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**WRAP Policy**

**Annual Emission Goals for Fire**

**DRAFT**

**Prepared by the Annual Emission Goals Task Team**  
**For the**  
**Fire Emissions Joint Forum of the**  
**Western Regional Air Partnership**

**December 1, 2002**

# WRAP Policy

## Annual Emission Goals for Fire

### Executive Summary

The Western Regional Air Partnership (WRAP) is charged with developing technical and policy tools to assist states (or the delegated regulatory authority) and tribes with implementing the Regional Haze Rule (Rule).

The WRAP Policy on Annual Emission Goals for Fire (WRAP AEG Policy) has been developed over a six-month period through a stakeholder-based consensus process to assist the WRAP region states and tribes in addressing emissions from fire sources. In this Policy, the WRAP seeks to provide a consistent framework that states and tribes can use to efficiently develop their individual implementation plans. The WRAP recognizes states' and tribes' authority and responsibility to develop, adopt and implement their regional haze implementation plans, and recognizes the Rule as the principal document on which states and tribes should rely.

The Rule requires states to develop implementation plans (SIPs) for addressing regional haze in the Nation's 156 mandatory Class I areas. Additionally, the Rule requires effective management of fire sources. The Rule provides two pathways for western states to follow as they implement the requirements of the Rule: 1) develop their regional haze implementation plans per the nationally applicable provisions of Section 308, or 2) Transport Region states may choose to incorporate the Grand Canyon Visibility Transport Commission (GCVTC) Recommendations into their regional haze implementation plans under Section 309 of the Rule.

The GCVTC recognized that projected increases in fire activity will result in episodic impacts on visibility in the West, and called for the development of annual emission goals that would minimize these impacts. Section 309 of the Rule specifically requires the establishment of annual emission goals that minimize emission increases from fire to the maximum extent feasible. Further, these goals must be developed in cooperation with states, tribes, land management agencies and private entities.

The WRAP defines the annual emission goal as a quantifiable value that is used to measure progress each year toward the desired outcome of achieving the minimum emission increase from fire. In this WRAP AEG Policy, the WRAP outlines a process by which states/tribes may establish annual emission goals, based on the utilization of currently available emission reduction techniques (ERTs), to include in their regional haze implementation plans.

Although Section 309 of the Rule specifically requires the establishment of annual emission goals, the strategy outlined here for the utilization of ERTs could be considered by states and

1 tribes that choose to follow the requirements of Section 308 of the Rule and/or may be used  
2 to protect visibility in non-mandatory Federal Class I areas.<sup>1</sup>  
3

4 Tribes are not subject to the same requirements of the Rule as states, but tribes wishing to  
5 assume the regional haze requirements outlined in the Rule may, according to the Tribal  
6 Authority Rule (TAR), seek approval under 40 CFR 49 to be “treated as States.” The intent  
7 of this Policy is to assist both states and tribes with the development of their regional haze  
8 implementation plans (SIPs/TIPs), and therefore, tribes are included in all references to  
9 states, except where specific requirements and/or deadlines of the Rule are cited. In the case  
10 of annual emission goals, the WRAP considers them a viable tool for all tribes in the WRAP  
11 region to use to achieve the minimum emission increase from fire.  
12

13 The WRAP AEG Policy document is comprised of four major sections. Section 1 is the  
14 seven WRAP AEG Policy statements. Section 2 provides overall background for the WRAP  
15 AEG Policy. Section 3 is an annotation of each of the seven policy statements, further  
16 explaining and defining them. Finally, the Appendices include (A) a glossary of terms, (B) a  
17 related documents listing, (C) additional guidance for states/tribes on the implementation of  
18 annual emission goals, and D) an example of a table that will be developed as a separate  
19 guidance document by the WRAP Fire Emissions Joint Forum for use with annual emission  
20 goals.

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<sup>1</sup> The Rule is only applicable to mandatory Class I areas. States/tribes in the WRAP region may utilize the AEG Policy to protect visibility in non-mandatory Class I areas.

1  
2 **WRAP Policy**

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4 **Annual Emission Goals for Fire**

5  
6  
7 **TABLE OF CONTENTS**

8  
9 **Executive Summary** **i**

10  
11 **1. The WRAP Policy on Annual Emission Goals for Fire** **1**

12 **Policy Statements**

13

14 **2. Background** **1**

15

16 2.1 Clean Air Act and Grand Canyon Visibility Transport Commission 1

17 2.2 Western Regional Air Partnership 2

18 2.3 Regional Haze Rule 2

19

20 **3. Annotated Policy** **3**

21

22 3.1 Introduction 3

23 3.2 Policy Statement A: AEGs Required Under Section 309 4

24 3.3 Policy Statement B: Annual Emission Goal Defined 4

25 3.4 Policy Statement C: Applicability 5

26 3.5 Policy Statement D: Emission Reduction Techniques (ERTs) 6

27 3.5.1 Implementation Options 8

28 3.6 Policy Statement E: Feasibility Criteria 9

29 3.7 Policy Statement F: Utilizing Collaborative Processes 10

30 3.8 Policy Statement G: Tracking Procedure 10

31

32 **4. Appendices** **11**

33

34 Appendix A: Glossary 11

35

36 Appendix B: Related Documents Listing 14

37

38 Appendix C: Annual Emission Goal Implementation Guidance 15

39

40 1. Applicability 15

41

42 2. Regional Haze Implementation Plans 15

43 2.1 Section 308/309 Requirements 15

44 2.2 Submission of Periodic Reports 16

45

1	<b>TABLE OF CONTENTS</b>	
2		
3		
4	3. Use of ERTs	16
5	3.1 California	17
6	3.2 Oregon	17
7	3.3 Washington	17
8	3.4 Utah	17
9		
10	4. Establishment of Annual Emission Goals	18
11	4.1 Current ERT Application	18
12	4.2 Non-burning Alternatives and Annual Emission Goals	18
13	4.3 Determination of Appropriate ERTs	19
14	4.4 Feasibility Criteria	20
15	4.5 Existing Guidance Documents	20
16	4.6 Research Needs	21
17	4.7 Calculation of Averted Emissions	21
18		
19	Appendix D: ERT & Associated Emission Averted Table	23

# 1. WRAP Policy on Annual Emission Goals for Fire

## Policy Statements

A) The establishment and implementation of annual emission goals is a viable technique to control<sup>2</sup> fire emissions for WRAP states and tribes. Annual emission goals are required for states under Section 309 of the Regional Haze Rule.

B) Annual emission goals will achieve the minimum emission increase from fire. Annual emission goals are quantifiable values that are distinct from emission limits.

C) Annual emission goals are applied to all fire sources (excluding wildfire) due to their potential impacts on visibility.

D) The minimum emission increase from fire is accomplished through the optimal application of emission reduction techniques, which provides the basis for annual emission goals.

E) The use of emission reduction techniques to achieve annual emission goals is subject to economic, safety, technical and environmental feasibility criteria, and land management objectives.

F) States, tribes or the designated authority will establish annual emission goals in cooperation with federal land management agencies and private entities on a yearly basis.

G) States and tribes will need to develop a procedure for verifying the use of emission reduction techniques and for tracking the achievement of annual emission goals.

## 2. Background

### 2.1 Clean Air Act and Grand Canyon Visibility Transport Commission

In 1990, Congress amended the Clean Air Act (CAA), and as part of these amendments created the Grand Canyon Visibility Transport Commission (GCVTC).<sup>3</sup> The GCVTC was charged with assessing the current scientific information on visibility impacts and making recommendations for addressing regional haze in the western United States. The GCVTC signed and submitted more than 70 recommendations to the Environmental Protection Agency (EPA) in a report dated June 1996 that indicated that visibility impairment was caused by a wide variety of sources and pollutants, and that a comprehensive strategy was

---

<sup>2</sup> “Control” as used in this Policy means the use of techniques that result in a quantifiable reduction in emissions from individual fire sources.

<sup>3</sup> The GCVTC was composed of the governors of eight western states (AZ, CA, CO, NM, NV, OR, UT, WY), four tribes (Acoma Pueblo, Hopi, Hualapai, and Navajo), four Federal land management agencies (Bureau of Land Management, U.S. Fish and Wildlife Service, U.S. Forest Service, National Park Service), the Columbia River Inter-Tribal Fish Commission, and the Environmental Protection Agency.

1 needed to remedy regional haze.

2  
3 The GCVTC Report recognized that fire plays a significant role in visibility on the Colorado  
4 Plateau. According to the GCVTC Report, emissions from wildfire and prescribed fire are  
5 “an important episodic contributor to visibility-impairing aerosols, including organic carbon,  
6 elemental carbon, and particulate matter (PM<sub>2.5</sub>).”<sup>4</sup> The GCVTC Report also stated that  
7 agricultural burning emissions and their effects have been identified as a concern, but have  
8 not been quantified due to insufficient data.<sup>5</sup>

## 9 10 2.2 Western Regional Air Partnership

11  
12 The Western Regional Air Partnership (WRAP) was established in 1997 as the successor  
13 organization to the GCVTC. The WRAP is a voluntary organization comprised of western  
14 governors, tribal leaders and federal agencies,<sup>6</sup> and is charged “to identify regional or  
15 common air management issues, develop and implement strategies to address these issues,  
16 and formulate and advance western regional policy positions on air quality.”<sup>7</sup> These policies  
17 and technical tools are developed through inclusive, stakeholder-based processes and  
18 approved by consensus of the WRAP.

19  
20 WRAP participants include state air quality agencies, tribes, federal/state/private land  
21 managers, the EPA, environmental groups, industry, academia and other interested parties.  
22 There are over 400 tribes within the WRAP region. The large number of tribes limits the  
23 participation of all of them in WRAP activities, and accordingly, in the development of this  
24 Policy. Therefore, the tribal representatives involved in the development of this Policy may  
25 not represent all tribal concerns.

## 26 27 2.3 Regional Haze Rule

28  
29 Following the issuance of the GCVTC Report, the EPA issued the Regional Haze Rule  
30 (Rule) in July 1999 to improve visibility in 156 national parks and wilderness areas across  
31 the country. The Rule outlines the requirements for states and tribes to address visibility  
32 impairment in mandatory Class I areas due to emissions from all sources, including fire  
33 activities. EPA incorporated all of the GCVTC recommendations into Section 309 of the  
34 Rule, which may be used by some of the WRAP states/tribes. The remaining WRAP states  
35 must utilize the nationally applicable Section 308 provisions of the Rule. Tribes are not  
36 subject to the same requirements of the Rule as states, but tribes wishing to assume the

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<sup>4</sup> GCVTC Report, p. 47.

<sup>5</sup> Ibid.

<sup>6</sup> The WRAP membership is comprised of the governors of thirteen western states and thirteen western tribes. The current WRAP members include the States of AK, AZ, CA, CO, ID, MT, ND, NM, OR, SD, UT, WA, and WY, and the Tribal Nations of Pueblo of Acoma, Campo Band of Kumeyaay Indians, Cortina Indian Rancheria, Hopi Tribe, Hualapai Nation of the Grand Canyon, Nez Perce Tribe, Northern Cheyenne Tribe, Salish and Kootenai Confederated Tribes, Pueblo of San Felipe, and Shoshone-Bannock Tribes of Fort Hall. Federal WRAP members are the Department of the Interior, the Department of Agriculture, and the Environmental Protection Agency.

<sup>7</sup> WRAP Charter, Purpose, p. 1.

1 regional haze requirements outlined in the Rule may, according to the Tribal Authority Rule  
2 (TAR), seek approval under 40 CFR 49 to be “treated as States.”<sup>8</sup> In these cases, EPA still  
3 recognizes that “unlike States, tribes are not required by the TAR to adopt and implement  
4 CAA plans or programs, thus tribes are not subject to mandatory deadlines for submittal of  
5 implementation plans.”<sup>9</sup> Although provision for flexibility in the submission of programs  
6 and implementation plans for tribes is made under TAR, EPA does “encourage tribes  
7 choosing to develop implementation plans to make every effort to submit by the deadlines to  
8 ensure that the plans [TIPs] are integrated with and coordinated with regional planning  
9 efforts.”<sup>10</sup>

10  
11 EPA recognizes the WRAP as the Regional Planning Organization that is developing the  
12 necessary policy and technical tools to implement the Rule in the WRAP region. A WRAP  
13 policy, once approved, represents the WRAP’s consensus position on the best means for  
14 states and tribes to implement the portion of the Rule at issue. The WRAP recognizes states’  
15 and tribes’ authority and responsibility to develop, adopt and implement their regional haze  
16 state and tribal implementation plans, and the seminal guidance to do this is the Rule.<sup>11</sup>

### 17 18 **3. Annotated Policy**

#### 19 20 3.1 Introduction

21  
22 The WRAP AEG Policy is the result of the WRAP region-wide, multi-state/tribe stakeholder  
23 planning and coordination effort. The intent of the WRAP AEG Policy is to assist states (or  
24 the delegated authority) and tribes to address smoke impacts on visibility associated with fire  
25 in a way that is adequate for SIP/TIP implementation.

26  
27 The WRAP AEG Policy provides states and tribes with a consistent method for the  
28 identification, use, and tracking of emission reduction techniques (ERTs) to meet the annual  
29 emission goals requirement of the Rule. Although this Policy promotes the use of ERTs to  
30 meet the annual emission goals requirement of Section 309 of the Rule, it does not prescribe  
31 how each state/tribe integrates this Policy into its regional haze SIP/TIP or limit the use of  
32 alternative approaches to the implementation of annual emission goals.

33  
34 This WRAP AEG Policy has been developed to embody appropriate regulatory and policy  
35 requirements and to provide a predictable framework for annual emissions goals that can be  
36 reasonably implemented by states and tribes. The WRAP believes that states maintain the  
37 ultimate responsibility for the implementation of annual emission goals, whether they choose  
38 to use ERTs or some other method that meets Regional Haze Rule implementation plan  
39 requirements. Tribes, or EPA on their behalf, may choose to utilize, as a severable element,  
40 annual emission goals in their implementation plans. The WRAP recognizes that the  
41 implementation plans will be revisited and revised, per the schedule specified in the Rule,  
42 giving opportunities to refine individual programs for annual emission goals that reflect

---

<sup>8</sup> 64 FR 35759.

<sup>9</sup> 64 FR 35758.

<sup>10</sup> 64 FR 35759.

<sup>11</sup> WRAP Charter, p.1.

1 technical advances and policy updates.

### 2 3 3.2 Annual Emission Goals Required Under Section 309

4 *Policy Statement A: The establishment and implementation of annual emission goals*  
5 *is a viable technique to control fire emissions for WRAP states and tribes. Annual*  
6 *emission goals are required for states under Section 309 of the Regional Haze Rule.*  
7

8 In this Policy, the WRAP seeks to provide a consistent and equitable framework that states  
9 and tribes can use to efficiently develop their regional haze implementation plans  
10 (SIPs/TIPs). Under Section 309, the Rule calls for “establishment of annual emission goals  
11 for fire (excluding wildfire) that will minimize emission increases from fire to the maximum  
12 extent feasible.”<sup>12</sup> The Policy can be considered by all other states and tribes as a means to  
13 control fire emissions, and annual emission goals are a viable technique for controlling fire  
14 emissions if a state’s or tribe’s visibility impairment analysis for Section 308 of the Rule  
15 shows that fire sources contribute to visibility impairment in a mandatory Class I area.  
16

### 17 3.3 Annual Emission Goal Defined

18 *Policy Statement B: Annual emission goals will achieve the minimum emission*  
19 *increase from fire. Annual emission goals are quantifiable values that are distinct*  
20 *from emission limits.*  
21

22 In its Report, the GCVTC acknowledged federal and state land managers’ projection of  
23 “significant increases in prescribed fire in order to reduce the effects of wildfire resulting  
24 from past decades of fire suppression.”<sup>13</sup> The Rule also recognized that “forest fuels have  
25 built up over many years due to past management practices designed to protect public health  
26 and safety through fire suppression.” And further, that this “...has led to an increased risk of  
27 wildfire...” which would need to be offset by “the increased use of prescribed fire...”<sup>14</sup>  
28

29 This increase in fire activity prompted the GCVTC to recommend the establishment of  
30 annual emission goals that would minimize increases from fire emissions, which the Rule  
31 then adopted as a requirement under Section 309.<sup>15</sup> The Rule utilizes the GCVTC’s  
32 terminology in Section 309 and in the Preamble, both in its section on the Treatment of the  
33 GCVTC Recommendations and in the Annex to the GCVTC Report.<sup>16</sup> Therefore, for its  
34 definition of “annual emission goal” the WRAP looked to the GCVTC Report.  
35

36 Although not formally defined, the term “goal” is specifically used in the GCVTC Report in  
37 the contexts of both Area Sources and Air Pollution Prevention to focus efforts on a desired  
38 outcome.<sup>17</sup> This desired outcome may have a numeric measure associated with it, but is  
39 distinct from a limit. The GCVTC defines both the terms “cap” and “target” as emissions

---

12 64 FR 35771 §51.309 (d)(6)(v).

13 GCVTC Report, p. 23.

14 64 FR 35735.

15 GCVTC Report, p. 50.

16 64 FR 35748 and 35756.

17 GCVTC Report, p. 30.

1 limits, and uses them in its section on Stationary Sources.<sup>18</sup> The GCVTC also distinguishes  
2 between “target” and “cap” as follows:

3  
4 ... “targets” are intended as firm limitations on emissions and have the same  
5 effect as a “cap.” However, we are reserving the term “cap” to refer to the limits  
6 set under a regulatory program, which would be triggered if the “targets” are  
7 exceeded.<sup>19</sup>

8  
9 In using the term goal, and not target or cap, the GCVTC clearly intended the annual  
10 emission goal to be something other than an emission limit, and that it not have the attendant  
11 regulatory consequences of a cap, as supported by the specific use of these terms in its  
12 Report. Therefore, the WRAP AEG Policy defines annual emission goals as quantifiable  
13 indicators of progress toward the desired outcome of minimizing increases from fire  
14 emissions.

15  
16 In distinguishing between goals and limits, it is not the intent of this Policy to preclude the  
17 establishment of emission limits. However, it currently does not appear that an adequate fire  
18 emissions inventory exists throughout the WRAP Region to support the establishment of an  
19 emissions limit on fire sources.<sup>20</sup> The WRAP does recognize that scientific advances may  
20 support the feasibility of an emissions limit (either target or cap) in the future.

### 21 22 3.4 Applicability

23 *Policy Statement C: Annual emission goals are applied to all fire sources (excluding*  
24 *wildfire) due to their potential impacts on visibility.*

25  
26 The Rule, the GCVTC and WRAP policy development to date acknowledge that all types of  
27 fire must be addressed equitably as part of a visibility protection strategy since all fire  
28 contributes to regional haze.<sup>21</sup> Therefore, the WRAP AEG Policy applies to all fire sources,  
29 except for wildfire, which is specifically excluded in Section 309 of the Rule.<sup>22</sup>

30  
31 The Rule excludes wildfire from the annual emission goals requirement of Section 309 due  
32 to the inability to directly control the emissions from wildfires. The same concern would be  
33 relevant to states under Section 308 or tribes that choose to use annual emission goals as a  
34 method to control fire emissions.

35  
36 This Policy applies to federal, tribal, and state land managers and to private landowners that  
37 use prescribed fire, wildland fire used for resource benefits (WFU)<sup>23</sup> or agricultural burning

---

<sup>18</sup> GCVTC Report, p. xi and pp. 32-37.

<sup>19</sup> GCVTC Report, p. 34, footnote 4.

<sup>20</sup> In order to implement an emission limit, states/tribes would need to have emissions inventory data adequate to establish an emissions baseline, establish the baseline, conduct periodic evaluations of the effectiveness of the baseline, and institute sufficient enforcement mechanisms. Even so, the baseline may not be a reliable tool due to the variability of fire emissions.

<sup>21</sup> GCVTC Report, p. 47, 64 FR 35735, WRAP ESMP and Fire Categorization Policies.

<sup>22</sup> 64 FR 35771 §51.309 (d)(6)(v).

<sup>23</sup> Also known as Prescribed Natural Fire (PNF).

1 to achieve land management objectives on agricultural land or wildland.<sup>24</sup> In accordance  
2 with Section 118(a) of the CAA requiring that all entities, federal and non-federal, be subject  
3 to the same requirements, authorities and processes,<sup>25</sup> the WRAP AEG Policy will be applied  
4 equitably to all fire sources, excluding wildfire.

5  
6 The WRAP AEG Policy specifically does not apply to Native American cultural non-  
7 vegetative burning for traditional, religious, or ceremonial purposes (e.g., cremation, sweat  
8 lodge fires).<sup>26</sup> Nor does it apply to open burning activities on residential, commercial, or  
9 industrial property (e.g., backyard burning, garbage incineration, residential wood  
10 combustion, construction debris).<sup>27</sup> However, states/tribes may choose to consider the  
11 impacts of these fire sources when developing their regional haze implementation plans.

### 12 13 3.5 Emission Reduction Techniques (ERTs)

14 *Policy Statement D: The minimum emission increase from fire is accomplished*  
15 *through the optimal application of emission reduction techniques, which provides the*  
16 *basis for annual emission goals.*

17  
18 The WRAP AEG Policy provides a practical approach to establishing annual emission goals  
19 that states and tribes can use in their implementation plans and can apply in the immediate  
20 future. The WRAP has developed the AEG Policy to address three issues central to this  
21 visibility protection strategy.

22  
23 First, *annual* emission goals are to be developed on an annual basis, for each year, and  
24 therefore need to be based on a measure that can be determined in one year's time. The  
25 annual level of fire activity is dependent on a variety of external factors such as crop type  
26 planted, funding for federal or state fire programs, weather, etc. These factors will also  
27 influence the potential use of fire emission control strategies. In order to accommodate this  
28 variability and address the annual nature of the Rule requirement, annual emission goals are  
29 to be determined each year through a collaborative process between burners and the  
30 regulatory jurisdiction.

31  
32 Second, since annual emission goals are not emission limits, the goal is based on the sole  
33 purpose of minimizing emission increases from fire to the maximum extent feasible;  
34 therefore, annual emission goals can reasonably be tied to actions that have this result. Under  
35 this Policy, the process for establishment of the annual emission goal, rather than the specific  
36 numeric value (which varies from year to year), will be included in implementation plan  
37 submittal. In other words, the goal will focus on the efforts to minimize emissions; this  
38 process, being in the implementation plan, will be federally enforceable.

39  

---

<sup>24</sup> WRAP Policy for Categorizing Fire Emissions, November 15, 2001 (hereafter referred to as "WRAP  
Fire Categorization Policy"), p. 8. See also Appendix C for further details.

<sup>25</sup> Clean Air Act §118(a).

<sup>26</sup> WRAP Fire Categorization Policy, p. 24.

<sup>27</sup> *Ibid*, however "industrial property" would not include land such as industrial forestland.

1 Third, the WRAP region represents wide variety with regard to basic fire activity tracking,  
2 fire emissions data, and fire use, and therefore, the annual emission goals strategy will need  
3 to be one that is both flexible and practical under current circumstances. The strategy must  
4 also be capable of being implemented using tools and information currently available to meet  
5 the Section 309 deadline of December 31, 2003.

6  
7 To address these issues, the WRAP AEG Policy focuses on minimizing fire emission  
8 increases through the control of emissions on all fire projects where feasible. Control of fire  
9 emissions means utilizing methods that result in a reduction of the total amount of emissions  
10 generated from each fire project. Control of fire emissions is accomplished by using  
11 emission reduction techniques (ERTs), methods proven to reduce fire emissions.<sup>28</sup> ERTs  
12 include biomass utilization prior to burning, increasing combustion efficiency, and others.<sup>29</sup>

13  
14 For the purposes of this Policy, ERTs are not non-burning alternatives, which are techniques  
15 that replace fire as a means to achieve a particular land management objective (e.g.,  
16 reduction of fuel-loading, enhancement of wildlife habitat, etc.) At this time, methods exist  
17 for tracking and calculating the emissions averted from the use of ERTs for a broad array of  
18 vegetation types. Methods for tracking and calculating the benefits to using non-burning  
19 alternatives are not readily available in the Section 309 time frame.<sup>30</sup>

20  
21 Control measures are distinct from smoke management techniques, which are currently used  
22 in the West by land managers to minimize smoke impacts on public health, nuisance and  
23 visibility. A key smoke management technique is the timing of ignitions for better smoke  
24 dispersion with the intention of avoiding smoke impacts to sensitive areas (e.g., non-  
25 attainment areas, Class I areas, nearby communities). Smoke management techniques may  
26 give consideration to downwind air quality (e.g., nuisance impacts and National Ambient Air  
27 Quality Standards [NAAQS]) and visibility/regional haze.

28  
29 The emission reductions that are achieved through the use of ERTs are calculated on a  
30 project-specific basis, otherwise referred to as the operational phase of the fire project. The  
31 decision to burn a specific area has already been made prior to the implementation of a  
32 specific project; therefore, project-specific basis refers to projects where fire will be used to  
33 meet land management objectives. Annual emission goals, under this Policy, are established  
34 annually and apply to the upcoming year's projects where fire has been determined as the  
35 best tool for meeting specific land management objectives. The annual emission goal in this  
36 case would be the sum of emissions reductions from all fire projects where ERTs are used  
37 across the state or tribal jurisdiction, for the upcoming year.

### 38 39 40 3.5.1 Implementation Options 41

---

<sup>28</sup> The GCVTC projected that the use of optimal smoke management measures (which include the use of ERTs) could decrease fine particle (PM<sub>2.5</sub>) emissions from prescribed fires by approximately 15-20%. This resulted in modeled visibility improvements over the planning period of the GCVTC. GCVTC Report, p. 87.

<sup>29</sup> See Appendix C for more examples of specific ERTs and the application of ERTs.

<sup>30</sup> For a more detailed discussion of non-burning alternatives, see Section 4.2 of Appendix C.

1 Two options for the utilization of ERTs to meet the annual emission goal have been outlined  
2 below. These options are based on current use of ERTs, science and technology. The first  
3 option is based on estimations of emissions averted through the application of ERTs, and  
4 allows the calculation of an annual numeric value that indicates progress toward minimizing  
5 increases from fire emissions. The second option is provided for instances where estimates  
6 of emissions averted are not feasibly calculated due to insufficient data. In this second  
7 option, the annual numeric value is based on total percent use of ERTs with subsequent  
8 emission reductions inferred.

9  
10 The two options explored here are not exhaustive or definitive in structure or design.  
11 Application of these or any other options can be considered for each individual fire source  
12 sector or for combinations of them. All options for use of ERTs are subject to the feasibility  
13 criteria as outlined in Policy Statement E. Additionally, state/tribal authorities will want to  
14 be mindful of equitable treatment of sources in the implementation of ERTs.

15  
16 In either Option 1 or Option 2, state/tribes will need to determine the appropriate ERTs to be  
17 used for specific vegetation or crop types that will be treated to allow attainment of land  
18 management objectives. It is a common practice to apply a certain ERT to a specific  
19 vegetation or crop type, although more than one ERT may be feasible for a certain  
20 vegetation or crop type. Next, in establishing annual emission goals, the designation of all  
21 appropriate ERTs for each of the identified vegetation or crop type needs to be completed.

22  
23 For use in this process, Appendix D provides an example of a table that will correlate the use  
24 of ERTs with emissions averted. Appendix D will be augmented by subsequent guidance by  
25 the WRAP Fire Emissions Joint Forum (FEJF) that will summarize ERT options for common  
26 vegetation and crop types for both prescribed fire on wildlands and agricultural burning. This  
27 guidance document can be used in combination with known local practices to determine  
28 appropriate ERTs for the respective vegetation or crop type.

#### 29 30 Option 1

31  
32 Once applicable ERTs for the respective vegetation or crop type are agreed upon, the  
33 potential percentage use of ERTs would be determined subject to the feasibility  
34 criteria for the specific project. The potential percentage use is estimated by  
35 determining the portion of the project where ERTs are to be applied. Then an  
36 estimate of the emissions averted can be made. The annual emission goal is the  
37 emissions averted through the use of ERTs for all projected fire projects across the  
38 state or tribal jurisdiction.

#### 39 40 Option 2

41  
42 An estimate of emissions averted may not be feasible if ERT emission factors are not  
43 available (i.e., the specific amount of emissions reduction has not been determined  
44 through research). In this case, the annual emission goal is the percent of total acres  
45 on which ERTs are used where fire is to be employed across a state or tribal  
46 jurisdiction for the upcoming year.

1  
2 Although annual emission goals using ERTs can be established unilaterally across fire  
3 source sectors for either Option 1 or 2, there are benefits to establishing them by source  
4 sector so as to account for differences in management practices between agricultural and  
5 wildland burning, as well as in the availability of ERTs. Establishing the annual goal using  
6 ERTs by source sector may also alleviate equity issues since the goal is applied across  
7 projects with similar vegetative or crop types and land management objectives. The annual  
8 goal should be established after the evaluation of all potentially applicable ERTs.

9  
10 This Policy encourages states/tribes to coordinate with neighboring states/tribes to improve  
11 the knowledge base of ERTs and to maintain consistency in calculating emissions averted.  
12 Interstate coordination is key for minimizing visibility impacts in mandatory Federal Class I  
13 areas and for addressing regional haze in the WRAP region.<sup>31</sup>

### 14 15 3.6 Feasibility Criteria

16 *Policy Statement E: The use of emission reduction techniques to achieve annual*  
17 *emission goals is subject to economic, safety, technical and environmental feasibility*  
18 *criteria, and land management objectives.*

19  
20 The feasibility of ERT use is variable and dependent on criteria as established in the WRAP  
21 Fire Categorization Policy:

22  
23 Per the GCVTC Recommendations, economic, safety, technical and  
24 environmental considerations are part of the application of emission controls for  
25 the implementation of this Policy statement. Due to these considerations, the  
26 control of emissions from some fire types may not be feasible, which will be  
27 determined by the land manager in collaboration with the applicable air quality  
28 regulatory authority.<sup>32</sup>

29  
30 The WRAP AEG Policy also recommends that land management objectives be included in  
31 these criteria during the decision-making process to ensure that ERTs are used appropriately  
32 and at levels of usage that are feasible. It should be noted that the specific land management  
33 objective for an area could preclude the use of a specific ERT where that ERT would prevent  
34 the attainment of the land management objective, e.g., if the land management objective is to  
35 reduce downed large fuels in an area, the use of burning under high fuel moisture of large  
36 woody fuels (i.e., the ERT being considered) would not be an option. See Appendix C for  
37 more detailed information on the application of ERTs.

### 38 39 40 41 3.7 Utilizing Collaborative Processes

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<sup>31</sup> 64 FR 35728.

<sup>32</sup> WRAP Fire Categorization Policy, p. 11.

1           *Policy Statement F: States, tribes or the designated authority will establish annual*  
2           *emission goals in cooperation with federal land management agencies and private*  
3           *entities on a yearly basis.*

4  
5 Section 309 of the Rule requires that annual emission goals are “established in cooperation  
6 with States, tribes, Federal land management agencies, and private entities.”<sup>33</sup> In addition, the  
7 WRAP’s policies on fire to date endorse the importance of using this collaborative process.  
8 Annual emission goals will be reviewed and revised on a yearly basis. Coordination within  
9 states and across jurisdictional boundaries is key for minimizing visibility impacts in  
10 mandatory Federal Class I areas and for addressing regional haze in the WRAP region.<sup>34</sup>

11  
12 3.8 Tracking Procedure

13           *Policy Statement G: States and tribes will need to develop a procedure for verifying*  
14           *the use of emission reduction techniques and for tracking the achievement of annual*  
15           *emission goals.*

16  
17 Development of a procedure for verifying the use of ERTs, and for tracking an estimate of  
18 the emission reductions achieved, where possible, is essential to assess whether the annual  
19 emission goal is being achieved. Such a procedure could also facilitate the state’s/tribe’s  
20 ability to ensure accountability of the source sectors in utilizing ERTs. It is possible to track  
21 other parameters, such as fuel moisture, to indicate indirectly which ERTs are being used in  
22 the field.

23  
24 The tracking information will be invaluable for assessing whether revisions need to be made  
25 to the annual emission goal in the future. The WRAP Fire Tracking System Policy identifies  
26 essential components of a fire tracking system that may be augmented with additional  
27 components so as to satisfy a tracking procedure for annual emission goals.

28  
29 States/tribes can utilize the tracking procedure for the annual emission goal as a means for  
30 assessing the effectiveness of the control measures (i.e., ERTs) in their SIPs/TIPs. States  
31 under Section 309 are required to submit periodic reports to EPA that assess the  
32 effectiveness of their control measures, including “. . . a summary of the emissions reductions  
33 achieved throughout the State through implementation. . .” of such measures.<sup>35</sup>

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<sup>33</sup> 64 FR 35771 §51.309(d)(6)(v).

<sup>34</sup> 64 FR 35728.

<sup>35</sup> 64 FR 35772 §51.309(d)(10)(i)(A).

## 4. Appendices

### Appendix A Glossary

Agricultural Fire/Burning – Any fire ignited by management actions to meet specific objectives (i.e., managed to achieve resource benefits) on agricultural land.

Agricultural Land – Agricultural land includes croplands, pasture, and other lands on which crops or livestock are produced. Rangeland will be included with wildland for the purposes of the Fire Emissions Joint Forum work.

Alternatives to Burning – See Non-burning Alts. Definition below.

Best Available Control Measures (BACM) – A term used to refer to the most effective measures (according to EPA guidance) for controlling small or dispersed particulates and other emissions from sources such as roadway dust, soot and ash from woodstoves and open burning of brush, timber, grasslands, or trash.

Best Management Practices (BMPs) – A term applied collectively to any administrative or on-the-ground procedure that reduces the negative impacts of some action. An example of a Best Management Practice with respect to air quality would be conducting a prescribed burn when atmospheric ventilation is good, which in turn promotes smoke dispersal.

Control – To reduce emissions from an individual fire source.

Class I Area – An area set aside under the Clean Air Act to receive the most stringent protection from air quality degradation. Mandatory Class I Federal Areas are: 1) international parks, 2) national wilderness areas and memorial parks larger than 5,000 acres in size, 3) national parks that exceed 6,000 acres in size and which were in existence when the 1977 Clean Air Act amendments were enacted. The extent of a mandatory Class I Federal area includes subsequent changes in boundaries, such as park expansions. Class I areas can also include lands designated by states or tribes, but these areas are not deemed mandatory by the Clean Air Act.

Emission – Pollution discharged into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities; from residential chimneys; from motor vehicle, locomotive, aircraft, or other non-road engines; and from area sources such as fire.

Emission Cap - An enforceable limit on the amount of specific air pollutants that can be released or on the amount of a specific pollutant that is allowed to be in the air in a defined geographic area, and that has regulatory consequences. See also Emission Goal and Emission Target.

Emission Goal - A desired future outcome that may be represented by a numeric indicator,

1 but without regulatory consequences, and as distinguished from a limit (i.e., target or cap).  
2 See also Emission Cap and Emission Target.

3  
4 Emission Reduction Technique (ERT) - A technique for controlling emissions from  
5 prescribed fires to minimize the amount of emission output per unit of area treated.

6  
7 Emission Target - A firm limit on the amount of specific air pollutants that can be released  
8 or on the amount of a specific pollutant that is allowed to be in the air in a defined  
9 geographic area, but without regulatory consequences (as distinguished from a cap). See also  
10 Emission Cap and Emission Goal.

11  
12 Enhanced Smoke Management Program (ESMP) - A program for fire that considers  
13 visibility effects, in addition to health and nuisance objectives, and is based on the criteria of  
14 efficiency, economics, law, emission reduction opportunities, management objectives, and  
15 reduction of visibility impact.

16  
17 Fire - When this term appears, it refers inclusively to wildfire, prescribed natural  
18 fire/wildland fire managed for resource benefits, prescribed fire, rangeland fire, and  
19 agricultural fire.

20  
21 Land Managers - When this term appears, it refers inclusively to federal, state, tribal, and  
22 private land managers.

23  
24 Non-burning Alternatives to Fire - Techniques that replace fire as a means to achieve a  
25 particular land management objective (e.g., reduction of fuel-loading, manipulation of fuels,  
26 enhancement of wildlife habitat, eco-system restoration, etc.) In this Policy, non-burning  
27 alternatives do not include techniques used in conjunction with fire. Techniques used in  
28 conjunction with fire are referred to as ERTs.

29  
30 Prescribed Fire - Any fire ignited by management actions to meet specific objectives, i.e.,  
31 managed to achieve resource benefits.

32  
33 Rangelands - Land on which the historic climax plant community is predominantly grasses,  
34 grass-like plants, forbs, or shrubs. Includes lands re-vegetated naturally or artificially when  
35 routine management of that vegetation is accomplished mainly through manipulation of  
36 ecological principles. Rangeland includes natural grasslands, savannas, shrub lands, most  
37 deserts, tundra, alpine communities, coastal marshes and wet meadows (Natural Resources  
38 Conservation Service National Range and Pasture Handbook, 1997.)

39  
40 Regional Haze - Visibility impairment caused by the cumulative air pollutant emissions from  
41 numerous sources over a wide geographic area.

42  
43 Smoke Effects - The effects on visibility (both plume blight and regional haze), public  
44 nuisance, and the health-based NAAQS due to emissions from fire.

45

1 Smoke Management - Programs, practices, and techniques to minimize and/or reduce smoke  
2 emissions or impacts from fire.

3

4 State Implementation Plan (SIP) - Plans devised by states to carry out their responsibilities  
5 under the Clean Air Act. SIPs must be approved by the U.S. Environmental Protection  
6 Agency and include public review.

7

8 Transport Region State - One of nine states that make up the Grand Canyon Visibility  
9 Transport Region: Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon,  
10 Utah, and Wyoming.

11

12 Tribal Implementation Plan (TIP) - Plans devised by tribes to carry out their responsibilities  
13 under the Clean Air Act. TIPs must be approved by the U.S. Environmental Protection  
14 Agency and include public review.

15

16 Wildfire - Any unwanted, non-structural fire.

17

18 Wildland - An area where development is generally limited to roads, railroads, power lines,  
19 and widely scattered structures. The land is not cultivated (i.e., the soil is disturbed less  
20 frequently than once in 10 years), is not fallow, and is not in the USDA Conservation  
21 Reserve Program (CRP). The land may be neglected altogether or managed for such  
22 purposes as wood or forage production, wildlife, recreation, wetlands, or protective plant  
23 cover (EPA Interim Air Quality Policy on Wildlands and Prescribed Fires). The land is not  
24 “agricultural land” as operationally defined above. Silvicultural land and rangelands (per the  
25 FEJF charge), woodlots, and private timberlands will be included with wildlands for the  
26 purposes of the FEJF work.

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## Appendix B

### Related Documents Listing

#### **Regional Haze Rule**

Published in the Federal Register on July 1, 1999, 64 FR 35714.

[http://www.epa.gov/ttn/oarpg/t1/fr\\_notices/rhfedreg.pdf](http://www.epa.gov/ttn/oarpg/t1/fr_notices/rhfedreg.pdf)

#### **Grand Canyon Visibility Transport Commission Report**

Grand Canyon Visibility Transport Commission, Recommendations for Improving Western Vistas, Report to the U.S. EPA, June 10, 1996.

<http://www.wrapair.org> Go to the GCVTC link.

#### **EPA Interim Air Quality Policy on Wildland and Prescribed Fire**

U.S. EPA, Office of Air Quality Planning and Standards, Interim Air Quality Policy on Wildland and Prescribed Fires, April 23, 1998.

<http://www.epa.gov/ttn/oarpg/t1/memoranda/firefnl.pdf>

#### **Prescribed Burning Background Document and Technical Information Document for Prescribed Burning Best Available Control Measures**

U.S. EPA, Office of Air Quality Planning and Standards, September 1992.

Research Triangle Park, NC. EPA-450/2-92-003.

<http://www.epa.gov/ttncaaa1/t1bid.html>

#### **AAQTF Recommendation on Air Quality Policy**

Agricultural Air Quality Task Force, Air Quality Policy on Agricultural Burning, Recommendation to the U.S. Department of Agriculture, November 10, 1999.

<http://fargo.nserl.purdue.edu/faca/Archives/2000/Policy/Burning%20Policy.htm>

#### **Tribal Authority Rule**

Published in the Federal Register on February 12, 1998, 63 FR 7253.

<http://www.epa.gov/fedrgstr/EPA-AIR/1998/February/Day-12/a3451.htm>

#### **Smoke Management Guide for Prescribed and Wildland Fire**

National Wildfire Coordinating Group Fire Use Working Team (NWCG), 2001 Edition.

<http://www.nwcg.gov>

#### **On the WRAP Website (<http://www.wrapair.org>):**

##### **WRAP Policy for Categorizing Fire Emissions**

Approved by the Western Regional Air Partnership, November 15, 2001.

Go to the FEJF Task Teams, then Natural Background.

##### **Non-Burning Management Alternatives on Agricultural Lands in the Western United States**

Go to FEJF Task Teams, then Non-Burning Alternatives on Agricultural Lands

##### **Class I Area Map**

Go to About WRAP, then WRAP Boundaries and Regional Visibility Planning in the West.

**Appendix C**  
**Annual Emission Goal Implementation Guidance**

**1. Applicability**

As this Policy builds on the WRAP Fire Categorization Policy, the scope and applicability in regard to the “anthropogenic” or “natural” classifications defined by the WRAP Fire Categorization Policy is clarified below. Those interested should consult the WRAP Fire Categorization Policy for further detail.

<b>Fire Categories<sup>36</sup></b>	<b>WRAP AEG Policy Applicability</b>
“Natural” Sources <ul style="list-style-type: none"> <li>• Wildfire</li> <li>• Prescribed fire (including WFU) used for ecosystem maintenance purposes</li> <li>• Native American cultural burning for traditional, religious, and ceremonial purposes</li> </ul>	Exempted by Rule Covered  Covered
“Anthropogenic” Sources <ul style="list-style-type: none"> <li>• Prescribed fire (including WFU) used for any purpose except ecosystem maintenance</li> </ul>	Covered
Other Sources <ul style="list-style-type: none"> <li>▪ Native American cultural non-vegetative burning</li> <li>▪ Other open burning activities</li> </ul>	Not Covered  Not Covered

**2. Regional Haze Implementation Plans**

2.1 Section 308/309 Requirements

It is anticipated that annual emission goals will be incorporated into the Section 309 implementation plans submitted to EPA in order to meet the requirements of the Rule. States/tribes complying with Section 309 are required to have a regional haze implementation plan that addresses the 16 mandatory Federal Class I areas of the Colorado Plateau submitted by December 31, 2003, with implementation of certain control measures, including annual emission goals, by the following year. All other mandatory Federal Class I areas in the GCVTC transport region will be addressed by 2008 under the Section 308 or 309 implementation plan schedule.

Although Section 309 of the Rule specifically requires the establishment of annual emission goals for fire, the methods that are promoted in this Policy could be considered by

<sup>36</sup> WRAP Fire Categorization Policy, p.8.

1 states/tribes that choose to follow the requirements of Section 308 of the Rule as a viable  
2 means to control fire emissions.

3  
4 The Rule requires under Section 309 that annual emission goals for fire (excluding wildfire)  
5 be established through 2018 as a means for demonstrating reasonable progress  
6 requirements.<sup>37</sup> The WRAP considers this approach to have merit beyond 2018.<sup>38</sup> Section  
7 309 states may need to consider developing further contingency measures, e.g., a regional  
8 application of annual emission goals, in their implementation plans if the annual emission  
9 goals do not adequately minimize emission increases from fire. The annual emission goal  
10 approach is a viable strategy to control fire emissions and, thereby, make reasonable progress  
11 toward the attainment of natural conditions by 2064, as required by the Rule.

## 12 13 2.2 Submission of Periodic Reports

14  
15 Beginning in 2008, states are required by the Rule to submit periodic reports to the EPA to  
16 assess the adequacy of its SIP, including assessing the adequacy of certain elements, such as  
17 the annual emission goals. These periodic reports are due every five years. If the state/tribe  
18 determines that the SIP is or may be inadequate to meet reasonable progress goals, the state  
19 is required to develop additional strategies to address deficiencies in the plan. These  
20 strategies are then submitted to EPA for approval.

## 21 22 **3. Use of ERTs**

23  
24 ERTs are proven to be effective methods to control fire emissions and are applied in  
25 different ways by regulatory authorities. For example, some regulatory authorities promote  
26 the use of ERTs as part of a voluntary management program while others enforce the use of  
27 ERTs through rule making. For example, the California Agricultural Burning Guidelines  
28 enforce the use of ERTs by specifying requirements for the burning of rice, barley, oat, and  
29 wheat straw. The Guidelines require the use of a "crackle test" to determine if the fuel is dry  
30 enough to burn. In the state of Washington, wildland land managers are encouraged to use  
31 techniques, such as fans, crane piling, mass ignition, accelerated mop-up, and other methods  
32 of increasing combustion efficiency and reducing the smoldering stage of burning.

33  
34 Although a few states in the WRAP region do promote or require the use of ERTs and  
35 specify burning conditions that must be met in order to burn, currently no systems are in  
36 place to track the emissions averted from the application of such methods across all fire  
37 source sectors. Currently programs do exist in some areas for tracking of emissions averted  
38 through the use of ERTs for wildland prescribed fires.

39  
40 The following paragraphs provide a summary of some of the current efforts by regulatory  
41 entities to use ERTs as a means to reduce emissions from prescribed fire and agricultural  
42 burning.

43  

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<sup>37</sup> 64 FR 35771 §51.309 (d)(6)(v).

<sup>38</sup> WRAP Initiatives Oversight Committee (IOC), Transmittal Letter, November 15, 2001.

1 3.1 California

2  
3 In California, the California Agricultural Burning Guidelines specify requirements for the  
4 burning of rice, barley, oat and wheat straw. The Guidelines require the straw to be burned  
5 under optimal moisture conditions, use of a mechanical spreader to ensure even distribution  
6 (rice straw only), use of specific firing techniques, and specific burning windows. In  
7 addition, the Guidelines require the use of a “crackle test” to determine if the fuel is dry  
8 enough to burn. If the straw makes an audible crackle when it is bent sharply, it is dry  
9 enough to burn.

10  
11 California also specifies certain requirements for rangeland improvement burns, forest  
12 management burning, and wildland vegetation management burning. These requirements  
13 include, but are not limited to, specific burning windows, and drying periods to ensure  
14 optimal fuel moisture.

15  
16 3.2 Oregon

17  
18 In Oregon, the rules for agricultural burning include, but are not limited to, measures to  
19 ensure that crop residues are evenly distributed and in good burning condition, rapid ignition  
20 techniques are employed, and alternatives to open burning of fields are considered. For  
21 prescribed fires on wildlands, the Oregon Smoke Management Program requires land  
22 managers to consider utilization of residue, fuel reduction measures, alternate treatment  
23 practices, and reduction of prescribed burning emissions to achieve emissions reduction  
24 goals established within the Oregon Visibility Protection Plan. Burning during the spring  
25 when the 1000-hour and larger fuels have high fuel moisture is promoted. Post-burn reports  
26 require the tracking of fuel moisture content, ignition method, and other information to  
27 support calculation of ERT use.

28  
29 3.3 Washington

30  
31 In Washington, wildland land managers are encouraged to use techniques, such as fans,  
32 crane piling, mass ignition, accelerated mop-up, and other methods of increasing combustion  
33 efficiency and reducing the smoldering stage of burning. No tracking of specific ERTs is  
34 required. The Washington Smoke Management Plan for silvicultural burning does establish  
35 a tracking system to measure progress toward specific emission reduction targets. Burn  
36 days and specific burning conditions are established by the Department of Ecology for  
37 agricultural burning and a permitting system is in place.

38  
39 3.4 Utah

40  
41 In Utah, agricultural burning is not regulated by the State of Utah. However, counties  
42 require such burns to be conducted during optimal dispersion conditions. State air quality  
43 regulations require wildland land managers to take measures to prevent smoke impacts. State  
44 law requires identification of best management practices including the use of ERTs. Land  
45 managers are required to identify the techniques that are employed in addition to fuel  
46 moisture and ignition method in their daily emissions report.

1  
2 **4. Establishment of Annual Emission Goals**

3  
4 4.1 Current ERT Application

5  
6 Research has shown that ERTs can result in emission reductions, which, in turn, reduce  
7 smoke impacts on air quality. According to the National Wildfire Coordination Group’s  
8 (NWCG) *Smoke Management Guide for Prescribed and Wildland Fire*, methods used to  
9 reduce emissions generated from prescribed burning on wildlands are: reducing the area  
10 burned, reducing fuel loading, reducing fuel production, reducing fuel consumed, scheduling  
11 burning before new fuels appear, and increasing combustion efficiency.<sup>39</sup>

12  
13 EPA’s *Prescribed Burning Background Document and Technical Information Document for*  
14 *Prescribed Burning Best Available Control Measures* states that the methods for reducing  
15 the amount of emissions generated from agricultural burning include: reducing the acres  
16 burned annually, altering the fuel distribution, improving firing techniques, and burning  
17 under optimum fuel moisture.<sup>40</sup>

18  
19 4.2 Non-burning Alternatives and Annual Emission Goals

20  
21 Annual emission goals, under this Policy, are established annually and apply to the  
22 upcoming year’s projects where fire has been previously determined as the best tool for  
23 meeting specific land management objectives. Therefore, this Policy makes a distinction  
24 between those ERTs that are used *with* fire and those techniques that *replace* fire (i.e., non-  
25 burning alternatives, sometimes grouped with ERTs).<sup>41</sup> For public lands, non-burning  
26 alternatives that replace fire are typically considered in long-term programmatic plans and do  
27 not coincide with annual operational plans for fire projects. By the time the project plan is  
28 being implemented, the decision to use fire as a tool to meet the land management objective  
29 has been made.

30  
31 Land management decisions for federal land managers and possibly other land managers are  
32 made years in advance of actual project implementation and for multi-year periods, under  
33 long-term land management plans or project plans. These plans, and the supporting NEPA  
34 analyses, are the process under which alternatives to burning and levels of management  
35 application of fire are established. This land management decision process is on a different  
36 temporal/spatial scale from project level operations. In addition, the decision by federal land  
37 managers to replace fire is based on other environmental considerations that cannot be  
38 adequately addressed on an operational basis, which is the focus of the application of ERTs

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<sup>39</sup> NWCG’s *Smoke Management Guide For Prescribed And Wildland Fire*, 2001 Edition (hereafter referred to as “2001 Smoke Management Guide”), pages 143-151.

<sup>40</sup> EPA’s *Prescribed Burning Background Document and Technical Information Document for Prescribed Burning Best Available Control Measures*, September 1992, (hereafter referred to as “EPA’s BACM Document”), p. 9-13.

<sup>41</sup> See the Glossary in Appendix A for the definition of non-burning alternatives as used in this Policy. This definition is not meant to contradict EPA’s as described in its BACM Document, but rather refers to the application of non-burning alternatives specific to annual emission goals, as defined in this Policy.

1 for annual emission goals, as defined by the Policy. Although specific projects may also go  
2 through a NEPA analysis during which non-burning alternatives may be assessed, again,  
3 these are typically done well in advance of the operational effort.

4  
5 In distinguishing between ERTs used on fire projects and non-burning alternatives used to  
6 replace fire on other land management projects, it is the WRAP's intent only to clarify the  
7 application of ERTs as the basis for annual emission goals. The WRAP supports efforts to  
8 utilize alternatives to burning (such as collection and removal of residue for use offsite with  
9 no subsequent on-site burning) in land management and fire management plans or other  
10 equivalent long-term plans. The use of non-burning alternatives is one of the key elements of  
11 the enhanced smoke management program as defined by the WRAP ESMP Policy. Further,  
12 the WRAP encourages each state/tribe to work cooperatively with land managers to identify,  
13 implement, and track all feasible non-burning alternatives.<sup>42</sup>

14  
15 Several guidance documents provide information on the use of various types of non-burning  
16 alternatives that could be used by land managers. WRAP's 2001 *Non-Burning Management*  
17 *Alternatives on Agricultural Lands in the Western United States* identifies potential non-  
18 burning management alternatives for agricultural burning including methods for assessing  
19 the impacts of alternatives. The WRAP's draft *Comprehensive Manual on Non-Burning*  
20 *Alternatives* provides a catalogue of alternatives to prescribed burning on wildlands,  
21 including a risk versus benefit decision-making process related to the use of alternatives.

#### 22 23 4.3 Determination of Appropriate ERTs

24  
25 The opportunity for the application of ERTs varies greatly. The 2001 Smoke Management  
26 Guide states, "ERTs vary widely in their applicability and effectiveness by vegetation type,  
27 burning objective, region of the country, and whether fuels are natural or activity-  
28 generated."<sup>43</sup>

29  
30 For example, a maintenance burn in a brush vegetative type within a wilderness area may  
31 have virtually no options for ERT application. Alternatively, multiple ERTs may be  
32 applicable in a ponderosa pine vegetation type where activity such as logging or thinning has  
33 occurred. The applicability of a particular technique or practice will depend, in part, on the  
34 objectives of that burn. For example, the objective of a prescribed burn on wildlands may be  
35 to create open space for wildlife. A backing fire, which is a firing technique that is used to  
36 reduce the amount of emissions generated, may not produce sufficient fire characteristics to  
37 achieve the management objective.

38  
39 It is important to note that while ERTs offer an excellent tool for meeting goals for visibility  
40 protection, ERTs may cause negative effects such as soil compaction, nutrient loss, and  
41 impaired water quality on other valuable resources. Therefore, it is imperative that ERTs are  
42 used carefully, and that land managers and air regulators are provided the information and  
43 training necessary to make informed decisions.

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<sup>42</sup> See the WRAP Policy on Fire Tracking Systems.

<sup>43</sup> 2001 Smoke Management Guide, p. 141.

1  
2 4.4 Feasibility Criteria  
3

4 The use of ERTs should be based on economic, safety, technical and environmental  
5 feasibility criteria, as well as land management objectives. The WRAP recommends that  
6 education and training are also included as feasibility criteria. It is imperative that education  
7 and training are provided to ensure that ERTs are used appropriately. All of the above  
8 criteria will affect the application of certain ERTs for vegetation or crop types, burning  
9 objectives, and area in the WRAP region.

10  
11 Examples of how states/tribes might apply the feasibility criteria are listed below.

12  
13 Economic: What are the economic costs of applying a certain ERT? Is a specific ERT more  
14 economical than others? Any ERT that significantly reduces crop yields or exceeds the cost  
15 of a crop is not likely to be accepted by farmers or growers. The same concern is relevant to  
16 the application of ERTs on wildlands.

17  
18 Safety: Are certain ERTs not feasible due to public and firefighter safety concerns? Are  
19 certain ERTs not feasible due to concerns related to containment of the fire, i.e., keeping the  
20 fire within certain boundaries? Do certain ERTs minimize the possibility of nuisance and  
21 hazard smoke?

22  
23 Technical: Are the equipment and resources available to utilize a specific ERT? Are  
24 sufficient training programs available in the use of ERTs for the land managers?

25  
26 Environmental: Are there specific air quality and non-air quality environmental limitations  
27 (e.g., vegetation/crop type, fire type, time of year, area in WRAP region, soil compaction,  
28 water quality, etc.) that influence the use of certain ERTs?

29  
30 Land Management Objectives: Is a certain ERT not feasible due to conflicts with land  
31 management objectives? Do certain ERTs maximize the likelihood of achieving the land  
32 management objective of the burn?

33  
34 4.5 Existing Guidance Documents  
35

36 Several guidance documents provide information on the use and effectiveness of various  
37 types of ERTs that could be used by land managers to control fire emissions and reduce  
38 smoke impacts. EPA's BACM Document, the 2001 Smoke Management Guide, and the  
39 GCVTC's Fire Emission Project<sup>44</sup> are three examples.

40  
41 EPA's BACM Document provides information on ERTs for both wildland and agricultural  
42 burning. The BACM Document is one of the best comprehensive references on potential  
43 ERTs for agricultural burning. Most of the WRAP states do not have agricultural smoke  
44 management programs, so the demand for additional research is minimal. Once agricultural

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<sup>44</sup> WRAP Report: Integrated Assessment Update and 2018 Emissions Inventory for Prescribed Fire, Wildfire and Agricultural Burning (DRAFT), Appendix A, pp. 61-96.

1 smoke management programs are developed, further research on common ERTs for  
2 agricultural burning applications may be available.

3  
4 The 2001 Smoke Management Guide presents information on the use and effectiveness of  
5 ERTs, frequency of specific ERT usage, and qualitative assessment of emission reductions  
6 achieved through the use of ERTs. The majority of the information presented in the Guide  
7 was gathered from fire practitioners at three national workshops held during the fall of 1999.  
8 Much of the research into ERTs and subsequent emissions benefits for wildlands, such as the  
9 Consume software program,<sup>45</sup> has been conducted in the Pacific Northwest, although the  
10 general principles are applicable elsewhere in the WRAP Region.

11  
12 The GCVTC's Fire Emission Project assessed the potential application of ERTs by wildland  
13 vegetation type and fire type on a region-wide basis. Included in the assessment was  
14 percentage of feasible use of ERTs for these wildland vegetation and fire types, with the  
15 emissions reduced as a result of the use of ERTs also evaluated.

#### 16 17 4.6 Research Needs

18  
19 ERTs have been proven to reduce fire emissions through documented research, but more  
20 research is needed to make them a more quantifiable tool for land managers. The 1999 Air  
21 Quality Policy on Agricultural Burning emphasized this fact by stating, "Emission reduction  
22 technology to reduce the impact of pollutants emitted from agricultural burning on ambient  
23 concentrations is needed".<sup>46</sup>

24  
25 The identification of common ERTs for agricultural burning is a difficult task since most of  
26 the WRAP states do not have smoke management programs to address agricultural burning,  
27 and therefore the demand for such information is not great. Information regarding  
28 availability, applicability, and cost effectiveness of ERTs can be found in various research  
29 documents, but a comprehensive guide does not currently exist.

30  
31 The research on ERTs for wildland fire was predominantly conducted in the Pacific  
32 Northwest. Although the general principles are applicable elsewhere in the WRAP Region,  
33 more research is needed on ERTs for wildland fire, with emphasis placed on vegetation types  
34 located outside of the Pacific Northwest.

#### 35 36 4.7 Calculation of Averted Emissions

37  
38 According to the 2001 Smoke Management Guide, "The overall potential for emission  
39 reductions from prescribed fire depends on the frequency of use of emission reduction  
40 techniques and the amount of emission reduction that each method offers."<sup>47</sup> Therefore, in  
41 order to determine the potential for emission reductions from prescribed fire, land managers

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<sup>45</sup> Pacific Northwest Research Station, Forestry Sciences Laboratory, Consume Software, Version 2.1.

<sup>46</sup> Agricultural Air Quality Task Force's (AAQTF) Air Quality Policy on Agricultural Burning, Recommendation to the U.S. Department of Agriculture, November 10, 1999.

<sup>47</sup> 2001 Smoke Management Guide, p. 152.

1 will need to calculate the specific amount of emission reduction that each method offers.  
2 Consume 2.1, a fuel consumption and emissions model, can be used to estimate potential  
3 emission reductions that may be achieved by employing certain ERTs.<sup>48</sup>  
4

5 The WRAP recognizes the need for a more comprehensive guide for estimating potential  
6 emission reductions achieved through the use of ERTs for agricultural burning and wildland  
7 fire. This guidance will be developed by the WRAP in a similar format to that of Appendix  
8 D to support states' and tribes' use of annual emission goals. Appendix D provides a table  
9 that lists ERT options that can be applied by land managers and the corresponding emissions  
10 averted by using a particular ERT.  
11

12 The 2001 Smoke Management Guide contains several tables that may be useful to  
13 states/tribes in order to establish annual emission goals. The tables include information on  
14 the frequency of use of specific ERTs by region of the country, the general effectiveness of  
15 specific ERTs, the significant constraints limiting the wider application of ERTs, and the  
16 potential emission reductions that may be achieved by employing various ERTs as estimated  
17 by Consume 2.1. There are some limitations to the information contained in the 2001 Smoke  
18 Management Guide, as some vegetation types that are found in the WRAP region are not  
19 included.  
20

21 These tables should be utilized with the understanding that the effectiveness of a particular  
22 ERT may vary considerably. Considering all burning nationally, if ERTs were optimally  
23 used, emissions could probably be reduced by approximately 20-25 percent assuming all  
24 other factors (vegetation types, acres, etc.) were held constant and land management goals  
25 were still met.<sup>49</sup> Individual states/tribes or regions may be able to achieve greater emission  
26 reductions than this or much less depending on the states' or regions' individual situations.

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<sup>48</sup> Ottmar, Roger D.; Reinhardt, Timothy E.; Anderson, Gary; DeHerrera, Paul J. [In preparation]. Consume 2.1 User's Guide. Gen. Tech. Rep. PNW-GTRxxx. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

<sup>49</sup> J. Peterson and B. Leenhouts, "What Wildland Fire Conditions Minimize Emissions and Hazardous Air Pollutants and Can Land Management Goals Still Be Met?" (Draft), August 20, 1997.

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2  
3  
4  
5

## APPENDIX D

### Example of ERT & Associated Emission Averted Table

(This example demonstrates the future guidance that will be issued by the FEJF.)

ERT Category	Practice	Treatment	Size Class	Vegetation Type	Smolder	Equation	Reduction Factor
Increased Combustion Efficiency	Backing Fires	First Entry	All	Ponderosa Pine	N/A	ERT Emissions = Total Emissions x 0.9	0.1
			All	Pinyon/Juniper Woodland, Oak Brush, Sage, Desert Shrub, Annual Grass, Perennial Grass	N/A	ERT Emissions = Total Emissions x 0.9	0.1
		Maintenance	All	Ponderosa Pine, Pinyon/Juniper, Woodland, Oak Brush, Sage, Desert Shrub, Annual Grass, Perennial Grass	N/A	ERT Emissions = Total Emissions x 0.9	0.1

6