, this rule does not have tribal implications as specified by Executive Order 13175 (65 FR 67249, November 9, 2000), because the SIP is not approved to apply in Indian country located in the state, and EPA notes that it will not impose substantial direct costs on tribal governments or preempt tribal law.

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 action 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 **Federal Register**. A major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is not a "major rule" as defined by 5 U.S.C. 804(2).

Under section 307(b)(1) of the CAA, petitions for judicial review of this action must be filed in the United States Court of Appeals for the appropriate circuit by September 21, 2012. Filing a petition for reconsideration by the Administrator of this final rule does not affect the finality of this action for the purposes of judicial review nor does it extend the time within which a petition for judicial review may be filed, and shall not postpone the effectiveness of such rule or action. This action may not be challenged later in proceedings to enforce its requirements. (*See* section 307(b)(2)).

List of Subjects in 40 CFR Part 52

Environmental protection, Air pollution control, Incorporation by reference, Intergovernmental relations, Nitrogen dioxide, Ozone, Reporting and recordkeeping requirements, Volatile organic compounds.

Dated: June 25, 2012.

A. Stanley Meiburg,

Acting Regional Administrator, Region 4.

40 CFR part 52 is amended as follows:

PART 52—[AMENDED]

■ 1. The authority citation for part 52 continues to read as follows:

Authority: 42 U.S.C. 7401 *et seq.*

Subpart RR—Tennessee

■ 2. Section 52.2219 is added to read as follows:

§ 52.2219 Conditional approval.

Conditional Approval—Submittal from the State of Tennessee, through the Department of Environment and Conservation (TDEC), dated December 14, 2007, to address the Clean Air Act (CAA) infrastructure requirements for the 1997 8-hour ozone National Ambient Air Quality Standards. On March 28, 2012, TDEC supplemented their December 14, 2007, submission with a commitment to address the deficient requirements of CAA section 110(a)(2)(E)(ii) of the CAA, which requires state compliance with section

128(a)(1) of the CAA. EPA is conditionally approving Tennessee's submittal with respect to CAA section 110(a)(2)(E)(ii) specifically related to the adoption of enforceable measures contained in CAA section 128(a)(1).

■ 3. Section 52.2220(e) is amended by adding a new entry "110(a)(1) and (2) Infrastructure Requirements for the 1997 8-Hour Ozone National Ambient Air Quality Standards" at the end of the table to read as follows:

§ 52.2220 Identification of plan.

* * * * *

(e) * * *

EPA-APPROVED TENNESSEE NON-REGULATORY PROVISIONS

Name of nonregulatory SIP provision	Applicable geographic or nonattainment area	State effective date	EPA approval date	Explanation
* * *	* * *	* * *	* * *	* * *
110(a)(1) and (2) Infrastructure Requirements for the 1997 8-Hour Ozone National Ambient Air Quality Standards.	Tennessee	12/14/2007	7/23/2012 [Insert citation of publication].	

[FR Doc. 2012-17644 Filed 7-20-12; 8:45 am]

BILLING CODE 6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 52

[EPA-R03-OAR-2012-0042; FRL-9702-2]

Approval and Promulgation of Air Quality Implementation Plans; Maryland; Offset Lithographic Printing and Letterpress Printing Regulations

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: EPA is approving a State Implementation Plan (SIP) revision submitted by the State of Maryland. The revision pertains to amendments to the Code of Maryland (COMAR) 26.11.19.11, Lithographic and Letterpress Printing. EPA is approving the revision to meet the requirements to adopt Reasonably Available Control Technology (RACT) for sources covered by EPA's Control Techniques Guidelines (CTG) for offset lithographic printing and letterpress printing in accordance with the requirements of the Clean Air Act (CAA).

DATES: This final rule is effective on August 22, 2012.

ADDRESSES: EPA has established a docket for this action under Docket ID Number EPA-R03-OAR-2012-0042. All documents in the docket are listed in the www.regulations.gov Web site.

Although listed in the electronic docket, some information is not publicly available, i.e., 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 electronically through www.regulations.gov or in hard copy for public inspection during normal business hours at the Air Protection Division, U.S. Environmental Protection Agency, Region III, 1650 Arch Street, Philadelphia, Pennsylvania 19103. Copies of the State submittal are available at the Maryland Department of the Environment, 1800 Washington Boulevard, Suite 705, Baltimore, Maryland 21230.

FOR FURTHER INFORMATION CONTACT: Asrah Khadr, (215) 814-2071, or by email at khadr.asrah@epa.gov.

SUPPLEMENTARY INFORMATION:

I. Background

On May 14, 2012 (77 FR 28336), EPA published a notice of proposed rulemaking (NPR) for the State of Maryland. The NPR proposed approval of amendments to COMAR 26.11.19.11, Lithographic and Letterpress Printing. The amendments adopt EPA's CTG for lithographic and letterpress printing. The formal SIP revision (#11-09) was submitted by the Maryland Department of the Environment (MDE) on December 15, 2011. Additional background

information behind this SIP revision is discussed in detail in the NPR.

II. Summary of SIP Revision

This SIP revision consists of amendments to COMAR 26.11.19.11 to adopt a new CTG for offset lithographic printers and letterpress printers, entitled *Control Techniques Guidelines for Offset Lithographic Printing and Letterpress Printing* (see EPA 453/R-06-002). A detailed summary of EPA's review of and rationale for approving this SIP revision may be found in the TSD for this action which is available in the docket. No public comments were received on the NPR.

III. Final Action

EPA is approving the Maryland SIP revision which adopts the CTG standards for offset lithographic printing and letterpress printing into the Code of Maryland.

IV. Statutory and Executive Order Reviews

A. General Requirements

Under the CAA, the Administrator is required to approve a SIP submission that complies with the provisions of the CAA and applicable Federal regulations. 42 U.S.C. 7410(k); 40 CFR 52.02(a). Thus, in reviewing SIP submissions, EPA's role is to approve state choices, provided that they meet the criteria of the CAA. Accordingly, this action merely approves state law as meeting Federal requirements and does not impose additional requirements beyond