

**SUMMARY OF BOARD ITEM**

**ITEM # 00-9-3:** PUBLIC HEARING TO CONSIDER THE ADOPTION OF REGULATIONS FOR THE CONDITIONAL RICE STRAW BURNING PROGRAM

**STAFF RECOMMENDATION:** The staff recommends that the Board adopt the proposed regulations to establish the Conditional Rice Straw Burning Permit Program.

**DISCUSSION:** Since 1991, rice growers in the Sacramento Valley Air Basin (Basin) have been participating in an annual reduction of rice straw burning. This reduction in burning was established by the Connelly-Areias-Chandler Rice Straw Burning Reduction Act of 1991. Beginning in 2001, growers may burn up to the lesser of 25 percent of each grower's planted acreage or 125,000 total acres in the Basin. However, allocations up to this amount are allowed for disease control purposes only, and may be permitted only if specified conditions are met.

Section 41865 of the Health and Safety Code requires ARB, in consultation with the Department of Food and Agriculture and the Sacramento Valley Basinwide Air Pollution Control Council (Basinwide Council), to adopt regulations for the issuance of conditional rice straw burning permits in the Basin. Beginning in September 2001, county air pollution control officers may grant conditional rice straw burning permits only if the county agricultural commissioner and the applicant have met specified conditions to verify that the applicant's field is significantly impacted by a rice disease. ARB regulations will establish a framework for disease verification and permit issuance. The permit program will be locally adopted, in accordance with these regulations, by the Basinwide Council for review and approval by ARB.

**SUMMARY AND IMPACTS:**

Implementation of the Conditional Rice Straw Burning Permit Program will entail necessary but minor costs to the rice industry, the local air pollution control districts, the Basinwide Council, local agricultural commissioners and ARB.

A local program must be adopted by the Basinwide Council in accordance with the provisions of the proposed conditional rice straw burning regulations.

Growers will have to submit conditional burning permit requests accompanied by field inspection reports. Reports must be verified and approved by local agricultural commissioners. Until May 30, 2003, determinations of the significance of disease impacts on rice yield must be made. After this time, only a determination of disease presence will be required. This 2003 program modification is based on staff's expectation that at least 25 percent of each grower's acreage has significant disease and, therefore, continued annual quantification is not necessary beyond 2003. Staff will analyze the first two years of disease quantification data to evaluate the need for continued disease quantification and report to the Board on the findings. If data indicates that quantification should be continued, this regulation would have to be amended to continue that provision. If staff's expectations are confirmed, no amendments will be necessary.

Field inspections must be made by qualified personnel. Accordingly, a training program to provide the necessary expertise for field inspectors is required by the proposed regulations.

Once approved by local agricultural commissioners, the permit and inspection reports will be submitted to local air pollution control officers who may then consider the issuance of a permit in accordance with the provisions of the Sacramento Valley Burn Plan and other applicable statewide burning provisions.

Staff believes that this program will cost approximately \$1.00 per acre of rice straw burned during the first two years of the program (until May 30, 2003). The ongoing costs beyond May 30, 2003 are expected to be approximately \$0.70 per acre burned. A reasonable estimate of profit for the production of rice in the SVAB is approximately \$150 per acre. Therefore, this regulation should affect grower profitability by less than one-half of one percent.



**TITLE 17. CALIFORNIA AIR RESOURCES BOARD****PUBLIC HEARING TO CONSIDER THE ADOPTION OF A REGULATION  
PERTAINING TO THE CONDITIONAL RICE STRAW BURNING PERMIT PROGRAM**

The Air Resources Board (Board or ARB) will conduct a public hearing at the time and place noted below to consider the adoption of regulations to implement the Conditional Rice Straw Burning Permit Program (Program).

DATE: September 28, 2000  
TIME: 9:30 a.m.  
PLACE: Air Resources Board  
Hearing Room, Lower Level  
2020 L Street  
Sacramento, CA 95814

This item will be considered at a two-day meeting of the Board, which will commence at 9:30 a.m., September 28, 2000, and may continue at 8:30 a.m., September 29, 2000. Please be advised that this item will not be considered until after 2:00 p.m. on September 28, 2000. However, this item may not be considered until September 29, 2000. Please consult the agenda for the meeting, which will be available at least 10 days before September 28, 2000, to determine the day on which this item will be considered.

This facility is accessible to persons with disabilities. If accommodation is needed, please contact ARB's Clerk of the Board at (916) 322-5594, or Telephone Device for the Deaf (TDD) at (916) 324-9531, or (800) 700-8326 for TDD calls from outside the Sacramento area, at least 14 days before the hearing.

**INFORMATIVE DIGEST OF PROPOSED ACTION AND PLAIN ENGLISH POLICY  
STATEMENT OVERVIEW**

**Sections Affected:** Proposed amendments to section 80100, title 17, California Code of Regulations (CCR). Proposed adoption of sections 80156, 80157, 80158, and 80159, title 17 CCR.

**Description of the Proposed Regulatory Action**

Since 1991, rice growers in the Sacramento Valley Air Basin (Basin) have been participating in a reduction of rice straw burning. This reduction in burning was established by the Connelly-Areias-Chandler Rice Straw Burning Reduction Act of 1991. Beginning in 2001, growers will be allowed to burn up to the lesser of



25 percent of each growers planted acreage or 125,000 total acres in the Basin. However, allocations up to this amount will be allowed for disease control purposes only.

Section 41865 of the Health and Safety Code (HSC) requires ARB to adopt regulations for the issuance of conditional rice straw burning permits in the Basin. Beginning in September 2001, the local air pollution control officers may grant conditional rice straw burning permits only if the county agricultural commissioner and the applicant have met specified conditions to verify that the applicant's field is significantly impacted by a rice disease. ARB regulations will establish a framework for disease verification and permit issuance. The permit program will be locally adopted, in accordance with these regulations, by the Sacramento Valley Basinwide Air Pollution Control Council (Basinwide Council) once the regulation is adopted.

At the September 28, 2000, meeting, the staff will recommend the adoption of the regulations establishing a Conditional Rice Straw Burning Permit Program in the Basin. The staff is recommending that the Board authorize the Basinwide Council to submit a program containing the elements required by this regulation. Staff further recommends that the Executive Officer be specifically authorized to consider approval of the Basinwide Council's submittal. The Board will discuss and consider staff's recommendation after hearing public comment.

#### **AVAILABILITY OF DOCUMENTS AND AGENCY CONTACT PERSON**

ARB staff has prepared a Staff Report: Initial Statement of Reasons (ISOR) for the proposed Conditional Rice Straw Burning Permit Program, which includes the full text of the proposed regulatory language, a summary of the environmental and economic impacts of the proposal, and reporting requirements.

Copies of the staff report may be obtained from ARB's Public Information Office, 2020 L Street, Sacramento, California 95814, (916) 322-2990. This notice and the staff report are available on the ARB Internet site at <http://www.arb.ca.gov/regact/rice/rice.htm>. To obtain these documents in an alternative format, please contact the Air Resources Board ADA Coordinator at (916) 323-4916, TDD (916) 324-9531, or (800) 700-8326 for TDD calls from outside the Sacramento area.

The staff has also compiled a record that includes all information upon which the proposal is based. This material is available for inspection upon request to the agency contact person identified below.

The ARB has determined that it is not feasible to draft the regulation in plain English due to the technical nature of the regulation; however, a plain English summary of the regulation is available from the agency contact person named in this notice, and is also contained in the ISOR for this regulatory action.

Telephone inquiries regarding this matter should be directed to the agency contact person, Paul Buttner, Planning and Technical Support Division, Air Resources Board, P.O. Box 2815, Sacramento, California 95812, (916) 324-8622.

### **COSTS TO PUBLIC AGENCIES AND TO BUSINESSES AND PERSONS AFFECTED**

The determinations of the Board's Executive Officer concerning the cost or savings necessarily incurred by public agencies and private persons and businesses in reasonable compliance with the proposed regulatory action are presented below.

The Executive Officer has determined that the proposed regulatory action will not create costs or savings, as defined in CCR section 11346.5(a)(6), to any state agency or in federal funding to the State, costs or mandate to any school district whether or not reimbursable by the State pursuant to part 7 (commencing with section 17500), division 4, title 2 of the Government Code, or non-discretionary costs or savings to the state. However, the proposed regulatory action will create costs to local agencies from program mandates that are recoverable through local authority to levy permit fees, sufficient to pay for the mandates within the meaning of section 17556 of the Government Code. County agricultural commissioners will incur these costs for the review of conditional rice straw burn permit applications and inspection reports. ARB staff expects these costs to average approximately \$8,000 per year, for each county in the Basin with planted rice acreage.

In developing this regulatory proposal, ARB staff evaluated the potential economic impacts and/or benefits on private persons and businesses. The Executive Officer has determined that the proposed regulatory action will not have a significant adverse economic impact on businesses, including the ability of California businesses to compete with businesses in other states, or on private persons or businesses directly affected. Growers who may burn a maximum of 25 percent of their acreage for disease control purposes will realize an economic benefit. Burning of rice straw is the most cost-effective method currently available to dispose of the straw.

In accordance with CCR section 11346.3(b)(1), the Executive Officer has determined that the proposed amendments will have no significant impacts on the creation or elimination of jobs within the State of California, no significant impacts on the creation of new businesses and the elimination of existing businesses within the State of California, and no significant impacts on the expansion of businesses currently doing business within the State of California. A detailed assessment of the economic impacts of the proposed amendments can be found in the staff report.

The Board's Executive Officer has also determined, pursuant to Government Code section 11346.5(a)(3)(B), that the regulation will affect small business. Staff estimates that the majority of growers that will utilize the Conditional Rice Straw Burning Permit Program are small businesses. They will incur some cost to pursue a conditional rice straw burning permit. However, if their request is approved, they will benefit from the use of burning for disposal and disease control.

Before taking final action on the proposed regulatory action, ARB must determine that no alternative considered by the agency would be more effective in carrying out the purpose for which the action is proposed or would be as effective and less burdensome to affected private persons or businesses than the proposed action. The Board's action to adopt a regulation is expressly required by HSC 41865(e). Staff recommends that the Board make a finding that no known alternative would be as effective and less burdensome.

### **SUBMITTAL OF COMMENTS**

The public may present comments on this matter orally or in writing at the hearing, and in writing or by e-mail before the hearing. For consideration by ARB, written submissions must be addressed to and received by the Clerk of the Board, Air Resources Board, P.O. Box 2815, Sacramento, California 95812, or 2020 L Street, 4<sup>th</sup> Floor, Sacramento, California 95814, no later than 12:00 noon, September 27, 2000, or received by the Clerk of the Board at the hearing. To be considered by ARB, e-mail submissions must be addressed to [rice00@listserv.arb.ca.gov](mailto:rice00@listserv.arb.ca.gov) and received no later than 12:00 noon, September 27, 2000.

ARB requests, but does not require, 30 copies of any written submission. Also, ARB requests that written and e-mail statements be filed at least 10 days prior to the hearing so that ARB staff and Board Members have time to fully consider each comment.

### **STATUTORY AUTHORITY AND REFERENCES**

This regulatory action is proposed under the authority granted to ARB in sections 39600, 39601, 41856, 41859 and 41865 of the Health and Safety Code. This action is proposed to implement, interpret, or make specific sections 39011, 39025, 39053, 41850, 41852, 41853, 41854, 41855, 41856, 41857, 41858, 41859, 41861, 41862, 41863, and 41865 of the Health and Safety Code.

### **HEARING PROCEDURES**

The public hearing will be conducted in accordance with the California Administrative Procedure Act, title 2, division 3, part 1, chapter 3.5 (commencing with section 11340) of the CCR. Following the public hearing, ARB may adopt the regulatory language as originally proposed or with nonsubstantial or grammatical modifications. ARB may also adopt the proposed regulatory language with other modifications if the modifications are sufficiently related to the originally proposed text that the public was adequately placed on notice that the regulatory language as modified could result from the proposed regulatory action. In the event that such modifications are made, the full regulatory text, with the modifications clearly indicated, will be made available to the public for written comment at least 15 days before it is adopted.

The public may request a copy of the modified regulatory text from ARB's Public Information Office, 2020 L Street, Sacramento, California 95814, (916) 322-2990.

CALIFORNIA AIR RESOURCES BOARD



Michael P. Kenny  
Executive Officer

Date: August 1, 2000



# Proposed Regulations for the Conditional Rice Straw Burning Program

## Staff Report



September 2000

California Environmental Protection Agency

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Air Resources Board

Planning and Technical Support Division



California Environmental Protection Agency  
AIR RESOURCES BOARD  
Planning and Technical Support Division

## Initial Statement of Reasons for Rulemaking

### Public Hearing to Consider the Adoption of the Conditional Rice Straw Burning Permit Regulations

Date of Release: August 11, 2000

Scheduled for Consideration: September 28, 2000

Location:

Air Resources Board  
Board Hearing Room  
2020 L Street  
P.O. Box 2815  
Sacramento, California 95812



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This report has been reviewed by the staff of the California Air Resources Board and approved for publication. Publication does not signify that the contents reflect the views and policies of the Air Resources Board.



**INITIAL STATEMENT OF REASONS FOR RULEMAKING  
TABLE OF CONTENTS**

<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>I. INTRODUCTION .....</b>	<b>4</b>
<b>II. RICE DISEASE AND RICE STRAW MANAGEMENT .....</b>	<b>8</b>
<b>III. BASIS AND RATIONALE FOR PROPOSED AMENDMENTS .....</b>	<b>11</b>
<b>IV. CONSULTATIVE AND PUBLIC INVOLVEMENT PROCESS .....</b>	<b>25</b>
<b>V. ENVIRONMENTAL ANALYSIS .....</b>	<b>27</b>
<b>VI. ECONOMIC CONSIDERATIONS .....</b>	<b>32</b>
<b>VII. STAFF RECOMMENDATIONS .....</b>	<b>35</b>
<b>VIII. STAFF REPORT REFERENCES .....</b>	<b>36</b>

**APPENDICES**

<b>APPENDIX A: PROPOSED REGULATION ORDER .....</b>	<b>A-1</b>
<b>APPENDIX B: HEALTH AND SAFETY CODE SECTION 41865 .....</b>	<b>B-1</b>
<b>APPENDIX C: CONDITIONAL RICE STRAW BURNING</b>	
<b>ADVISORY GROUP RECOMMENDATIONS .....</b>	<b>C-1</b>
<b>APPENDIX D: CONDITIONAL RICE STRAW BURNING ADVISORY GROUP</b>	
<b>SUGGESTED PROCEDURES AND REPORTING FORMS .....</b>	<b>D-1</b>
<b>APPENDIX E: "DISEASE SIGNIFICANCE THRESHOLD" CALCULATIONS .....</b>	<b>E-1</b>
<b>APPENDIX F: ECONOMIC ANALYSIS WORKSHEETS .....</b>	<b>F-1</b>

**LIST OF FIGURES**

<b>FIGURE II-1: EFFECTS OF RICE STRAW MANAGEMENT ON YIELD IN 4-YEAR STUDY .....</b>	<b>8</b>
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**LIST OF TABLES**

<b>TABLE I-1: RICE ACREAGE PLANTED AND BURNED IN THE SACRAMENTO VALLEY .....</b>	<b>5</b>
<b>TABLE I-2: SMOKE COMPLAINTS DURING THE PHASE-DOWN YEARS .....</b>	<b>5</b>
<b>TABLE III-1: METHODS CONSIDERED BY ADVISORY GROUP .....</b>	<b>16</b>
<b>TABLE III-2: STAFF'S INITIAL COMMENTS ON INSPECTION METHODS .....</b>	<b>18</b>
<b>TABLE III-3: DISEASE SIGNIFICANCE THRESHOLDS .....</b>	<b>20</b>
<b>TABLE III-4: EXAMPLES OF FIELD INSPECTION EVALUATIONS BY AGRICULTURAL COMMISSIONERS .....</b>	<b>21</b>
<b>TABLE IV-1: SUMMARY OF PUBLIC OUTREACH EFFORTS .....</b>	<b>26</b>
<b>TABLE V-1: RICE STRAW REMOVAL EMISSION FACTOR ESTIMATES .....</b>	<b>29</b>
<b>TABLE VI-1: ESTIMATED ANNUAL COSTS FOR PROGRAM IMPLEMENTATION .....</b>	<b>32</b>



## EXECUTIVE SUMMARY

Since 1991, rice growers in California have been participating in a "phase-down" of rice straw burning in the Sacramento Valley. This reduction in burning was established by the Connelly-Areias-Chandler Rice Straw Burning Reduction Act of 1991 ("Act" or "phase-down"; Health and Safety Code (HSC) section 41865). The phase-down has gradually reduced burning of rice fields over the past decade.

Currently, the Act allows growers to burn up to 200,000 acres per year provided the meteorology is favorable for pollutant dispersal. The 2000 growing season is the final year that this limit applies. Beginning in 2001, State law allows burning only for disease control purposes. Growers will then be allowed to burn up to the lesser of 25 percent of each grower's planted acreage or 125,000 total acres in the Sacramento Valley Air Basin (SVAB or Basin).

State law also requires the Air Resources Board (ARB or Board) to adopt a regulation for the issuance of conditional rice straw burning permits for disease control (HSC section 41865). Such permits may be granted only for fields with rice disease in amounts likely to cause a quantifiable and significant reduction in rice yield in the current or upcoming growing season. Permits are issued at the local level by air districts in the Basin.

We are proposing a regulatory framework for issuing conditional burn permits consistent with the criteria in State law. The proposed regulation requires the Sacramento Valley Basinwide Air Pollution Control Council (Basinwide Council), which consists of representatives from the air districts in the Basin, to adopt and submit to ARB a program that contains the elements specified in the State's regulation. These elements include confirmation of disease by the county agricultural commissioner, use of specified significance thresholds for disease, procedures for field inspection, annual reporting, and certification of rice disease inspectors.

The proposed regulation requires agricultural commissioners to use specified disease significance thresholds (expressed as a percent of fieldwide disease occurrence) to approve or "qualify" rice fields for burning. The results of field inspections are compared to these thresholds to evaluate the significance of disease. Significance thresholds are identified in the proposed regulation for the three most common diseases -- stem rot, aggregate sheathspot, and rice blast. The thresholds were developed using research on the effects of disease on yield, as well as data on market price and average production per acre. We expect these three diseases to represent the vast majority of cases faced by agricultural commissioners. For other disease scenarios that may occur in the field, the agricultural commissioners must rely on professional judgement and experience to make a significance determination.

The use of the disease significance thresholds, in conjunction with the quantification of disease for each field, is required for the first two years of the program. After the first two seasons (2001 and 2002), we will reassess the need to continue this approach to quantifying disease presence. If the data clearly shows that at least 125,000 or more acres have significant disease, a simplified alternative demonstration of disease presence could be authorized by the Basinwide Council.

Staff proposes to report to the Board in the fall of 2003 to describe our conclusions regarding the first two years of disease data. If, at that time, data shows that at least 125,000 acres have qualified with the use of disease significance thresholds, no further regulatory amendments would be needed because the alternative provision would become effective.

If data shows that the threshold evaluation is still needed to demonstrate and quantify significant disease presence, the Board would have to revisit the regulation to require the continued use of this evaluation method. The reason for including the alternative approach in the proposed regulation now, instead of later, is that we believe there is good possibility that disease significance will be well documented in the first two years of the program.

Agricultural commissioners will be primarily responsible for implementing this proposed regulation. The Act makes them responsible for all field inspections. We have interpreted this to mean that they may delegate this responsibility in accordance with this proposed regulation's requirements for the training of field inspectors and verification of reports by agricultural commissioners.

The process by which a conditional permit to burn a rice field in the Sacramento Valley Air Basin may be issued is:

- 1) The grower contracts to have a field inspected, or conducts a self-inspection (certification of all inspectors is required).
- 2) The inspector completes an inspection report.
- 3) The grower submits an application to burn and an inspection report to the local agricultural commissioner.
- 4) The local agricultural commissioner reviews and evaluates the report for accuracy and makes several findings, including a determination of significance of disease.
- 5) If approved by the agricultural commissioner, the application is forwarded to the local air pollution control officer (APCO).
- 6) The APCO may then issue a permit in accordance with the provisions of the Sacramento Valley Burn Plan and other applicable statewide burning provisions.

The proposed regulation requires the Basinwide Council to submit a final program, by February 15, 2001, with all of the above-listed elements. The staff recommends that the Executive Officer be delegated the authority to consider approval of the Basinwide Council's submittal. The February 15, 2001, deadline was selected to allow time for a comprehensive pilot program to evaluate field sampling and inspection procedures during the year 2000 growing season. The Conditional Rice Straw Burning Advisory Group has committed to this voluntary activity to help to provide practical information important to the development of a successful program. The Advisory Group--created under State law to assist in development of this proposed regulation--has also provided recommendations that form the basis of this proposal. Key elements recommended by the Advisory Group include the role of the Basinwide Council, the inspection training program, and the provision for delegating inspections to certified inspectors.

In developing the proposed regulation, the staff worked closely with the California Department of Food and Agriculture (CDFA), as well as the Basinwide Council and the Conditional Rice Straw Burning Advisory Group. We worked to ensure that all stakeholders had ample opportunity to participate in this program's development. To that end, we held three public workshops and participated in numerous consultation meetings with CDFA, the Basinwide Council, the Advisory Group, and the agricultural commissioners in the Basin.

We estimate the cost of the conditional rice straw burning permit program to be approximately \$0.98 per acre of rice straw burned for the first two years and \$0.70 per acre thereafter. A reasonable average estimate of profit for rice culture in the Sacramento Valley is approximately \$150 per acre. Therefore, this proposed regulation should affect grower profitability by less than one-half of one percent.

In summary, we believe the framework provided by this proposed regulation will result in a local program that meets the objectives of the Act by requiring a sound technical approach for documenting disease while minimizing program costs. The resulting program will require inspections by trained personnel to confirm the presence and quantity of disease. This information will be assessed by local agricultural commissioners who have the responsibility under State law to make the significance finding prior to approving a conditional rice straw burning permit application.



## I. INTRODUCTION

### **Why does rice farming have an impact on air quality in the Sacramento Valley Air Basin?**

Rice is the most widely planted crop in the Sacramento Valley. Planted acreage has doubled in the past 40 years, with over 500,000 acres planted in 1999. In addition to rice, the fields produce from two to three tons of rice straw per acre. The traditional method of clearing the rice straw from the fields has been to burn it. Managing rice straw in this manner results in emissions of smoke and other pollutants being released into the atmosphere. This has led to public complaints and concerns over public health and welfare in the SVAB.

### **What has been done to reduce smoke and emissions from rice straw burning?**

The Connelly-Areias-Chandler Rice Straw Burning Reduction Act of 1991 (Act or "phase-down") established section 41865 of the Health and Safety Code (HSC) and mandated a reduction in the post-harvest burning of rice straw in the Sacramento Valley. Due to this phase-down law, a steadily decreasing percentage of acres of rice straw have been burned on an annual basis from 1992 to 1997 (Table I-1). In 1998, a legislative modification of the phase-down law was implemented that allowed for the burning of 200,000 acres per year for a 3-year period (1998-2000), but limited fall burning to 90,000 acres. Restricting the fall allocations was partially fueled by the fact that most smoke complaints received by the ARB about rice straw burning occur during the fall. Smoke complaints have declined since the amended period of the phase-down law went into effect (Table I-2). The table indicates that in the first two years of this new requirement complaints received by ARB fell to 43 and 15 in 1998 and 1999, respectively. This compares to about 130 complaints annually in the prior two years. Beginning in the fall of 2001, the phase-down will establish a 125,000 acre annual cap and require that burning be allowed only for disease control. It is important to note, however, that a fall burning restriction will no longer exist. Therefore, it is possible that fall burning could increase slightly in the future.

**TABLE I-1**  
**RICE ACREAGE PLANTED AND BURNED IN THE SACRAMENTO VALLEY**

<b>Burn Year</b>	<b>Rice Acres Planted</b>	<b>Rice Acres Burned</b>	<b>% Acres Allowed to be Burned</b>	<b>% Acres Burned</b>
1992	401,807	303,103	90%	75%
1993	450,253	305,636	80%	68%
1994	514,045	293,210	70%	57%
1995	500,705	268,216	60%	54%
1996	514,720	211,322	50%	41%
1997	517,233	133,640	38%	26%
1998	490,625	140,627	200,000 acres	29%
1999	535,949	137,930	200,000 acres	26%

**TABLE I-2**  
**SMOKE COMPLAINTS DURING THE PHASE-DOWN YEARS**  
**(Fall Burn Season)**

<b>Year</b>	<b>No. of Smoke Complaints</b>
1992	57
1993	101
1994	336
1995	138
1996	124
1997	78
1998	43
1999	15

### **Why is the rice straw burned after harvest?**

The rice growers' rice straw disposal method of choice has been burning for two primary reasons—disease control and cost.

Incorporation of rice straw into the soil, a costly alternative to burning, has been shown to exacerbate disease levels. However, some methods of cutting and removing the rice straw from the field have been demonstrated to be nearly as effective as burning for controlling these diseases. Section II provides an overview of these rice disease management issues.

Burning rice straw is fairly inexpensive, costing approximately \$2 per acre. Currently, about 97 percent of rice straw that is not burned is incorporated into the soil. Overall incorporation costs are about \$36 per acre, approximately 18 times more costly than burning. Cutting and bailing of the straw is even more costly, averaging about \$54 per acre (not considering hauling costs to remove the bales). These factors make burning the most cost-effective means of disposal available to the rice growers in the Sacramento Valley. One way to address the economic advantage of burning is to develop uses for rice straw that could offset the additional cost to the growers from cutting and bailing.

### **What has been done to address the extra cost of incorporation of the straw into the soil?**

Primarily through State-sponsored programs, alternatives to burning and soil incorporation have been examined and continue to be pursued. To this end, ARB has conducted and coordinated activities designed to promote interest in alternative uses for rice straw. These include the promotion of ethanol and biomass product development through the Rice Straw Grant Program, the Rice Straw Diversion Plan, the Rice Straw Utilization Tax Credit Program, and the active participation of the Advisory Committee on Alternatives to Rice Straw Burning. These programs are discussed in more detail in the biennial report to the Legislature titled, *Draft Progress Report on the Phase Down of Rice Straw Burning in the Sacramento Valley Air Basin* (February 2000).

### **Why does the Board need to adopt a regulation?**

Realizing that some amount of burning will still be needed for disease control, the Legislature preserved burning for a maximum of 25 percent of each grower's planted acreage for this purpose. This legislation, contained in HSC section 41865(e), requires the Board to adopt regulations to provide for this burning. The program is referred to as the Conditional Rice Straw Burning Permit Program. Its purpose is to provide the framework for a local program to verify that enough disease is present to justify burning a field. Specifically, growers will utilize the program to demonstrate the presence of enough disease to cause a quantifiable and significant reduction in rice yield in the current or next growing season. If such a demonstration is made, a conditional rice straw burning permit may be issued by the local APCO.

### **How is this report structured?**

The body of the report is organized into eight short sections. Following this introduction, Section II provides a quick discussion of rice diseases and the impacts of burning and soil incorporation of residual rice straw. Section III provides a "plain English" step-by-step description of the text and the major requirements of the proposed regulation. Section IV provides a short introduction of the other organizations that have participated in the development of this proposed regulation. Environmental and economic analyses and findings are explained within Sections V and VI, respectively. Section VII contains

our recommendations to the Board. And lastly, the primary references used are cited in Section VIII.

Attachments to the report include the full text of the proposed regulatory amendments to Title 17, California Code of Regulations, Subchapter 2, Articles 1 and 2 (Appendix A). Health and Safety Code section 41865 is contained in Appendix B. Appendices C and D provide key documents from the Conditional Rice Straw Burning Advisory Group communicating its recommendations and examples of application and reporting forms from its suggested program. Appendix E provides an example of how we used information about rice production and disease to determine disease significance threshold proposed for use in the first two seasons of the program's implementation. And, finally, a worksheet detailing anticipated program costs is contained in Appendix F. Two worksheets are contained in this appendix. The first estimates the annual program costs for the 2001-2002 seasons. The second provides estimated annual costs for the 2003 season and beyond.

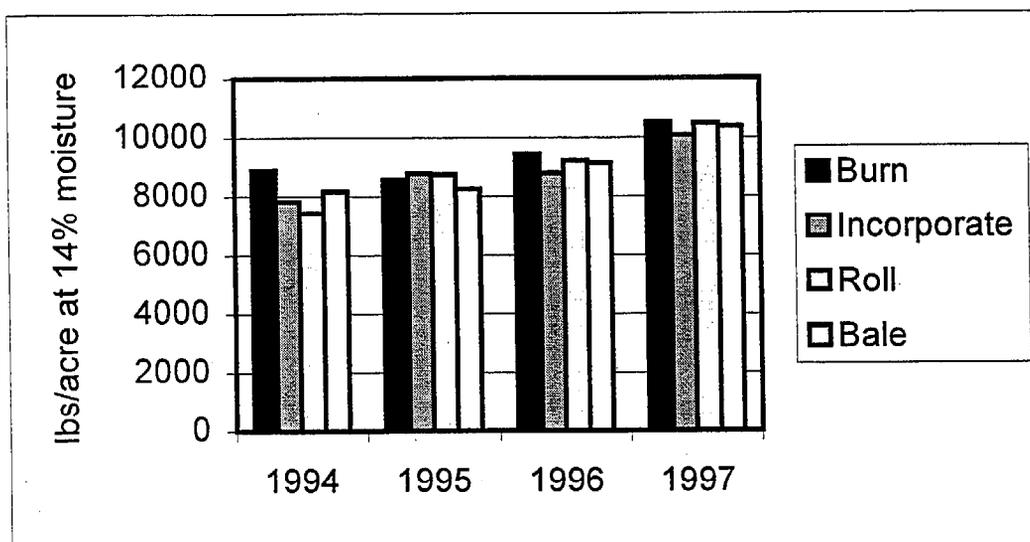
## II. Rice Disease and Rice Straw Management

### Rice Straw Management

The three major rice diseases of concern in California are stem rot, aggregate sheathspot, and rice blast. Control of these diseases, particularly stem rot and aggregate sheathspot, has traditionally been accomplished through the use of fire. Burning of the rice straw after harvest is inexpensive, fast, and extremely effective in removing the straw from the field and decreasing the incidence of disease in subsequent seasons. It also has the added benefit of increasing the amount of carbon in the soil. With the phase-down, growers have had to move to alternate forms of straw management. The most common of these is incorporation of the straw into the soil.

Major concerns regarding the use of incorporation as a means of rice straw management include disease management, expense, potential for reduced yield, and the short amount of time necessary to incorporate large acreages for optimal decomposition. However, experimental research has indicated that the use of incorporation as a straw management practice did not significantly reduce grain yield as long as nitrogen fertilizers were effectively used (van Kessel and Horwath, 2000). Physical removal of the rice straw from the field also did not show any significant change in grain yield (Figure II-1). Although, under similar fertilizer and pesticide regimes, a slight increase in stem rot was noted in incorporated versus burned fields. Research in this area is ongoing.

**FIGURE II-1**  
**EFFECTS OF RICE STRAW MANAGEMENT ON YIELD IN 4-YEAR STUDY**  
 (adapted from Cintas, 1998)



## Rice Diseases

### 1. *Stem Rot*

Stem rot, the most common rice disease in the Sacramento Valley, is caused by the fungus *Sclerotium oryzae*. The sclerotia produced by the fungus infects the rice stem at the waterline. It continues to form in infected tissue of the plants and in crop debris (Cintas, 1998). The fungi can survive the winter in infected crop residue and soil.

In addition to burning, stem rot can be controlled through a variety of management techniques, including strict maintenance of nitrogen levels in the soil. In addition, use of resistant rice varieties, surface application of potassium fertilizer, and the flooding of fields in winter have also been shown to decrease the incidence of stem rot development (Wick, et.al., 1997). This is of particular concern in the case of winter flooded incorporated straw acreage. Currently, no stem rot chemical controls are registered for use on rice in California.

### 2. *Aggregate Sheathspot*

Aggregate sheathspot is a fungal disease caused by *Rhizoctonia oryzae-sativae*. The disease, like stem rot, appears on the plant at the water line. It has been known to infect the stem, resulting in a rotting of the stem, but this is a condition rare in California (Wick, et.al., 1997). The fungus can produce new sclerotia and survive in the soil or in the crop residue over the winter season.

Effective control of aggregate sheathspot involves the removal of the infected crop residue. Burning provides the most effective management. Other favorable straw management techniques include crop rotation, moldboard plowing, and fallowing. There are no registered chemical controls for aggregate sheathspot in California.

### 3. *Rice Blast*

Rice blast is a disease caused by the fungus *Pyricularia grisea*. The fungus produces a lesion on the plant with fungal strands (conidiophores) growing out of the diseased tissue. These strands produce spores that are easily dispersed in the air. The fungus can survive over winter periods from one season to the next on rice straw and stubble. Favorable conditions will allow the blast to go through its life cycle within a single week. A single lesion can also produce hundreds of spores in one night and continue producing them for more than 20 days. This means that the fungus can go through many disease cycles in one season, seriously injuring a susceptible rice crop. This makes rice blast a much more challenging disease to address with burning.

Long periods of high humidity, free moisture, light or nonexistent winds and night temperatures between 63-73°F are optimal conditions for blast growth. During periods of high relative humidity, spores are produced and released. Optimal spore germination temperatures are between 77 and 82°F. This is also the optimal temperature range for lesion formation and sporulation. However, lesions are produced for longer periods when the daytime temperatures are between 61 and 77°F. Other, non-meteorological, factors also affect the development of the disease. Excessive nitrogen fertilization, aerobic soils, and drought stress are all favored. Non-flooded, aerated soil, such as occurs during extended drain periods, encourages the establishment of the disease.

An integrated management program provides the best mechanism for the control of rice blast. Methods for control include: destruction of diseased straw and crop residue by burning or removal to reduce the survival of reproductive material over winter periods in a given field; use of clean seed whenever possible; avoidance of excessive nitrogen fertilizer use; water seeding to reduce or eliminate disease transmission from seed to seeding; continuous field flooding to limit blast development and avoidance of extended periods of field drainage. Chemical controls are still being studied. The development of non-susceptible varieties of rice is also forthcoming.



### III. BASIS AND RATIONALE FOR PROPOSED AMENDMENTS

In this chapter, we provide a plain English discussion of the staff's proposed changes to the regulations. The discussion in this chapter is intended to provide a technical summary of major program elements and to satisfy the requirements of Government Code section 11346.2(a)(1), which requires that a non-controlling "plain English" summary of proposed regulations be made available to the public when possible.

#### Summary

The proposed amendments are designed to enable rice growers to continue to burn up to 25 percent of their fields, but only for the purposes of controlling disease. In summary, we are setting out the regulatory framework for a program that will be used by Sacramento Valley rice growers to demonstrate the presence and severity of disease in rice fields. Beginning in 2001, the growers will use this program to get approval to burn fields for disease control. The actual program will be adopted by the Basinwide Council in accordance with the proposed regulation and submitted to the ARB for approval.

Currently, the Act allows growers to burn up to 200,000 acres per year if meteorology is favorable. The 2000 growing season is the final year that this limit applies. Growers will then be allowed to burn up to the lesser of 25 percent of each grower's planted acreage or 125,000 total acres in the Sacramento Valley Air Basin (SVAB or Basin). Such permits may be granted only for fields with rice disease in amounts likely to cause a quantifiable and significant reduction in rice yield in the current or upcoming growing season.

The proposed regulation requires agricultural commissioners to use specified disease significance thresholds (expressed as a percent of fieldwide disease occurrence) to approve burning in affected fields. The results of field inspections are compared to the thresholds to evaluate disease significance. Significance thresholds are identified for occurrences of stem rot, aggregate sheathspot, and rice blast (neck blast only). The thresholds were developed using research on the effects of disease on yield and other information related to the production of rice. A discussion of this calculation can be found in Appendix E. We expect these three types of disease impacts to represent most of the cases agricultural commissioners will encounter. The county agricultural commissioner will rely on professional judgement to evaluate the significance of less common disease situations that are presented in the field on a case by case basis.

The use of the disease significance thresholds is required for the first two years of the program's implementation. Beyond the first seasons (2001 and 2002), the regulation is modified to only require the grower to demonstrate "presence" of a qualifying disease. If the data clearly shows that at least 125,000 or more acres have significant disease, we believe that the quantification of disease, required by phase-down law, is achieved.

Staff proposes to report to the Board in the fall of 2003 to describe our conclusions about the overall incidence of disease in the Basin. If data indicates that at least 125,000 acres have qualified with the use of disease significance thresholds, no further regulatory amendments would be needed. In contrast, if data shows that the threshold evaluation is still needed to prioritize burning, the Board would have to revisit the regulation to require the continued use of this evaluation method. At this time, we believe there is good possibility that disease presence will be well documented in the first two years of the program.

Agricultural commissioners will be primarily responsible for implementing this proposed regulation. Existing law established that they are "responsible for all field inspections." We interpret this to mean that the agricultural commissioners may delegate this responsibility in accordance with this proposed regulation's requirements which are designed to provide some uniformity and accountability for field inspections. This is accomplished through mandates for field inspector training and verification of reporting accuracy by agricultural commissioners.

The steps required by growers to get approval to burn a diseased rice in the Sacramento Valley Air Basin are the following:

- The grower contracts to have a field inspected, or conducts a self-inspection. All inspections must be performed by certified inspectors.
- The inspector completes an inspection report following the detailed procedures for the inspection method used.
- The grower submits an application to burn, along with an applicable inspection report, to the local agricultural commissioner.
- The local agricultural commissioner then reviews and evaluates the report for accuracy and makes several findings, including a determination of significance of disease.
- If approved by the agricultural commissioner, the application is forwarded to the local air pollution control officer (APCO).
- The APCO may then issue a permit in accordance with the provisions of the Sacramento Valley Burn Plan and other applicable statewide burning provisions.

The proposed regulation requires the Basinwide Council to submit a final program, by February 15, 2001, with all of the above-listed elements. The staff recommends that the Executive Officer be delegated the authority to consider approval of the Basinwide Council's submittal. The February 15, 2001, deadline was selected to allow time for a comprehensive pilot program to evaluate field sampling and inspection procedures during the year 2000 growing season. The Conditional Rice Straw Burning Advisory Group has committed to this voluntary activity to help to provide practical information important to the development of a successful program. The Advisory Group—created under State law to assist in development of this proposed regulation—has also provided recommendations that form the basis of this proposal. Key elements recommended by

the Advisory Group include the role of the Basinwide Council, the inspection training program, and the provision for delegating inspections to certified inspectors.

The key requirements of the proposed regulation can be summarized as follows:

- The Basinwide Council must submit a program, in accordance with these proposed regulations, to implement the Conditional Rice Straw Burning Permit Program. The Basinwide Council's program must include the following:
  - The publication of specific procedures for field inspectors to follow in conducting inspections.
  - A training program to certify qualified personnel to perform field inspections and to prepare field inspection reports.
  - The use of uniform application forms and field inspection forms.
  - The use of field inspection reports to be submitted by applicants to the agricultural commissioner to verify the presence of disease.
  - The use of field inspection reports to be submitted by applicants to the agricultural commissioner to quantify the severity of disease through May 30, 2003.
  - Requirements for the agricultural commissioner to make specific findings and determinations regarding the applicant's eligibility for a permit to burn.
  - Requirements for the agricultural commissioner to utilize disease significance thresholds through May 30, 2003.
  - Enforcement provisions designed to address and discourage false reporting by field inspectors.
  - Mandatory oversight inspections or "spot checks" by the county agricultural commissioner to verify that inspections are conducted and reported properly.
- The Basinwide Council must submit an annual report to the ARB on the program's implementation.

### **Discussion of the Proposed Amendments**

This section provides a step-by-step description and technical discussion of the proposed amendments. The full text of the proposed amendments can be found in Appendix A, Proposed Regulation Order for the Conditional Rice Straw Burning Program.

The proposed regulation is divided into two parts. Article 1 contains general definitions. Article 2 describes the operational requirements of the Conditional Rice Straw Burning Permit Program to be implemented by the Basinwide Council with the required participation of growers, county agricultural commissioners, and air districts.

## Amendments to Article 1 – General Provisions

- *Definitions (amendments to section 80101)*

The proposed amendments in this section define new terms that have been introduced as a result of the proposed amendments. They have been combined with an existing definitions section to avoid the potential confusion of having multiple definitions section within the same article of regulation.

Definitions that have been added include “biased inspection site<sup>1</sup>,” “unbiased inspection site<sup>1</sup>,” “conditional rice straw burn permit,” “conditional rice straw burn permit applicant,” “qualified rice disease inspector,” “growing season,” and “disease significance threshold.”

“Biased” versus “unbiased” inspection site selection relates to the random inspection of fields. A biased inspection site is not random. It is selected based on the visual presence or anticipated presence of disease. In contrast, an “unbiased” inspection site is one that is predetermined before an inspector has even seen the field. Therefore, the goal of the unbiased inspection site is to provide a random sample.

The definition of “conditional rice straw burn permit” has been added to establish the provisional nature of this type of burn permit. This definition includes reference to the appropriate sections of the HSC that establish conditions under which the permit can be issued. A definition of the “applicant” of such a conditional permit is also added.

A definition for “qualifying disease,” with the appropriate HSC citation, has been added to determine the required characteristics for a disease to be included in the program. The definition of “growing season” has been precisely determined as the period between seedbed preparation and harvest of the rice. Finally, the concept of a “disease significance threshold” has been developed in the proposed regulation and defined in this section. It explains that an applicable disease threshold level will be predetermined and compared to results of field inspection reports.

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<sup>1</sup> The terms “biased inspection site” and “unbiased inspection site” refer to inspection sites selected solely on their biological characteristics. They could also be called “biologically biased inspection site” and “biologically unbiased inspection site” for this reason. However, for simplicity purposes, these terms are referred to as “biased inspection site” and “unbiased inspection site” throughout the staff report and proposed regulation order (Attachment A).

## Amendments to Article 2 – Air District Smoke Management Program

- *Conditional Rice Straw Burning Permit Program for the Sacramento Valley Air Basin (new section 80156)*

This is a new section that contains the framework for the Conditional Rice Straw Burning Permit Program. This section requires the Sacramento Valley Basinwide Air Pollution Control Council to develop a rice straw burning permit program that would implement and enforce a process for issuing conditional rice straw burning permits. The final program would be adopted by the Basinwide Council and submitted to the Executive Officer of the ARB for approval. The section describes the major elements required for an approvable program. Required elements include provisions for the application of (1) inspection methods and documentation, (2) agricultural commissioner findings and determinations, (3) disease significance thresholds, and (4) oversight inspections and enforcement.

### 1. *Inspection Methods and Documentation*

The Advisory Group has suggested four inspection methods for inclusion in the program. The methods are the following:

- Biased/Unbiased Plant Sampling
- Soil Inspection
- Biased Plant Sampling
- Visual Plant Assessment

A brief discussion of each of these methods is presented below. Additionally, examples of the forms designed for the recording and transmitting of inspection results are included in Appendix D.

Method #1, referred to as biased/unbiased plant inspection, uses multiple plant sample sites to characterize the field. These results can then be averaged to get an estimate of disease in the total field that can be compared to disease significance thresholds. It requires that 4 samples be taken to characterize a field of 50 acres or less, and that 6 samples be collected in fields of greater than 50 acres.

Method #2, a soil sampling method, also uses multiple samples and can be compared to disease significance thresholds developed by Dr. Robert Webster at University of California, Davis. However, early tests of this method indicate that it may be cost prohibitive for wide acceptance in this program.

Method #3 is a single-sample biased method that only looks at one highly diseased area or "hot spot" in the field. ARB staff, through workshops and consultations, has asked the Advisory Group to merge this method with method #1. This would allow the inspectors the flexibility to stop sampling at any time after the first biased test if results are high enough to qualify the field, based upon a fieldwide average, even if the unsampled sites are assumed to equal zero.

Method #4 is based only upon a visual inspection of plants in order to obtain a percent incidence of disease. It is important to note that inspection method #4 was recently modified. This was done in response to our concerns about the method. We did not believe that the original proposed method contained adequate provisions for quantification of disease impacts. The HSC requires that disease impacts be "quantifiable".

Table III-1 summarizes each inspection method.

TABLE III-1

METHODS CONSIDERED BY ADVISORY GROUP		
#	Description	Disease Quantification?
1	Plant Inspection (Biased/Nonbiased) <ul style="list-style-type: none"> <li>• 1 sample at site of expected disease</li> <li>• 3-5 samples at prescriptive locations that may or may not show disease symptoms</li> <li>• 50 samples scored (for percentage) per site</li> </ul>	Yes - Percent Incidence
2	Soil Inspection (Biased/Nonbiased) <ul style="list-style-type: none"> <li>• Similar format to #1 above except soil is collected in a seedbed prior to flooding</li> <li>• Samples of reproductive material called "inoculum"</li> <li>• Material evaluated in laboratory</li> </ul>	Yes - Viable Inoculum*  <i>*Inoculum is the reproductive material in the soil of affected rice fields.</i>
3	Plant Inspection Biased (Biased) <ul style="list-style-type: none"> <li>• 1 sample at site of expected disease</li> <li>• 100 samples scored (for percentage) from the site</li> </ul>	Yes - Percent Incidence
4	Visual Assessment (July 2000 Revision) <ul style="list-style-type: none"> <li>• Peripheral visual, followed by in-field visual</li> <li>• No sampling, depends inspection only to identify and score percentage of diseased plants</li> </ul>	Yes - Percent Incidence

We have examined all of the inspection methods proposed by the Advisory Group and have preliminary comments on the likely advantages and disadvantages of each proposed method. These are presented in Table III-2.

Based upon current analysis, we favor Method #1 (Biased/Unbiased Plant Sampling) for several reasons. It provides a firm assessment of "presence" of disease by having a single biased site sampling component. This biased element allows the inspector to go to an area of the field in which disease symptoms are clearly present and take one set of samples. This provides a high level of confidence that the presence of the disease will be confirmed. It is also expected that sampling at this biased site will produce a higher measure of percent disease incidence than what exists in the remainder of the field. However, this effect is offset by the remaining part of the procedure. The field inspector must also go to three to five additional "unbiased" sites (depending on field size) as directed by the method, regardless of whether or not disease symptoms are pronounced in those areas. The results from all four to six sample sites, including the biased site, are averaged together to calculate an average estimated "fieldwide" disease incidence level for the total field proposed for burning. This becomes the final value that the agricultural commissioner compares to the disease significance thresholds adopted as part of this proposed regulation. However, we believe that any of the methods identified will satisfy the requirements of the proposed regulation.

We have developed a framework to allow for maximum flexibility in the selection of methods. However, the HSC provides some minimum performance standards that relate to this element. In our approval of the final plan, we will consider recommending the approval of any inspection method that reasonably quantifies an impact on rice yield. However, we have established some minimum criteria for the methods proposed in the final program. Each method must have a prescriptive procedure for the random selection of plants for sampling and/or visual inspection. In quantification efforts, the methods must discourage the selective sampling of diseased plants.

Each of these methods will be evaluated during a voluntary pilot project in the fall of 2000. We will participate in this pilot project. These inspection program evaluation activities, implemented by the Advisory Group, are designed to refine and prioritize these measures before they are submitted to the Executive Officer as part of the final program. Accordingly, the forms have been formatted for use in the pilot program, also called the 2000 scoping process. Each form contains a temporary heading of "Test Program" and a footer requesting evaluation information from inspectors during the fall 2000 scoping process. For each method used in the final program, these forms will be finalized and formatted as official documents.

Table III-2

STAFF'S INITIAL COMMENTS ON INSPECTION METHODS		
	Benefits/Pros	Limitations/Cons
#1 (Biased/Unbiased)	<ul style="list-style-type: none"> <li>• Effective for determining "presence" of disease</li> <li>• Allows field-wide disease incidence estimate by averaging 4-6 sample sites</li> <li>• Reasonable sample collection time efficiency</li> <li>• Results in a reasonable estimate of percent of diseased plants in a total field to compare to a disease significance threshold</li> <li>• Relatively simple to conduct</li> </ul>	<ul style="list-style-type: none"> <li>• Slightly inflated disease estimate due to biased component</li> <li>• Requires the collection of 200-300 stems per field</li> </ul>
#2 (Soil)	<ul style="list-style-type: none"> <li>• Reasonably effective for predicting the "presence" of disease</li> <li>• Ease of sample collection (working in a dry field)</li> <li>• Reasonable sample collection time requirements</li> <li>• Results can be compared to research data to determine significance of disease</li> </ul>	<ul style="list-style-type: none"> <li>• Likely the highest cost procedure due to the lab analysis component</li> <li>• Fairly complicated to implement</li> <li>• Lab procedures need refinement</li> <li>• Narrow time window for sampling</li> <li>• Labs currently unavailable</li> </ul>
#3 (Biased)	<ul style="list-style-type: none"> <li>• Minimal sample collection time requirements</li> <li>• Very conclusive for "presence" of disease</li> <li>• Simple to conduct</li> </ul>	<ul style="list-style-type: none"> <li>• Field quantification depends on information from a single site</li> <li>• Sample may not reflect field</li> </ul>
#4 (Visual, July 2000 Revision)	<ul style="list-style-type: none"> <li>• Minimal field effort with no sample collection</li> <li>• Requires plant inspection only</li> <li>• Fairly simple to conduct</li> <li>• Could be a quicker method for extremely impacted fields</li> </ul>	<ul style="list-style-type: none"> <li>• Sample may not reflect field</li> <li>• Field needs to show clear macro symptoms</li> <li>• Initial assessments of the method indicate high variability of results, similar time requirements to sampling, underestimation of disease, and difficult method to train</li> <li>• Field water level may create difficulty for inspection of individual plants unless conducted after water is removed from the field.</li> </ul>

## 2. *Agricultural Commissioner Findings and Determinations*

A central program element is the findings that must be made by the county agricultural commissioners. In accordance with the HSC, the agricultural commissioner must ensure the applicant's compliance with the following:

- (1) The fields proposed for burning are specifically described.
- (2) The applicant has not violated any provision of HSC section 41865 within the previous three years.

The agricultural commissioner must also make the following two specific findings:

- (1) During the growing season, the county agricultural commissioner has independently determined the significant presence of a pathogen in an amount sufficient to constitute a rice disease.
- (2) The county agricultural commissioner determines that the existence of the pathogen will likely cause a significant, quantifiable reduction in yield in the field proposed for burning during the current or next growing season.

Of the agricultural commissioner findings listed above, the finding of "significant reduction in rice yield" is the most difficult to address. We discussed this issue in detail with stakeholders in consultations and workshops. Based on these discussions, we are proposing uniform "disease significance thresholds" for each disease and type of inspection method, where possible. We believe this can be done now for stem rot, aggregate sheathspot, and certain cases of rice blast. This should cover most situations and will enable agricultural commissioners to have "brightline" thresholds to compare against inspection reports. In those situations for which a disease significance threshold does not apply, professional judgement of the agricultural commissioners will be critical to determine significance.

## 3. *Disease Significance Thresholds*

To comply with HSC section 41865, we propose the use of disease significance thresholds through May 30, 2003. Existing law requires the agricultural commissioners to make a determination that disease is causing a significant reduction in yield in a field before it can be approved for burning. The use of thresholds to satisfy this requirement can provide uniform determinations throughout the Basin and generate a rich database of information to base future program decisions upon. We believe that if good data is developed in the first two years of program implementation, we may be able to utilize the information to streamline the program in the future. Therefore, we have developed detailed calculations using scientific information about rice disease and market information about the rice industry here in California. Staff's calculations can be found in Appendix E of this staff report. Staff proposes that disease significance thresholds be adopted by the Board and utilized by agricultural commissioner's to make determinations during the first two years of the program.

The use of the disease significance thresholds in conjunction with the quantification of disease for each field is required for the first two years of the program. After two seasons (2001 and 2002), we will reassess the need to continue this approach to quantifying disease presence. If the data clearly shows that at least 125,000 or more acres have significant disease, a simplified alternative demonstration of disease presence could be authorized by the Basinwide Council.

Staff proposes to report to the Board in the fall of 2003 to describe our conclusions regarding the first two years of disease data. If, at that time, data shows that at least 125,000 acres have qualified with the use of disease significance thresholds, no further regulatory amendments would be needed because the alternative provision would become effective.

If data shows that the threshold evaluation is still needed to demonstrate and quantify significant disease presence, the Board would have to revisit the regulation to require the continued use of this evaluation method. The reason for including the alternative approach in the proposed regulation now instead of later is that we believe there is good possibility that disease presence will be well documented in the first two years of the program.

The proposed disease significance thresholds are described in Table III-3.

**TABLE III-3**

<b>DISEASE SIGNIFICANCE THRESHOLDS</b>	
Type of Disease	Threshold*
Stem Rot ( <i>Sclerotium oryzae</i> )	15 percent
Aggregate Sheathspot ( <i>Rhizoctonia oryzae-sativae</i> )	(cumulative)
Blast ( <i>Pyricularia grisea</i> ) – occurrences of neck blast only	1.8 percent

*\*Proposed for implementation in the Basinwide Council's program through May 30, 2003 only. Calculations are explained in Appendix E.*

These thresholds are to be applied against fieldwide average inspection results to evaluate whether or not a field qualifies for burning. For example, the biased/unbiased method requires the use of 4 sampling sites for fields of less than 50 acres. Therefore, the inspector would calculate disease incidence at each of the four sites, sum the values, and then divide by four to calculate a fieldwide average. If the fieldwide average exceeded the thresholds above, the field would qualify. The procedure is the same for fields greater than 50 acres, except it is based on 6 samples rather than 4. Table III-4 illustrates how the math works in these calculations. The table shows five hypothetical situations—three for stem rot (and/or aggregate sheathspot because they can be

considered cumulatively) and two for neck blast. It is important to note that an inspector may not have to sample at all inspection sites if the initial site(s) are high enough to pass the field when the fieldwide calculations are made.

**Table III-4**

EXAMPLES OF FIELD INSPECTION EVALUATIONS BY AGRICULTURAL COMMISSIONERS								
<i>(example based on method #1 for field sizes of 50 acres and greater – 6 samples required)</i>								
Examples	Site & Inspection Results (%)						Fieldwide Average Calculation	Finding
	1*	2	3	4	5	6		
1 (Stem Rot)	25	15	10	14	16	12	$(25+15+10+14+16+12)/6 = 15.3\%$	Pass
2 (Stem Rot)	75	20	-	-	-	-	$(75+20+0+0+0+0)/6 = 15.8\%$	Pass
3 (Stem Rot)	30	10	10	8	5	6	$(30+10+10+8+5+6)/6 = 11.5\%$	Fail
4 (Blast)	5	2	3	1	-	-	$(5+2+3+1+0+0)/6 = 1.8\%$	Pass
5 (Blast)	12	-	-	-	-	-	$(12+0+0+0+0+0)/6 = 2\%$	Pass

\*Biased inspection site—expected to be higher than the remaining unbiased inspection sites.

As demonstrated by these examples, if a field is severely impacted by disease, the field inspector can elect not to sample anytime after the first biased inspection site if sampling results are high enough. Example #1 shows a field that required sampling at all 6 sites to qualify for burning. The next example, #2, shows a passing field where the inspector was able to forego sampling at the last 4 sites. Example #3 demonstrates a field that does not have high enough fieldwide average disease levels to qualify for burning. We would expect this field to be incurring less than a one sac<sup>1</sup> per acre reduction in yield from stem rot and/or aggregate sheathspot. The last two example are for neck blast situations. Example #4 shows that, even with relatively low levels of the disease, the inspector was able to qualify this field without sampling at the last two inspection sites. And finally, example #5 shows a field that would qualify with just a single initial sample of 12 percent blast incidence.

A detailed explanation of the calculations used to determine the disease significance thresholds is attached as Appendix E of this staff report. As described above, this strategy can be used to determine what level of reduction in rice yield is deemed significant. Then, a correlation of the rice disease incidence level expected to result in a “significant” reduction in yield could be determined. Data available for this analysis include best available scientific conclusions about the impacts of qualifying diseases, and rice industry data regarding average yields, prices, profitability, and production.

<sup>1</sup> The term “sac” refers to a 100 pounds of rice, also commonly referred to as a “hundred-weight” or “cwt” of rice.

#### 4. *Oversight Inspections and Enforcement*

The agricultural commissioners must conduct a minimum level of oversight inspections or “spot checks” to confirm inspection reporting accuracy. We are proposing to require the agricultural commissioners to field-verify a minimum of five percent of all reports. This is a minimum level requirement, agricultural commissioners are encouraged to conduct as many inspections as are needed to adequately enforce the program.

The selection of five percent requirement was based on an existing similar program requirement for the review of “restricted use” pesticides (CCR, Title 3, Division 6, section 6436). This existing law provides for a minimum agricultural commissioner oversight level of five percent.

We are proposing that any false inspections performed by inspectors or submitted by growers to be deemed a violation of HSC sections 41865 and 42402.2(b). HSC 41865 identifies the section that requires this regulation. Subdivision (h)(2) of this statute states that an applicant cannot qualify for burning if he/she has violated the provisions of HSC section 41865 within the past three years. Therefore, false inspection or the submittal of false reports by any grower would prohibit that grower from qualifying to burn for a period of three years.

HSC section 42402.2(b) is a general provision that prohibits intentional false reporting in any regulatory program established by order of the ARB. Those in violation are subject to penalties established by this provision of law.

- *Inspection Training Requirements for Conditional Rice Straw Burning Permit Program for the Sacramento Valley Air Basin (new section 80157)*

This section has been added to require a field inspector training program to certify individuals wishing to perform inspections to identify and quantify disease. It must be implemented by the Basinwide Council, in consultation with CDFA and ARB. The training program must be implemented through an accredited agricultural research facility, such as the University of California Cooperative Extension (UCCE). Training shall be required for any persons who wish to conduct inspection services. The training curriculum will provide the participants with the ability to identify the diseases covered by the program.

Though not required, agricultural commissioners and his/her staff are encouraged to attend the training. Agricultural commissioner staff routinely holds several agriculture-related certifications and, therefore, may already be well versed in these issues. However, involvement in the training may provide additional skills.

The training procedures will be tested in mid-August 2000 as part of the program scoping efforts. ARB staff will be actual "students" during this training to evaluate the training program's effectiveness and suggest improvements where needed. Along with other stakeholders involved in the training program trained, ARB staff will conduct actual inspections as part of the pilot program. We will report to the Board on the status of the program of the trial training program at the September 28, 2000 hearing.

- *Annual Reporting Requirements for Conditional Rice Straw Burning Permit Program for the Sacramento Valley Air Basin (new section 80158).*

This section has been added to describe annual reporting responsibilities required by the proposed regulation.

The Advisory Group has requested that the Basinwide Council be authorized to implement the program on behalf of the ARB. We agree that the Basinwide Council is the appropriate authority to implement the program. In order to recommend approval of this request, we are requiring that the Basinwide Council, beginning in 2002, submit an annual report by July 15. The reporting will enable us to ensure that the program is operating as intended. Details of the reporting requirements are presented in the next section.

As part of the annual report, we are asking for the total number of planted rice acres, by county. Since ARB allocates burn acres for rice, we need this information to track the progress towards the applicable acreage limits set out by the phase-down law. In the past, ARB has only tracked the total rice acres burned. However, under this next phase of the Act, rice acreage could be limited by 25 percent of each individual grower's planted acreage.

- *State Approval Procedures for Conditional Rice Straw Burning Permit Program for the Sacramento Valley Air Basin (Section 80159)*

This section establishes a procedure for the ARB's Executive Officer to approve or disapprove of any program, or part of a program, submitted by the Basinwide Council. The procedures to be followed by both parties in the event of a disapproval, conditional approval, or intent to disapprove are also described. In summary, the Basinwide Council's program submittal is due February 15, 2001. The Executive Officer must indicate intent or take action on the submittal within 90 days. If the plan is not approvable, the Basinwide Council has 90 days to resubmit a program. However, if the Basinwide Council has not submitted a program by March 1, 2001, or the Executive Officer has not approved a program by July 15, 2001, the ARB may adopt an alternative program.

This section also addresses procedures for amendment of the program. With 90 days notice, the Executive Officer may amend the program, in consultation with the Basinwide Council. The Basinwide Council may also submit proposed amendments to the Executive Officer. The Executive Officer may request the submittal of program amendments from the Basinwide Council.

#### IV. CONSULTATIVE AND PUBLIC INVOLVEMENT PROCESS

##### 1. *Role of the Conditional Rice Straw Advisory Group*

HSC section 41865(e) required the ARB and CDFA, by September 1, 1996, to appoint an Advisory Group to assist in the development of the regulation required by that section. Since its creation, the Advisory Group has met on numerous occasions to develop recommendations to the ARB regarding the development of this proposed regulation. These recommendations are included in this report as Appendix C. In addition, the Advisory Group has developed a draft suggested program. Examples of the application and reporting forms suggested by the Advisory Group for use in the program is contained in Appendix D.

We consider the Advisory Group's draft suggested program to be a good foundation for the development of the local program. Therefore, we have developed a proposed regulation that will enable the suggested program to be utilized as a basis for the final program required by this regulation.

As part of the draft suggested program, the Advisory Group has committed to coordinating a pilot program to "test drive" the suggested strategies. This testing period, called the fall 2000 scoping process, will take place during the growing season in 2000. The data from this activity should be available to help refine the final program to be submitted by the Basinwide Council by February 15, 2001.

The Advisory Group has also suggested the initial three diseases that should qualify as part of the program. These are stem rot (*Sclerotium oryzae*), aggregate sheathspot (*Rhizoctonia oryzae-sativae*), and blast (*Pyricularia grisea*). We agree and are recommending these be included in the program.

##### 2. *Roles of Department of Food and Agriculture and the Sacramento Valley Basinwide Air Pollution Control Council*

HSC section 41865(e) requires the ARB staff to consult with CDFA and the Basinwide Council in the development of the regulation. Staff has achieved this through numerous meetings and communications with each of these partners, as well as soliciting their input, in a series of public workshops.

CDFA also has a consultation role with ARB staff in regard to looking at the qualification of rice diseases for the program. HSC section 41865(h) requires that a disease may not qualify under this program if the ARB and CDFA jointly determine that other feasible and cost-effective measures for controlling the disease exist. ARB staff will work with CDFA annually to determine if diseases should be added or removed from the program.

### 3. *Workshops and other Public Presentations*

In an effort to develop a consensus-based program, staff has made a considerable effort to discuss the developing regulation with all affected stakeholders. Staff has shared working drafts of the proposed regulation, sample approaches for the determination of significance, cost estimates, and other related documentation with all interested parties. Table IV-1 provides a summary of staff's efforts to receive input on the developing regulation.

**TABLE IV-1**  
**SUMMARY OF PUBLIC OUTREACH EFFORTS**

<b>Outreach Action/Meeting</b>	<b>Dates (2000)</b>
Release of Preliminary Draft Proposed Regulation	Wednesday, May 17
Technical Advisory Committee Consultation	Friday, May 19
Workshop #1: Sacramento	Tuesday, May 30
Workshop #2: Colusa	Thursday, June 1
Basinwide Council Consultation	Friday, June 2
Release of Preliminary Draft Program Cost Estimate	Thursday, June 8
Agricultural Commissioner Group Consultation	Thursday, June 15
Technical Advisory Committee Consultation	Friday, June 16
Conditional Rice Burning Advisory Group Consultation	Friday, June 30
Release of Second Draft Proposed Regulation	Thursday, July 20
Workshop #3: Colusa	Thursday, July 27
Basinwide Council Consultation	Friday, August 4

## V. ENVIRONMENTAL ANALYSIS

Both the California Environmental Quality Act (CEQA) and Board policy require the ARB to consider the potential adverse environmental impacts of proposed regulations. Because the Secretary of Resources for the California Resources Agency has certified ARB's program for the adoption of regulations (see Public Resources Codes section 21080.5), CEQA allows the ARB's environmental analysis to be included in the ARB Staff Report in lieu of preparing an environmental impact report or negative declaration. As such, this chapter analyzes the environmental impacts from proposed changes to the existing regulations.

In addition, we will respond in writing to all significant environmental points raised during the public review period or at the Board hearing. These responses will be contained in the Final Statement of Reasons.

On January 1, 1994, the requirements of SB 919 became effective (Statutes, 1993, Chapter 131). SB 919 amended CEQA by adding new Public Resources Code section 21159. With regard to the proposed regulations, Public Resources Code section 21159 requires that the environmental analysis conducted by the ARB include, at a minimum, all of the following: (1) an analysis of the reasonably foreseeable environmental impacts of the methods of compliance, (2) an analysis of reasonably foreseeable feasible mitigation measures, and (3) an analysis of reasonably foreseeable alternative means of compliance with the proposed regulation.

Our analysis of the reasonably foreseeable environmental impacts of the methods of compliance is presented below. In fulfillment of the requirement for an analysis of reasonably foreseeable feasible mitigation measures, we have determined that no mitigation measures are necessary because we have identified no significant adverse environmental impacts associated with the proposed regulations. However, we will continue to monitor implementation of the regulation to insure that no serious adverse impacts occur in the future. In fulfillment of the requirements for an analysis of the reasonably foreseeable alternative means of compliance with the regulation, the ARB believes that the proposed regulations provide a great amount of latitude and flexibility to develop the final program.

### 1. *Proposed Finding*

The ARB staff has conducted an analysis of the potential environmental impacts of the proposed changes to the regulations. Based on this evaluation, we have determined that the proposed regulations would not pose significant adverse environmental impacts. Rather, we expect that compliance with the regulations may result in reduced smoke-related health impacts from rice straw burning. Any reduction in agricultural burning is expected to result in a beneficial impact on air quality and public health.

## 2. Air Quality Impact Analysis

Beginning in 2001, the existing phase-down law establishes a cap on rice burning for disease control purposes at 125,000 acres or 25 percent of each applicant's planted acres, whichever is less. Therefore, the potential impact of this proposed regulation is that it may reduce burning below the 125,000 acre cap if disease problems do not justify burning to that level. Accordingly, an appropriate analysis is to look at the impacts of activities that would replace burning under those circumstances.

Currently available disposal alternatives to rice straw burning are incorporation into the soil and removal from the field. Typically, removal is done to harvest the straw for some off-field use. To analyze the potential impacts, the emissions produced by rice straw burning must be compared with those of incorporation and removal.

Emissions from burning result from the combustion of the rice straw. Methane emissions from straw incorporation mostly result from farm equipment used to chop the straw and to work it into the soil. These emissions are due to dust and equipment engine exhaust. Emissions from hauling the straw offsite are due to activities in the field which also create dust. Examples include raking and baling, and exhaust emissions from motorized equipment. These impacts are also discussed in more detail in the biennial report to the Legislature titled, *Draft Progress Report on the Phase-Down of Rice straw Burning in the Sacramento Valley Air Basin (February 2000)*.

Straw burning produces combustion products such as particulate matter (PM<sub>10</sub>), carbon monoxide (CO), reactive organic gases (ROG), oxides of nitrogen (NO<sub>x</sub>), and oxides of sulfur (SO<sub>x</sub>). The engine exhaust emissions from farming equipment (such as tractors and harvesters) include all of these pollutants. Equipment operation also creates airborne dust which include additional PM<sub>10</sub> emissions.

Every grower does not accomplish incorporation of rice straw the same way. The emission estimates shown here for soil incorporation represent the most common method used by growers include chopping, discing, flooding, and rolling.

Data in Table V-1 demonstrates that emissions are much higher for burning rice straw, compared with incorporation and offsite removal.

**TABLE V-1**  
**RICE STRAW REMOVAL EMISSION FACTOR ESTIMATES**  
*(pounds/acre)*

<b>Straw Removal Method</b>	<b>Soil PM<sub>10</sub></b>	<b>Burning and Exhaust PM<sub>10</sub></b>	<b>ROG</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>x</sub></b>	<b>CO</b>
<b>Burning</b>	Unknown	20.8	5.2	17	3.7	188
<b>Incorporation</b>	9.2	0.9	1.7	11	0.2	4
<b>Offsite Removal</b>	2	0.3	0.6	4	0.1	1

*Note: Some of the factors used here were estimated using engineering judgement from rice growers, agricultural scientists, and emission inventory specialists.*

### 3. *Other Potential Environmental Impacts*

The following is a discussion of environmental concerns that ARB evaluated to determine if the proposed regulations would contribute potential adverse environmental impacts.

#### (a) Water Quality, Watershed Effects, and Aquatic/Riparian Protection

Under this proposed regulation, burning may be authorized if needed for disease control purposes. Therefore, it should not result in any increased usage of pesticides to control disease.

#### (b) Recreation

No anticipated impacts.

#### (c) Land Use and Planning

No anticipated impacts.

#### (d) Population and Housing

No anticipated impacts.

#### (e) Geophysical

No anticipated impacts.

(f) Transportation/Circulation

A slight increase in driving may occur for the performance of field inspection activities. This is not expected to significantly impact the vehicle miles traveled in the region.

(g) Biological Resources

No anticipated impacts.

(h) Energy and Mineral Resources

The proposed regulation is not expected to deplete non-renewable mineral resources at an accelerated rate or in a wasteful manner. There are no anticipated significant adverse impacts to mineral resources. It is possible that biomass material that is harvested rather than burned will result in greater use of alternative fuels. The air quality impacts of biomass utilization for electric power generation should be thoroughly analyzed as part of an air district's environmental assessment process at such time that it develops or enhances its smoke management program. Any statewide initiative that allows the bioconversion of vegetation and related materials to ethanol would also be required to perform an environmental assessment pursuant to CEQA requirements.

(i) Hazardous Materials and Air Toxic Emissions

No anticipated impacts.

(j) Noise

Under this proposed regulation, burning may be authorized if needed for disease control purposes. If this process were to result in less than 125,000 acres burned in the Sacramento Valley, there could be an increase in the operation of large farm equipment used to incorporate or cut and bale rice straw. However, these are farm operations where heavy equipment use is not unusual.

(k) Public Services

No anticipated impacts.

(l) Solid/Hazardous Waste Disposal

Under this proposed regulation, burning may be authorized if needed for disease control purposes. If this process were to result in less than 125,000 acres burned in the Sacramento Valley, there could be an increase in rice straw requiring some form of management. ARB, through grant programs, is pursuing development of alternative uses to assist growers with this disposal issue.

(m) Aesthetics

The proposed regulation is not expected to result in any new construction of buildings or permanent structures and thus would not cause adverse affects to scenic vistas.

(n) Cultural Resources

Significant adverse impacts to cultural resources are not expected because the proposed regulation would not require destruction or alteration of any buildings or sites with prehistoric, historic, archaeological, religious, or ethnic significance.

(o) Catastrophic Wildfires

No anticipated impacts.



## VI. ECONOMIC CONSIDERATIONS

To evaluate the potential economic impacts from this program, the staff has worked closely with the affected agricultural commissioners and growers to understand their costs to comply with this proposed regulation.

Our detailed analysis is contained in Appendix F and is condensed in Table VI-1 to provide the most relevant cost information. The table is subdivided to demonstrate the economic benefit from the 2003 program change. For each major column—agricultural commissioner costs, direct grower costs, and total annual costs—the table is subdivided into estimated 2001-2002 costs and cost estimates for 2003 and beyond. Reviewing these comparisons demonstrates program cost savings of nearly \$35,000 per year, starting in 2003.

**TABLE VI-1**  
**ESTIMATED (PRESENT VALUE) ANNUAL COSTS OF PROGRAM IMPLEMENTATION**

COUNTY	AG COMMISSIONER (\$)		DIRECT GROWER (\$)		TOTAL ANNUAL (\$)	
	2001-2002	2003 & later	2001-2002	2003 & later	2001-2002	2003 & later
BUTTE	13,964	10,526	9,590	6,393	23,554	16,919
COLUSA	19,560	14,747	14,918	9,945	34,478	24,692
GLENN	11,228	8,478	8,525	5,683	19,753	14,161
PLACER	2,673	2,031	1,598	1,065	4,271	3,096
SACRAMENTO	2,096	1,615	1,066	710	3,162	2,325
SUTTER	9,837	7,430	11,189	7,458	21,026	14,888
TEHAMA	105	85	53	36	158	121
YOLO	4,247	3,235	2,664	1,776	6,911	5,011
YUBA	5,805	4,415	3,730	2,486	9,535	6,901
<b>TOTAL</b>	<b>\$69,515</b>	<b>\$52,562</b>	<b>\$53,333</b>	<b>\$35,552</b>	<b>\$122,848</b>	<b>\$88,114</b>

*\*The two remaining SVAB counties, Shasta and Solano, have no affected rice acreage.*

### 1. *Agricultural Commissioners*

Our analysis considers anticipated costs for agricultural commissioners to review all inspection reports and to conduct the required amount of oversight inspections. Although staff is not proposing a requirement that agricultural commissioner staff be trained, it is greatly encouraged. Therefore, costs for training are also included. All agricultural commissioners were contacted to get actual hourly office costs for each county for use in staff's analysis of these local government costs.

Initially, agricultural commissioner cost are about \$70,000 per year for all counties in the Basin with rice acreage. With the 2003 program adjustment, these costs are reduced to about \$53,000 per year.

### 2. *Growers*

The staff's analysis also includes a section for direct costs to growers for the required inspections. Because the number of growers is large, staff developed a set of assumptions and averaged grower's cost to conduct its analysis. This information was developed from many discussions with growers and industry representatives. Appendix F explains these assumptions that include information such as cost estimates for labor, estimated time requirements for training, inspection and review tasks, and the estimated number of eligible fields.

Growers who choose to burn will initially incur direct costs of about \$53,000 per year. These costs will go down to approximately \$36,000 per year with the anticipated program modification in 2003.

On a "per burned acre" basis, the total program cost is about \$0.98 per burned acre in 2001-2002 and \$0.70 per burned acre in 2003 and beyond. Again, this estimated cost is based upon burned acreage only and works out to less than \$0.01 per sack or "hundredweight" (cwt) of rice produced on these acres. If the estimated total program cost were amortized over each grower's total acreage, it would equate to about a one-quarter of a one-cent per sack of rice produced by each grower.

### 3. *Districts*

We expect very little impacts on air districts from this program. The air districts currently have a process to issue burn permits to growers. Their process for doing this will be virtually unchanged. However, each APCO will have to coordinate with their county's agricultural commissioner to develop an efficient process for receiving the approved conditional rice straw burning permit application from the agricultural commissioner. If approved, the APCO then implements the existing process for issuing a burn permit.

### 4. *State Agencies*

It is not expected that additional direct costs would be incurred by the ARB because the proposed regulations do not impose additional requirements. Interaction between the ARB and agricultural commissioners should be within the normal course of activity and not require additional resources by the State.

In summary, staff estimates that this proposed regulation will result in a local program that will cost approximately \$0.70 per acre of rice straw burned. Assuming average production costs, a reasonable expectation of grower profit is approximately \$150 per acre. Therefore, staff expects the administrative costs of complying with this proposed regulation to represent approximately less than one-half of one percent of average grower profits.

#### Potential Impact on Employment

This cost of this program is not expected to have a significant adverse impact on California employment, considering the size of the rice products industry.

#### Potential Impact on Business Competitiveness

The increased costs of the proposed regulations are expected to have no significant adverse impact on the ability of the California rice industry to compete in the national market. The increased costs account only for 0.01 percent of the value of rice sold by California's rice industry.

#### Potential Impact on Business Creation, Elimination, or Expansion

The proposed regulations should have no significant adverse impact on the status of businesses in California's rice industry.



**VII. STAFF RECOMMENDATIONS**

We recommend that the Board approve the proposed amendments to Title 17, Subchapter 2, Article 1 and Article 2, to establish criteria for the development of the Conditional Rice Straw Burning Permit Program for the Sacramento Valley Air Basin. The specific amendments are contained in Appendix A of this staff report.



### VIII. STAFF REPORT REFERENCES

California Air Resources Board, 2000. Draft Progress Report on the Phase Down of Rice Straw Burning in the Sacramento Valley Air Basin, Sacramento, CA.

California Rice Commission, 2000. California Rice Statistics and related National and International Data, Sacramento, CA.

California State Farm Services Agency, 2000. Personal communication.

Cintas, N.A., 1998. Relationship of *Sclerotium oryzae*: Inoculum Levels, Stem Rot Incidence and Severity, Yield of Rice in California and Bacterial Populations Recovered from *S. oryzae* Sclerotia and Rice Stems under Different Rice Residue Management Practices. Dissertation, University of California, Davis.

Krause, R.A. and R.K. Webster, 1972. Sclerotial production, viability determination and quantitative recovery of *Sclerotium oryzae*. *Mycologia* **64**:1333-1337.

Krause, R.A. and R.K. Webster, 1973. Stem Rot of Rice in California. *Phytopathology* **63**: 518-523.

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Webster, R.K., 2000. Personal communication.

Williams, J.F., 2000. Personal communication.

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**APPENDIX A**  
**PROPOSED REGULATION ORDER**



Article 1. General Provisions

[Note for the explanation of proposed changes to section 80101: Section 80101 of Title 17 was amended on March 23, 2000 as part of amendments to California's Agricultural Burning Regulations. These recent amendments have not yet been submitted to the Office of Administrative Law and are not yet legally effective. These previous Agricultural Burning Regulations are identified by underline for the existing proposed additions and ~~striketrough~~ for the existing proposed deletions. For this section only, the new additions for the creation of the Conditional Rice Straw Burning Program are shown in double-underline and proposed deletions are shown in ~~double-striketrough~~.]

**§80101. Scope and Policy Definitions.**

- ~~(a) The Guidelines shall not supersede any rule or regulation of any district whose rule or regulation has been in effect for five or more years prior to September 19, 1970.~~
- ~~(b) Although any local or regional authority may establish stricter standards for the control and the regulation of agricultural burning than those set forth in the Guidelines, no local or regional authority may ban any agricultural burning.~~
- ~~(c) The Guidelines are not intended to permit open burning on days when such open burning is prohibited by public fire protection agencies for purposes of fire control or prevention.~~

~~NOTE: Authority cited: Sections 39600, 39601, 41856 and 41859, Health and Safety Code.  
Reference: Sections 41854, 41856, 41857, 41858, 41859 and 4184, Health and Safety Code.~~

- (a) "Agricultural burning" is defined in Health and Safety Code section 39011 as follows:
  - (1) "Agricultural burning" means open outdoor fires used in agricultural operations in the growing of crops or raising of fowl or animals, or open outdoor fires used in forest management, range improvement, or the improvement of land for wildlife and game habitat, or disease or pest prevention.
  - (2) "Agricultural burning" also means open outdoor fires used in the operation or maintenance of a system for the delivery of water for the purposes specified in subdivision (1).
  - (3) "Agricultural burning" also means open outdoor fires used in wildland vegetation management burning. Wildland vegetation management burning is the use of prescribed burning conducted by a public agency, or through a cooperative agreement or contract involving a public agency, to burn land predominantly covered with chaparral trees, grass, or standing brush. Prescribed burning is the planned application of fire to vegetation to achieve any specific objective on lands selected in advance of that application. The planned application of fire may also include natural or accidental ignition.

## PROPOSED REGULATION ORDER

- (b) “Air Pollution Control District” (APCD), “Air Quality Management District” (AQMD), “air district,” or “district” means an air pollution control district or an air quality management district created or continued in existence pursuant to provisions of Health and Safety Code section 40000 et seq.
- (c) “Air quality” means the characteristics of the ambient air as indicated by state ambient air quality standards which have been adopted by the state board pursuant to section 39606 of the Health and Safety Code and by National Ambient Air Quality Standards which have been established pursuant to sections 108 and 109 of the federal Clean Air Act pertaining to criteria pollutants and section 169A of the federal Clean Air Act pertaining to visibility.
- (d) “Ambient air” means that portion of the atmosphere, external to buildings, to which the general public has access.
- (e) “ARB” or “state board” means the Air Resources Board.
- (f) “Basinwide air quality factor” means an air quality factor which equals the 4:00 am to 6:00 am two hour average soiling index (COH\*10) ending at 6:00 am PST. The basinwide council may use other particulate matter measurements as an indicator of air quality if appropriate for its program.
- (g) “Biased Inspection Site” means an inspection site chosen, at the discretion of a field inspector, based upon the presence or anticipated presence of disease symptoms.<sup>1</sup>
- (~~g~~h) “Burn plan” means an operational plan for managing a specific fire to achieve resource benefits and specific management objectives. The plan includes, at a minimum, the project objectives, contingency responses for when the fire is out of prescription with the smoke management plan, the fire prescription (including smoke management components), and a description of the personnel, organization, and equipment.
- (~~h~~i) “Burn project” means an active or planned prescribed burn or a naturally ignited wildland fire managed for resource benefits.
- (~~i~~j) “Class I Area” means a mandatory visibility protection area designated pursuant to section 169A of the federal Clean Air Act.
- (k) “Conditional Rice Straw Burn Permit” means a permit issued pursuant to sections 41865(f) and (h) of the Health and Safety Code by an Air Pollution Control Officer (APCO) to conduct one burn, on one field, within one year or shorter time period, as specified.
- (l) “Conditional Rice Straw Burn Permit Applicant” means the individual (or his/her agent) with control over the property containing the rice fields proposed for burning.
- (~~m~~n) “Designated agency” means any agency designated by the Air Resources Board as having authority to issue agricultural burning, including prescribed burning, permits. An air district may request such a designation for an agency. The U.S. Department of Agricultural (USDA) Forest Service and the California Department of Forestry and Fire Protection (CDF) are so designated within their respective areas of jurisdiction.

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<sup>1</sup> The terms “biased inspection site” and “unbiased inspection site” refer to inspection sites selected solely upon their biological characteristics. They could also be called “biologically biased inspection site” and “biologically unbiased inspection site” for this reason. However, for simplicity purposes, these terms are referred to as “biased inspection site” and “unbiased inspection site” throughout the staff report and proposed regulation order (Attachment A).

- (n) “Disease Significance Threshold” means an estimated amount (expressed as a percentage of diseased stems) of a qualifying disease expected to result in significant decreased grain production (during the current or next growing season).
- (ko) “Fire protection agency” means any agency with the responsibility and authority to protect people, property, and the environment from fire, and having jurisdiction within a district or region.
- (lp) “Forty-eight hour forecast” means a prediction of the meteorological and air quality conditions that are expected to exist for a specific prescribed burn in a specific area 48 hours from the day of the prediction. The prediction shall indicate a degree of confidence.
- (q) “Growing Season” means the period of time from seedbed preparation through crop harvest.
- (mr) “Land manager” means any federal, state, local, or private entity that administers, directs, oversees, or controls the use of public or private land, including the application of fire to the land.
- (ns) “Marginal burn day” means a day when limited amounts of agricultural burning, including prescribed burning, for individual projects in specific areas for limited times is not prohibited by the state board and burning is authorized by the district consistent with these Guidelines.
- (et) “National Ambient Air Quality Standards (NAAQS)” mean standards promulgated by the United States Environmental Protection Agency that specify the maximum acceptable concentrations of pollutants in the ambient air to protect public health with an adequate margin of safety, and to protect public welfare from any known or anticipated adverse effects of such pollutants (e.g., visibility impairment, soiling, harm to wildlife or vegetation, materials damage, etc.) in the ambient air.
- (pu) “Ninety-six hour trend” means a prediction of the meteorological and air quality conditions that are expected to exist for a specific prescribed burn in a specific area 96 hours from the day of the prediction.
- (qv) “No-burn day” means any day on which agricultural burning, including prescribed burning, is prohibited by the state board or the air district in which the burning will occur.
- (fw) “Open burning in agricultural operations in the growing of crops or raising of fowl or animals” means:
  - (1) The burning in the open of materials produced wholly from operations in the growing and harvesting of crops or raising of fowl or animals for the primary purpose of making a profit, of providing a livelihood, or of conducting agricultural research or instruction by an educational institution.
  - (2) In connection with operations qualifying under subdivision (1):
    - (A) The burning of grass and weeds in or adjacent to fields in cultivation or being prepared for cultivation.
    - (B) The burning of materials not produced wholly from such operations, but which are intimately related to the growing or harvesting of crops and which are used in the field, except as prohibited by district regulations. Examples are trays for drying raisins, date palm protection paper, and fertilizer and pesticide sacks or containers, where the sacks or containers are emptied in the field.

## PROPOSED REGULATION ORDER

- (ex) “Particulate matter (PM)” means any airborne finely divided material, except uncombined water, which exists as a solid or liquid at standard conditions (e.g., dust, smoke, mist, fumes or smog).  
“PM2.5” means particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.  
“PM10” means particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers (including PM2.5).
- (ey) “Permissive-burn day,” or “burn day” means any day on which agricultural burning, including prescribed burning, is not prohibited by the state board and burning is authorized by the district consistent with these Guidelines.
- (ez) “Pre-fire fuel treatment” means techniques which can reasonably be employed prior to prescribed burning in order to reduce the emissions that would otherwise be produced in a prescribed fire.
- (vaa) “Prescribed burning” - see (a)(3). Tule burning in wildlands or wildland/urban interface is considered to be prescribed burning.
- (wbb) “Prescribed fire” means any fire ignited by management actions to meet specific objectives, and includes naturally-ignited wildland fires managed for resource benefits.
- (cc) “Qualified Rice Disease Inspector” means any person certified in accordance with the provisions of section 81057 of this regulation, other than agricultural commissioner staff, who conducts rice disease inspections on behalf of rice growers.
- (dd) “Qualifying Disease” means a rice disease that may cause significant yield loss and which the Secretary for the California Department of Food & Agriculture (CDFA) finds is controlled or effectively managed by the burning of straw, provided the ARB and CDFA have not determined, in accordance with section 41865(h) of the Health and Safety Code, that there are other economically and technically feasible alternative means of elimination that are not substantially more costly to the conditional rice straw burn permit applicant.
- (xee) “Range improvement burning” means the use of open fires to remove vegetation for a wildlife, game, or livestock habitat or for the initial establishment of an agricultural practice on previously uncultivated land.
- (yff) “Region” means two or more air districts within an air basin or adjoining air basins that sign a memorandum of understanding to implement a coordinated regional smoke management program pursuant to the requirements of Article 2 of this regulation.
- (zgg) “Residential burning” means an open outdoor fire for the disposal of the combustible or flammable solid waste of a single- or two-family dwelling on its premises. Residential burning is not considered to be prescribed burning.
- (aahh) “Seventy-two hour outlook” means a prediction of the meteorological and air quality conditions that are expected to exist for a specific prescribed burn in a specific area 72 hours from the day of the prediction.
- (bbi) “Smoke Management Plan” means a document prepared for each fire by land managers or fire managers that provides the information and procedures required in section 80160.

(eej) “Smoke management prescription” means measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include, but are not limited to, minimizing smoke impacts, and safety, economic, public health, environmental, geographic, administrative, social, or legal considerations such as complying with Health and Safety Code section 41700, public nuisance statute.

(dek) “Smoke Management Program” means the program defined in these Guidelines.

(eell) “Smoke sensitive areas” are populated areas and other areas where a district determines that smoke and air pollutants can adversely affect public health or welfare. Such areas can include, but are not limited to, towns and villages, campgrounds, trails, populated recreational areas, hospitals, nursing homes, schools, roads, airports, public events, shopping centers, and mandatory Class I areas.

(ffmm) “State ambient air quality standards” means specified concentrations and durations of air pollutants which reflect the relationship between the intensity and composition of air pollution to undesirable effects, as established by the state board pursuant to Health and Safety Code section 39606.

(nn) “Unbiased Inspection Site” means an inspection site at a specific location prescribed by a method that does not consider the location or anticipated location of disease symptoms.<sup>1</sup>

(ggoo) “Wildfire” means an unwanted wildland fire.

(hhpp) “Wildland” means an area where development is generally limited to roads, railroads, power lines, and widely scattered structures. Such land is not cultivated (i.e., the soil is disturbed less frequently than once in 10 years), is not fallow, and is not in the United States Department of Agriculture (USDA) Conservation Reserve Program. The land may be neglected altogether or managed for such purposes as wood or forage production, wildlife, recreation, wetlands, or protective plant cover.

For CDF only, “Wildland” as specified in California Public Resources Code (PRC) section 4464(a) means any land that is classified as a state responsibility area pursuant to Article 3 (commencing with Section 4125) of Chapter 1, Part 2 of Division 4 and includes any such land having a plant cover consisting principally of grasses, forbs, or shrubs that are valuable for forage. “Wildland” also means any lands that are contiguous to lands classified as a state responsibility area if wildland fuel accumulation is such that a wildland fire occurring on these lands would pose a threat to the adjacent state responsibility area.

(iiqq) “Wildland fire” means any non-structural fire, other than prescribed fire, that occurs in the wildland.

For CDF only, “wildland fire” as specified in PRC section 4464(c) means any uncontrolled fire burning on wildland.

(jrr) “Wildland/urban interface” means the line, area, or zone where structures and other human development meet or intermingle with the wildland.

NOTE: Authority cited: Sections 39600, 39601, 41856 and 41859, and 41865 of the Health and Safety Code. Reference: Sections 39011, 39025, 39053, 41850, 41852, 41853, 41854, 41855, 41856, 41857, 41858, 41859, 41861, 41862 and 41863, and 41865 of the Health and Safety Code.

<sup>1</sup> See footnote on page A-2.

**PROPOSED REGULATION ORDER**

[Note: For the remainder of this Proposed Regulation Order the following text is all new proposed language to Title 17, CCR.]

**§80156. Conditional Rice Straw Burning Permit Program for the Sacramento Valley Air Basin.**

- (a) The Sacramento Valley Basinwide Air Pollution Control Council (Basinwide Council) shall, by February 15, 2001, develop and submit to the state board a proposed rice straw burning permit program (program) for the issuance of conditional rice straw burning permits (permit) by the APCOs in the Sacramento Valley Air Basin. The program shall be adopted at a noticed public hearing of the Basinwide Council and shall implement and ensure compliance with the following requirements established by subdivisions (b) through (h).
- (b) The APCOs in the Sacramento Valley Air Basin may grant conditional rice straw burning permits only after the county agricultural commissioner has completed the following:
  - (1) Independently determined the significant presence of a pathogen located in the field proposed for burning in the county of his/her jurisdiction in an amount sufficient to constitute a rice disease during the growing season.
  - (2) Made a written finding, based upon the inspection results of methods specified in subdivision (e), that the existence of the pathogen will likely cause a significant, quantifiable reduction in yield in the field proposed for burning during the current or next growing season.
  - (3) Documented each applicant's compliance with the following terms and conditions:
    - (A) The fields proposed for burning are specifically described.
    - (B) The applicant has not violated any provision of section 41865 of the Health and Safety Code within the previous three years.
- (c) In making the finding and determinations described in subdivisions (b)(1) through (b)(3), the county agricultural commissioner may accept inspection reports from qualified rice disease inspectors. Prior to making the finding, the agricultural commissioner must review and evaluate the accuracy of all inspection reports prepared by qualified rice disease inspectors and conduct field inspections to confirm results on a minimum of five (5) percent of all inspection reports.
- (d) Until May 30, 2003, the Basinwide Council's program shall require the county agricultural commissioners, in determining disease significance pursuant to subdivision (b)(2), to base their determinations upon the following disease significance thresholds:
  - 1) For stem rot (*Sclerotium oryzae*), the disease significance threshold shall be 15 percent of the total stems sampled.
  - 2) For aggregate sheathspot (*Rhizoctonia oryzae-sativae*), the disease significance threshold shall be 15 percent of the total stems sampled.
  - 3) For neck blast (*Pyricularia grisea*), the disease significance threshold shall be 1.8 percent of the total stems sampled.
  - 4) The disease significance thresholds shall be compared against inspection results averaged over the field proposed for burning, in accordance with subdivision (e). If no disease significance threshold has been specified for the disease impact being evaluated by a

county agricultural commissioner, the county agricultural commissioner shall utilize professional judgement in determining the significance of disease. Beginning June 1, 2003, the Basinwide Council's program may propose alternative methods for evaluating the severity of qualifying diseases in an applicant's field.

- (e) The Basinwide Council shall develop detailed procedures for each inspection method proposed for adoption. Such inspection methods shall be based upon sound field sampling principles. Biased or unbiased methods, or combinations thereof, may be considered. Until May 30, 2003, the Basinwide Council's program shall comply with the requirements of paragraphs (1) through (4), below. Beginning June 1, 2003, the Basinwide Council's program may propose alternative methods for approving fields for burning based upon the presence of qualifying diseases in accordance with paragraph (4), below.
  - (1) Stem sampling inspection procedures that combine biased and unbiased inspection sites shall include, but shall not be limited to, the following provisions:
    - (A) Use a maximum of one (1) biased inspection site per field.
    - (B) Collect a minimum of fifty (50) stem samples at all inspection sites.
    - (C) Maintain a minimum ratio of biased to unbiased sampling sites of one (1) to three (3) in fields of 50 acres or less, and one (1) to five (5) in fields of greater than 50 acres.
    - (D) Determine the percentage of diseased stems at each inspection site.
    - (E) Sum the percentage values from paragraph (1)(D), above, and divide the sum by the total number of inspection sites to estimate the average percentage of diseased plants in the field proposed for burning.
    - (F) Allow for a field inspector to cease sampling at any time after the first biased site if the results indicate that the field qualifies for burning even with the remaining unsampled sites assumed to equal zero percent.
    - (G) If the field inspector elects to qualify the field using only one biased sampling site, the inspector must collect a minimum of one hundred (100) stem samples at that site. In all other sampling scenarios, the inspector may collect a minimum of fifty samples per site.
  - (2) Visual assessment inspection procedures shall be limited to fields with readily apparent macro disease symptoms and shall include, but shall not be limited to, the following provisions:
    - (A) Assess and map the entire field for macro disease symptoms.
    - (B) Inspect for micro disease symptoms at a minimum of one (1) biased site.
    - (C) Require that a minimum of five (5) groups of at least twenty (20) plants be inspected for micro disease symptoms at each site.
    - (D) Estimate the average percentage of diseased stems at each focussed site.
  - (3) Soil sampling inspection procedures that combine biased and unbiased inspection sites shall be restricted to assessment of stem rot and shall include, but shall not be limited to, the following provisions:
    - (A) Use a maximum of two (2) biased inspection sites per field.
    - (B) Collect a minimum of eight (8) soil samples per field, each at different locations.

## PROPOSED REGULATION ORDER

- (C) Maintain a minimum ratio of biased to unbiased sampling sites of one (1) to three (3).
  - (D) Determine the level of disease (in terms of average viable stem rot sclerotia per gram of soil) at each inspection site.
  - (E) Conduct the procedure in accordance with Webster's soil inoculum potential protocol for stem rot (Krause, R.A. & R.K. Webster, 1972, Mycologia 64:1333-1337).
- (4) Each procedure shall include, but is not limited to, the following information:
- (A) Protocol for selecting inspection sites.
  - (B) Number of required inspection sites.
  - (C) Methods of plant/soil collection.
  - (D) Methods of collection, counting, and scoring of rice plants.
  - (E) Methods of collection, storage, and analysis of soil samples.
  - (F) Procedures for calculating percentage of disease, if required, at specific inspection sites and use of this information to estimate average percentage of disease in a total field.
- (f) The applicant shall submit an application form to the county agricultural commissioner to request the findings of terms and conditions specified in subdivision (b). The applications shall be available for public inspection for a period of three years. Each application form shall include, but shall not be limited to, the following information:
- (1) Applicant's name.
  - (2) Applicant's identification number.
  - (3) Mailing address (property address, city, state, and zip code).
  - (4) Business telephone and fax number.
  - (5) Total planted rice acres.
  - (6) Site identification, location, and field acres proposed for burning.
  - (7) Description of diseases (type and indication of severity).
  - (8) A statement that inspection reports are required as an attachment to the application before it can be considered complete.
  - (9) A statement authorizing the county agricultural commissioner to inspect the sites for rice disease.
  - (10) Signature of the applicant.
  - (11) A place for the signature of the agricultural commissioner verifying compliance with required findings and determinations described in subdivision (b).
- (g) Qualified rice disease inspectors shall complete a field inspection reporting form for each inspection method and the grower shall submit the reporting form, with an application, to the county agricultural commissioner. The county agricultural commissioner must review and approve the submittal in accordance with the provisions of subdivisions (b), (c) and (d). Completed forms shall be filed in the county agricultural commissioner's office and made available for public inspection for at least three years. Each inspection form shall include, but shall not be limited to, the following information:
- (1) Applicant's name.
  - (2) Applicant's identification number.
  - (3) Mailing address (property address, city, state, and zip code).

- (4) Business telephone and fax number.
  - (5) Location and description of inspected fields.
  - (6) Acreage of area proposed for burning.
  - (7) Description of diseases (type and indication of severity).
  - (8) Estimated average disease infection level in the total area proposed for burning, if required.
  - (9) Total planted rice acres.
  - (10) Name, title, and signature of inspector.
  - (11) Qualified rice disease inspector's certification number, if applicable.
- (h) Enforcement provisions shall be included to discourage false reporting. Inspectors who perform fraudulent inspections are subject to permanent revocation of certification and other penalties provided by law. Growers who file false reports shall be deemed in noncompliance with Health and Safety Code sections 41865 and 42402.2(b), and subject to penalties provided by law.

NOTE: Authority cited: Sections 39600, 39601, 41856, 41859, and 41865 of the Health and Safety Code. Reference: Sections 41850, 41852, 41853, 41857, 41858, 41863, and 41865 of the Health and Safety Code.

**§80157. Inspection Training Requirements for Conditional Rice Straw Burning Permit Program for the Sacramento Valley Air Basin.**

- (a) The Basinwide Council, in consultation with CDFA and ARB, shall establish, a program to train and certify rice disease inspectors. The training program shall be implemented through an accredited agricultural educational facility, such as, but not limited to, the University of California Cooperative Extension. Successful completion of the training course shall be a prerequisite to certification. Trainers shall be experienced agricultural professionals with extensive in-field pest inspection and identification experience. Any individual, other than agricultural commissioners and their staff, performing inspections must be trained and certified. Agricultural commissioner staff shall be encouraged, though not required, to be trained through the program. The Basinwide Council may establish minimum criteria for entrance into the training program.
- (b) The certifications shall be issued by the training facility, Basinwide Council, or agricultural commissioner and shall be revocable by the issuer for cause. Issuance of certification shall be based upon evidence of completion of the training program and demonstrated knowledge of the following subject matter:
  - (1) Commonly occurring qualifying and nonqualifying rice diseases.
  - (2) Life cycle or etiology of rice diseases.
  - (3) Inspection methods and their statistical limitations.
  - (4) Techniques of prioritizing suitable test methods based upon field and disease characteristics.
  - (5) Penalties associated with fraudulent inspections and/or related documentation.
  - (6) Estimation of acreage of fields, acreage of inspection areas, and acreage of disease infected areas.

## PROPOSED REGULATION ORDER

- (7) Webster's stem rot disease severity quantification protocol (Krause, R.A. & R.K. Webster, 1973, *Phytopathology* 63: 518-523).
- (8) Webster's soil inoculum potential protocol for stem rot (Krause, R.A. & R.K. Webster, 1972, *Mycologia* 64:1333-1337).
- (9) Disease survey and detection techniques.
- (10) Visual inspection indicators, if available, that meet the disease significance thresholds defined in section 80101.

NOTE: Authority cited: Sections 39600, 39601, 41856, 41859, and 41865 of the Health and Safety Code. Reference: Sections 41850, 41852, 41853, 41857, 41858, 41863, and 41865 of the Health and Safety Code.

### **§80158. Annual Reporting Requirements for Conditional Rice Straw Burning Permit Program for the Sacramento Valley Air Basin.**

- (a) Beginning in 2002 and annually thereafter, the Basinwide Council shall submit to the ARB and CDFA, by July 15, a report on program implementation. The report shall include, but shall not be limited to, the following information, by county:
  - (1) General assessment of program operation.
  - (2) Total acres requested to be burned.
  - (3) Total acres determined by county agricultural commissioners to meet the terms and conditions for burning.
  - (4) Total acres approved for burning by the APCOs.
  - (5) Total acres burned.
  - (6) Total amount of planted acreage in the previous year.
  - (7) Total amount of planted acreage in the current year.
  - (8) Number of enforcement actions initiated for fraudulent inspections, and resolution of each.
  - (9) Total amount of fees charged by each county agricultural commissioner.

NOTE: Authority cited: Sections 39600, 39601, 41856, 41859, and 41865 of the Health and Safety Code. Reference: Sections 41850, 41852, 41853, 41857, 41858, 41863, and 41865 of the Health and Safety Code.

### **§80159. State Approval Procedures for Conditional Rice Straw Burning Permit Program for the Sacramento Valley Air Basin.**

- (a) The Executive Officer shall approve, approve with conditions, disapprove, or indicate intent to disapprove any program, portion of a program, or amendment of a program within 90 days after submittal by the Basinwide Council. Reasons for disapproval, conditional approval, or intent to disapprove shall be provided to the Basinwide Council in writing. The Basinwide Council shall resubmit an amended plan addressing the ARB's concerns within 90 days of the ARB's communication of disapproval, conditional approval, or intent for disapproval. If the Basinwide Council does not submit a program by March 1, 2001, or if the Executive

Officer has not approved a program submitted by the Basinwide Council by July 15, 2001, the Air Resources Board shall develop and adopt an alternative program. An alternative program shall be adopted by the Board at a public meeting in the Sacramento Valley Air Basin. An approved program may be amended by the Executive Officer with 90 days prior written notice to, and in consultation with, the Basinwide Council. The Basinwide Council may submit proposed program amendments to the Executive Officer for approval. The Executive Officer may request the submittal of program amendments from the Basinwide Council. No program, amendments, or portion thereof shall be implemented until approved in writing by the Executive Officer.

NOTE: Authority cited: Sections 39600, 39601, 41856, 41859, and 41865 of the Health and Safety Code. Reference: Sections 41850, 41852, 41853, 41857, 41858, 41863, and 41865 of the Health and Safety Code.



**APPENDIX B**

**HEALTH and SAFETY CODE SECTION 41865**



**HEALTH AND SAFETY CODE**

SECTION 41865. (a) This section shall be known, and may be cited, as the Connelly-Areias-Chandler Rice Straw Burning Reduction Act of 1991.

(b) As used in this section:

(1) "Sacramento Valley Air Basin" means the area designated by the state board pursuant to Section 39606.

(2) "Air pollution control council" means the Sacramento Valley Basinwide Air Pollution Control Council authorized pursuant to Section 40900.

(3) "Conditional rice straw burning permit" means a permit to burn granted pursuant to subdivisions (f) and (h).

(4) "Allowable acres to be burned" means the number of acres that may be burned pursuant to subdivision (c).

(5) "Department" means the Department of Food and Agriculture.

(6) "Maximum fall burn acres" means the maximum amount of rice acreage that may be burned from September 1 to December 31, inclusive, of each year.

(7) "Maximum spring burn acres" means the maximum amount of rice acreage that may be burned from January 1 to May 31 of the following year, inclusive.

(c) Notwithstanding Section 41850, rice straw burning in counties in the Sacramento Valley Air Basin shall be phased down, as follows:

(1) From 1998 to 2000, the maximum spring and fall burn acres shall be the following number of acres planted prior to September 1 of each year:

Year	Maximum Fall Burn	Maximum Spring Burn
	Acres	Acres
1998	90,000	110,000
1999	90,000	110,000
2000	90,000	110,000

(2) Notwithstanding paragraph (1), any of the 90,000 acres allocated in the fall that are not burned may be added to the maximum spring burn acres, provided that the maximum spring burn acres does not exceed 160,000 acres.

(3) Notwithstanding paragraph (1), the maximum acres burned between January 1, 1998, and August 31, 1998, shall be limited so that the total acres burned between September 1, 1997, and August 31, 1998, do not exceed 38 percent of the total acres planted prior to September 1, 1997.

(4) In 2001 and thereafter, the maximum annual burn acres shall be the number of acres prescribed in subdivision (i), subject to subdivisions (f) and (h).

(d) The number of allowable acres to be burned each day shall be determined by the state board and the air pollution control officers in the Sacramento Valley Air Basin and equitably allocated among rice growers in accordance with the annual agricultural burning plan adopted by the air pollution control council and approved by the state board.

(e) On or before September 1, 2000, the state board, in consultation with the department and the air pollution control council, shall adopt regulations consistent with the criteria provided in subdivisions (f) and (h). On or before September 1, 1996, an advisory group shall be established by the state board and the department to assist in the adoption of those regulations.

(f) Commencing September 1, 2001, the county air pollution control officers in the Sacramento Valley Air Basin may grant conditional rice straw burning permits once the county agricultural commissioner has determined that the applicant has met the conditions specified in subdivision (h). The county agricultural commissioner shall be responsible for all field inspections associated with the issuance of conditional rice straw burning permits. A conditional rice straw burning permit shall be valid for only one burn, per field, per year.

(g) The county agricultural commissioner may charge the applicant a fee not to exceed the costs incurred by the county agricultural commissioner in making the determination specified in subdivision (f). This subdivision shall be operative only until January 1, 2009.

(h) If the terms and conditions for issuing conditional rice straw burning permits specified in paragraphs (1) to (4), inclusive, are met, a conditional rice straw burning permit may be issued unless the state board and the department have jointly determined, based upon an annual review process, that there are other economically and technically feasible alternative means of eliminating the disease that are not substantially more costly to the applicant. The terms and conditions for issuing the conditional rice straw burning permits are:

(1) The fields to be burned are specifically described.

(2) The applicant has not violated any provision of this section within the previous three years.

(3) During the growing season, the county agricultural commissioner has independently determined the significant presence of a pathogen in an amount sufficient to constitute a rice disease such as stem rot.

(4) The county agricultural commissioner makes a finding that the existence of the pathogen as identified in paragraph (3) will likely cause a significant, quantifiable reduction in yield in the field to be burned during the current or next growing season. The findings of the county agricultural commissioner shall be based on recommendations adopted by the advisory group established pursuant to subdivision (e).

(i) (1) The maximum annual number of acres burned in the Sacramento Valley Air Basin pursuant to paragraph (3) of subdivision (c) shall be the lesser of:

(A) The number of 25 percent of each individual applicant's planted acres that are eligible for burning;

(B) A total of 100,000 acres planted in the Sacramento Valley Air Basin.

(2) Each grower shall be eligible to burn up to 25 percent of the grower's planted acres, as determined by the air pollution control officers in the Sacramento Valley Air Basin and subject to the maximum annual number of acres burned set forth in paragraph (1), if

the grower has met the criteria for a conditional rice straw burning permit.

(3) The air pollution control council shall annually determine which is the lesser of subparagraphs (A) and (B) of paragraph (1), and shall determine the maximum percentage applicable to all growers subject to the conditions set forth in subdivisions (f) and (h).

(4) A grower who owns or operates 400 acres or less who has met the criteria for the issuance of a conditional rice straw burning permit may burn his or her entire acreage once every four years, provided that the limit prescribed in paragraph (1) is not exceeded.

(5) Nothing in this subdivision shall permit an applicant to transfer, sell, or trade any permission to burn granted pursuant to this subdivision to another applicant or individual.

(j) The state board and the department shall jointly determine if the allowable acres to be burned, as provided in subdivisions (c), (f), and (h), may be exceeded due to extraordinary circumstances, such as an act of God, that have an impact over a continuing duration and make alternatives other than burning unusable.

(k) "Administrative burning" means burning of vegetative materials along roads, in ditches, and on levees adjacent to or within a rice field, or the burning of vegetative materials on rice research facilities authorized by the county agricultural commissioner, not to exceed 2,000 acres. Administrative burning conducted in accordance with Section 41852 is not subject to this section.

(1) (1) On or before September 1, 1992, the state board and the department shall jointly establish an advisory committee composed of 10 members to assist with the identification and implementation of alternatives to rice straw burning. Members of the committee shall be from the Sacramento Valley Air Basin, and the committee shall consist of two rice growers, two representatives from the environmental community, two health officials, two county supervisors or their designees, one member from the air pollution control council, and one member from the business community with expertise in market or product development. The committee shall meet at least annually. General Fund moneys shall not be used to support the committee.

(2) The committee shall develop a list of priority goals for the development of alternative uses of rice straw for the purpose of developing feasible and cost-effective alternatives to rice straw burning. These goals shall include, but not be limited to, research on alternatives, economic incentives to encourage alternative uses, and new product development.

(m) On or before September 1, 1998, the state board, in consultation with the department, the advisory committee, and the Department of Commerce, shall develop an implementation plan and a schedule to achieve diversion of not less than 50 percent of rice straw produced toward off-field uses by 2000. Off-field uses may include, but are not limited to, the production of energy and fuels, construction materials, pulp and paper, and livestock feed.

(n) On or before September 1, 1999, the state board and the department shall jointly report to the Legislature on the progress of the phasedown of, and the identification and implementation of alternatives to, rice straw burning. This report shall include an

economic and environmental assessment, the status of feasible and cost-effective alternatives to rice straw burning, recommendations from the advisory committee on the development of alternatives to rice straw burning, the status of the implementation plan and the schedule required by subdivision (m), progress toward achieving the 50 percent diversion goal, any recommended changes to this section, and other issues related to this section. The report shall be updated biennially and transmitted to the Legislature not later than September 1 of each odd-numbered year. The state board may adjust the district burn permit fees specified in subdivision (s) to pay for the preparation of the report and its updates. The districts shall collect and remit the adjustment to the state board, which shall deposit the fees in the Motor Vehicle Account in the State Transportation Fund. It shall be the goal of the state board and the department that the cost of the report and its updates shall not exceed fifty thousand dollars (\$50,000).

(o) The state board and the California Department of Food and Agriculture shall jointly collect and analyze all available data relevant to the air quality and public health impacts and, to the extent feasible, the economic impacts, that may be associated with the burning of rice straw pursuant to the schedule provided in subparagraph (1) of subdivision (c). On or before July 1, 2001, the state board shall submit a report to the Legislature presenting its findings regarding the air quality, public health, and economic impacts associated with the burning of rice straw pursuant to the schedule provided in paragraph (1) of subdivision (c).

(p) The Legislature hereby finds and declares as follows:

(1) Because of the requirements imposed by this section, rice straw that was previously burned may present, as solid waste, a new disposal problem.

(2) The state should assist local governments and growers in diverting rice straw from landfills by researching and developing diversion options.

(q) It is the intent of the Legislature that all feasible alternatives to rice straw burning and options for diverting rice straw from landfills be encouraged.

(r) This subdivision confirms that reductions in emissions from rice straw burning qualify for air quality offsets, in accordance with paragraphs (1) and (2).

(1) These credits shall meet the requirements specified in state law and district rules and regulations, and shall comply with applicable district banking rules established pursuant to Sections 40709 to 40713, inclusive. Districts are urged to establish banking systems in accordance with Sections 40709 to 40713, inclusive. The state board may adopt regulations to implement this subdivision, including, but not limited to, consideration of the seasonal and intermittent nature of rice straw burning emissions. In developing the regulations, the state board shall consult with all concerned parties. However, emission reduction credits that would otherwise accrue from reductions in emissions from rice straw burning shall not be affected or negated by the phasedown of burning, as specified in subdivision (c).

(2) Reductions in emissions achieved in compliance with subdivision (c) that are banked or used as credits shall not be

credited for purposes of attainment planning and progress towards the attainment of any state or national ambient air quality standard as required by state and federal law.

(s) (1) Any person who negligently or intentionally violates any provision of this article is guilty of a misdemeanor and is subject to a fine of not more than ten thousand dollars (\$10,000), imprisonment in the county jail for not more than nine months, or by both that fine and imprisonment. This subdivision applies only to agricultural burning in the Sacramento Valley Air Basin.

(2) Any person who negligently or intentionally violates any provision in this article is liable for a civil penalty of not more than ten thousand dollars (\$10,000). This subdivision applies only to agricultural burning in the Sacramento Valley Air Basin.

(t) Districts in the Sacramento Valley Air Basin shall impose fees on growers to cover the cost of implementing this section pursuant to Section 42311.

(u) To the extent that resources are available, the state board and the agencies with jurisdiction over air quality within the Sacramento Valley Air Basin shall do both of the following:

(1) Improve responses to citizen complaints, and, to the extent feasible, immediately investigate and analyze smoke complaints from the public to identify factors that contribute to complaints and to develop better smoke control measures to be included in the agricultural burning plan, keep a record of all complaints, coordinate among other agencies on citizens' complaints, and investigate the source of the pollution causing the complaint.

(2) Respond more quickly to requests for update from county air pollution control officers to help maximize burning days when meteorological conditions are best suited for smoke dispersion.



**APPENDIX C**

**CONDITIONAL RICE STRAW BURNING ADVISORY  
GROUP RECOMMENDATIONS**



# RECOMMENDATIONS FOR REGULATIONS ON CONDITIONAL RICE STRAW BURNING PERMITS

Prepared by

## THE ADVISORY GROUP ON CONDITIONAL RICE STRAW BURNING PERMITS

March 13, 2000

### BACKGROUND

Beginning in 2001, the Rice Straw Burning Reduction Act of 1991 limits the annual burning of rice straw to a specified amount of acreage and to only those fields covered by a conditional rice straw burning permit. Before the local Air Pollution Control Officer may issue such permits, the County Agricultural Commissioner must find that certain terms and conditions exist.

The Act also provides for an Advisory Group on Conditional Rice Straw Burning Permits. The Advisory Group is charged with providing assistance to the California Air Resources Board (CARB) in adopting regulations to govern the issuing of the permits.

The Advisory Group makes the following recommendations for regulations to implement procedures for the County Agricultural Commissioners' findings and the issuance of the conditional permits. These recommendations are guided by the requirements of the law for a determination of significant disease presence and a likelihood of significant, quantifiable yield loss. They are also guided by the need for a uniform and scientific basis for sampling and decision-making and by the need for a practical inspection application in order that the resources of the County Agricultural Commissioners are not exhausted.

### RECOMMENDATIONS FOR THE REGULATIONS

1. **Purpose** The purpose of the regulations is to provide for a uniform, scientifically based "Conditional Rice Straw Burning Permit Program." This program shall provide for the issuance of conditional rice straw burning permits when the terms and conditions of California Health and Safety Code (CH&SC) Section 41865 (h) are met. This program shall have the flexibility to adapt to changing disease conditions and scientific findings.

## 2. **Definitions**

- A. Qualifying disease – a rice disease, such as stem rot (*Sclerotium oryzae*), aggregate sheathspot (*Rhizoctonia oryzae-sativae*), and rice blast (*Pyricularia grisea*) which 1) may cause significant yield loss and 2) which the California Department of Food and Agriculture (CDFA) finds is controlled or effectively managed by the burning of straw and 3) which is not found to be a nonqualifying disease,
- B. Nonqualifying disease – A disease which CARB and CDFA, pursuant to CH&CS Section 41865(h), have jointly determined, based upon an annual review process, has other economically and technically feasible alternative means of elimination that are not substantially more costly to the conditional rice straw burn permit applicant.
- C. Field – a single discreet rice field, or a combination of rice paddies that are separated only by canals, ditches or roadways and are otherwise contiguous.

**Scope and Applicability** For purposes of efficiency and to provide for a public process that involves all interested parties such as rice growers, affected regulatory agencies, the environmental community, and the public, the regulations designate the Sacramento Valley Basinwide Air Pollution Control Council (BCC) as the agent to develop this program. The BCC shall include the program as part of its Annual Agricultural Burn Program (Smoke Management Program) for the Sacramento Valley. In developing and annually reviewing the program, the BCC shall consult with the interested parties named above and with CDFA, CARB, and the University of California. The program and its updates shall be subject to the review and approval of CARB and CDFA. CARB and CDFA shall coordinate their responsibilities under CH&SC Section 41865 (h) with the development of this program and its updates.

## 3. **Program Elements** The program shall contain the following elements:

- A. Procedures to ensure that the application for the County Agricultural Commissioner's determination of terms and conditions is separately documented from a conditional burn permit. The purpose of this separation is to ensure that the applicant obtains a permit from the APCO within his jurisdiction.
- B. Procedures for the County Agricultural Commissioner to use in establishing whether or not the permit applicant has violated provisions of CH&SC Section 41865 within the previous three years.
- C. Procedures for identifying the qualifying diseases, such as stem rot, aggregate sheath spot and rice blast, to which the Conditional Rice Straw Burning Permit Program will apply.
- D. An applicable definition for the term "growing season", which meets the needs of the program to identify disease conditions that may result in the findings required by CH&SC Section 41865 (h)(3) and (4) and takes into account the variability in disease manifestation and effects.
- E. Procedures for the County Agricultural Commissioners to opt to accept inspection documents from third parties, such as Pest Control Advisors, or from growers in making the disease findings required by CH&SC Section 41865(h)(3) and (4)
- F. Training requirements for third parties and growers who wish to conduct inspections and standards for the credentials and experience of those providing the training.
- G. Requirements for a specific and accurate description of any field proposed for burning, including a detailed map.

- H. Procedures for the selection and recording of field sampling sites, sample sizes, and disease incidence evaluations.
- I. Uniform procedures for the County Agricultural Commissioner to use in making the findings required by CH&SC Section 41865 (h)(3) regarding the significant presence of a pathogen and (h)(4) regarding yield reduction. Procedures shall include disease incidence and methods for determining how widespread the disease is in the field. Procedures may include other disease exacerbating factors as determined by CDFA.



## **APPENDIX D**

# **CONDITIONAL RICE STRAW BURNING ADVISORY GROUP SUGGESTED PROCEDURES AND REPORTING FORMS**



# PROCEDURE 1 – BIASED/NONBIASED COMBINATION

## RICE DISEASE INSPECTION FORM

Burn Year Commencing: September 1, 20\_\_\_\_

TEST PROGRAM – NOT AN OFFICIAL DOCUMENT - THIS IS NOT A PERMIT TO BURN

Grower Name: \_\_\_\_\_ Grower ID Number: \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip \_\_\_\_\_  
 Bus. Ph# (\_\_\_\_)\_\_\_\_-\_\_\_\_ Home Ph# (\_\_\_\_)\_\_\_\_ Fax (\_\_\_\_)\_\_\_\_

Total Planted Rice Acres: \_\_\_\_\_  
 Attach a map for each field showing collection sites. Refer to inspection procedures on the reverse side.

Field ID	Acres	Last Burn Date	Last Date Treated	Drain Date	Disease Percentage						Describe Disease(s) in Field	
					Loc 1	Loc 2	Loc 3	Loc 4	Loc 5	Loc 6		Avg

Signature of Inspector	Name of Agency
Name of Inspector	Address
Title of Inspector	
Date of inspection	PCA Lic # and categories
Rice Disease Identification Training Date _____	Rice Disease Training Certificate Number _____

## **PROCEDURE 1 – BIASED/NONBIASED COMBINATION RICE FIELD INSPECTION PROCEDURE**

528

- 1) Inspect the field for disease during the growing season – this includes the period up to and including harvest.
- 2) Select a focused inspection site where you see or suspect to find disease symptoms.
- 3) Select five additional inspection sites for the field, including at least one site on each of three sides, approximately mid-way from the corners, plus at least two others located at your discretion to represent the field. Note, in fields of 50 acres or less, select three additional sites, one from each of three sides of the field. Mark these sites on your field map. See figure below for an example.
- 4) At the focused site, cut 3 to 5 stems at ground level every 5 to 10 steps until at least 50 stems are collected. The pattern of collection can be circular or linear. Samples can be scored in the field and recorded or bagged and scored later.
- 5) At each of the other inspection site walk a minimum of 30 feet into the field before cutting any samples. Cut 3 to 5 randomly selected stems at ground level every 5 to 10 steps until at least 50 stems are collected. The pattern of collection can be circular or linear as long as sample collection is not biased. Samples can be scored in the field and recorded or bagged and scored later.
- 6) Score the 50 stems from each site to make a total of 300 stems (or 200 stems in the case of fields 50 acres or less). Score each stem for the presence or absence of disease symptoms. Record the percentage of plants infected at each inspection site. Record the average percentage of infection for the sites. (Note, do not consider disease severity, simply score for the presence or absence of disease symptoms.)

# PROCEDURE 1 – BIASED/NONBIASED COMBINATION INSPECTION

## RICE FIELD MAP

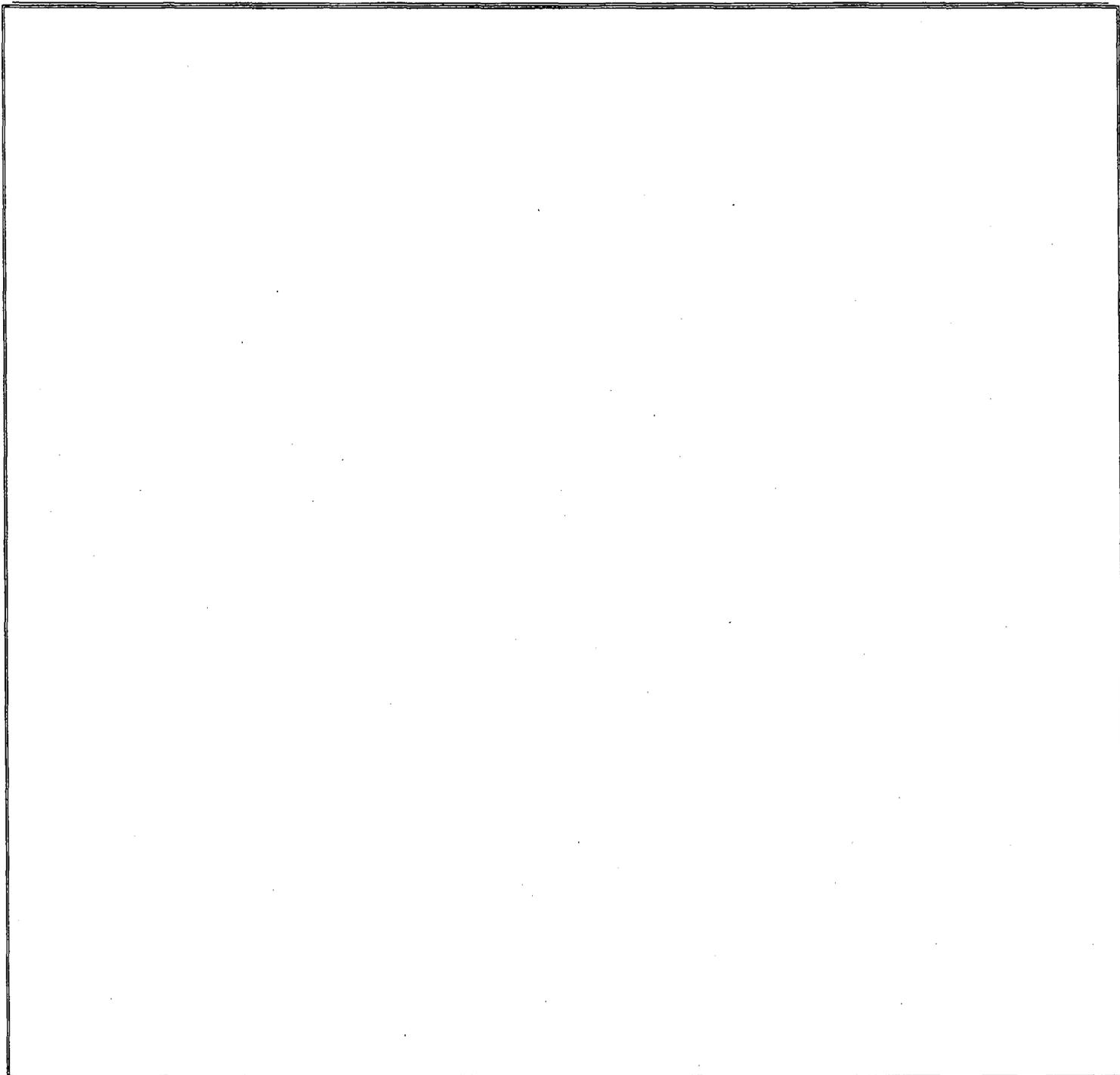
TEST PROGRAM – NOT AN OFFICIAL DOCUMENT – NOT A PERMIT TO BURN

Burn Year Commencing: September 1, 20\_\_\_\_

Application No. \_\_\_\_\_

Include closest road intersection, creeks, ditches and drains. Show areas where disease is found. Use "X" to show sampling sites. Identify biased sampling site.

N



## PROCEDURE 2 – SOIL INSPECTION

530

### SOIL SAMPLING PROCEDURE FOR DETERMINING THE SIGNIFICANT PRESENCE OF THE STEM ROT PATHOGEN IN RICE FIELDS

(TAKEN FROM WEBSTER, ET AL; HILGARDIA, VOL. 49, NO. 3, FEBRUARY, 1981)

#### BACKGROUND

SCLEROTIA OF *SCLEROTIUM ORYZAE* THAT SURVIVE VARIOUS CULTURAL PRACTICES AND EXIST IN THE SURFACE OF THE SEEDBED BEFORE FLOODING THE FIELD CONSTITUTE THE INOCULUM THAT CAUSES STEM ROT DISEASE IN THE CURRENT RICE CROP. INOCULUM LEVEL CAN BE EXPRESSED AS VIABLE SCLEROTIA PER GRAM OF SOIL. LOW INOCULUM LEVELS (0.07 VIABLE SCLEROTIA/GRAM OF SOIL OR LESS) ARE NOT LIKELY TO CAUSE SIGNIFICANT DISEASE. INOCULUM LEVELS ABOVE 0.3 VS/G ARE ASSOCIATED WITH SIGNIFICANT PRESENCE OF DISEASE AND ASSOCIATED SIGNIFICANT YIELD LOSS. INOCULUM LEVELS BETWEEN 0.08 VS/G AND 0.29 VS/G WOULD REQUIRE FURTHER DOCUMENTATION TO PROVE A SIGNIFICANT PRESENCE OF THE DISEASE LIKELY TO RESULT IN YIELD LOSS.

#### SAMPLE COLLECTION PROCEDURE

IN THE SPRING, AFTER SEEDBED PREPARATION IS COMPLETE AND BEFORE FLOOD-UP OF THE FIELD, COLLECT 8 TO 10, 200 GRAM TO 250 GRAM (APPROXIMATELY 8 OUNCES) SOIL SAMPLES FROM THE TOP 10 CM (4 INCHES) OF THE FINISHED SEEDBED. SAMPLES SHOULD BE TAKEN AT RANDOM FROM THE MOST DISEASE PRONE AREA OF THE FIELD, BUT FROM AN AREA NOT LESS THAN 2 ACRES.

#### DETERMINATION OF VIABLE SCLEROTIA PER GRAM OF SOIL

SOIL SAMPLES MUST BE SUBMITTED TO A QUALIFIED LABORATORY FOR DETERMINATION. THE METHOD USED TO DETERMINE INOCULUM LEVELS WAS BASED ON THE FACT THAT STEM ROT SCLEROTIA ARE HYDROPHOBIC AND BUOYANT AND FAIRLY UNIFORM IN SIZE. IN ADDITION, UPON GERMINATION ON WATER AGAR, THE FUNGUS IS EASILY IDENTIFIED. THE 8 TO 10 SOIL SAMPLES ARE AGGREGATED AND MIXED TO HOMOGENEITY. THREE 50 GRAM SAMPLES ARE TAKEN AT RANDOM FROM THE AGGREGATED SAMPLE, EACH PLACED IN A 400 ML BEAKER, COVERED WITH WATER AND LEFT TO SOAK OVERNIGHT. EACH SAMPLE IS BLENDED FOR 10 TO 15 SECONDS WITH 250 ML WATER, WASHED THROUGH A 20-MESH SCREEN AND THE MATERIAL COLLECTED ON A 100-MESH SCREEN. THE COLLECTED MATERIAL IS WASHED INTO A 400 ML BEAKER AND WATER ADDED TO 300 ML TOTAL VOLUME. AFTER STANDING FOR APPROXIMATELY 15 MINUTES, SCLEROTIA THAT HAVE FLOATED TO THE SURFACE ARE VACUUMED INTO A VACUUM FLASK AND FILTERED ONTO FILTER PAPER IN A BUCHNER FUNNEL. AFTER AIR DRYING, THE SCLEROTIA ARE BRUSHED INTO A PETRI DISH AND COUNTED UNDER A DISSECTING MICROSCOPE.

SCLEROTIA VIABILITY IS THEN TESTED BY PLACING 50 SCLEROTIA FROM EACH SAMPLE ONTO WATER AGAR PLATES CONTAINING STREPTOMYCIN SULFATE AND PENICILLIN G, EACH AT 3000 PPM, AND INCUBATING AT ROOM TEMPERATURE UNDER WHITE FLUORESCENT LIGHT FOR 12 DAYS. ONLY THOSE SCLEROTIA THAT GERMINATE ARE RECORDED AS VIABLE.

SEE REVERSE SIDE.

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For evaluation purposes, please provide the information requested below:

**How long did this inspection take? \_\_\_\_\_hour(s)\_\_\_\_\_minutes**

How long did it take to fill out the form on the reverse side? \_\_\_\_\_minutes.

Comments:

# PROCEDURE 3 – BIASED INSPECTION

## RICE DISEASE INSPECTION FORM

Burn Year Commencing: September 1, 20\_\_\_\_

TEST PROGRAM – NOT AN OFFICIAL DOCUMENT - THIS IS NOT A PERMIT TO BURN

Grower Name: \_\_\_\_\_ Grower ID Number: \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip \_\_\_\_\_  
 Bus. Ph# (\_\_\_\_)\_\_\_\_-\_\_\_\_ Home Ph# (\_\_\_\_)\_\_\_\_ Fax (\_\_\_\_)\_\_\_\_\_

Total Planted Rice Acres: \_\_\_\_\_  
 Attach a map for each field showing collection sites. Refer to inspection procedures on the reverse side.

Field ID	Acres	Last Burn Date	Last Date Treated	Drain Date	Disease Percentage						Describe Disease(s) in Field	
					Loc 1	Loc 2	Loc 3	Loc 4	Loc 5	Loc 6		Avg

\_\_\_\_\_  
Signature of Inspector

\_\_\_\_\_  
Name of Agency

\_\_\_\_\_  
Name of Inspector

\_\_\_\_\_  
Address

\_\_\_\_\_  
Title of Inspector

\_\_\_\_\_

\_\_\_\_\_  
Date of inspection

\_\_\_\_\_  
PCA Lic # and categories

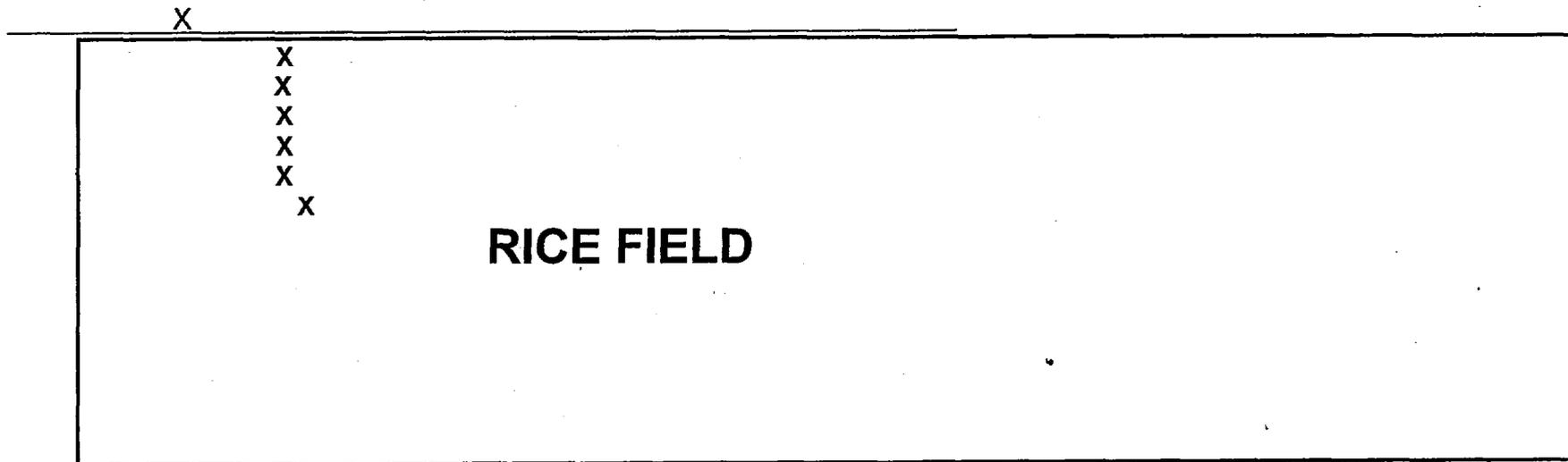
\_\_\_\_\_  
Rice Disease Identification Training Date

\_\_\_\_\_  
Rice Disease Training Certificate Number

### PROCEDURE 3 – BIASED INSPECTION RICE FIELD INSPECTION PROCEDURE

- 1) Inspect the field for disease during the growing season – this includes the period up to and including harvest.
- 2) Visually survey entire field from the perimeter and map field, indicating areas of visible decline; the map should reflect the approximate size of each of the diseased areas. Select a focused inspection site where you see or suspect to find disease symptoms and which is representative of the gross symptoms noted in the perimeter survey.
- 3) At the focused site, cut 3 to 5 stems at ground level every 5 to 10 steps until at least 100 stems are collected. The pattern of collection can be circular or linear but should include collection from across the entire diameter of the affected zone. Samples can be scored in the field and recorded or bagged and scored later.
- 4) Score the 100 stems for the presence or absence of disease symptoms. Record the percentage of plants infected. (Note, do not consider disease severity, simply score for the presence or absence of disease symptoms.)

#### Sampling Pattern (not to scale)



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For evaluation purposes, please provide the information requested below:

How long did this inspection take? \_\_\_\_\_hour(s)\_\_\_\_\_minutes

How long did it take to fill out the form on the reverse side? \_\_\_\_\_minutes.

Comments:

**PROCEDURE 3 – BIASED INSPECTION  
RICE FIELD MAP**

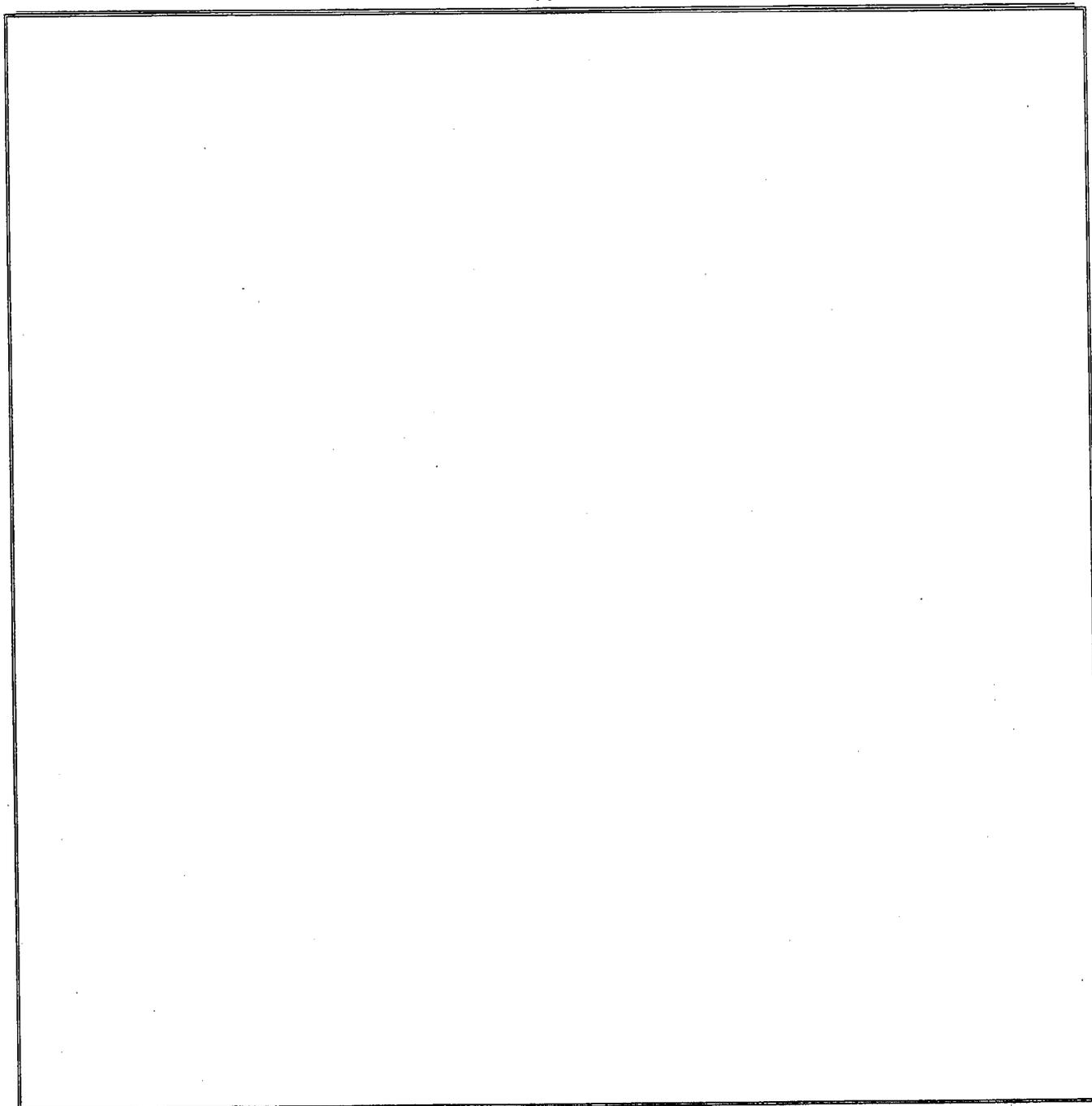
TEST PROGRAM – NOT AN OFFICIAL DOCUMENT – NOT A PERMIT TO BURN

**Burn Year Commencing: September 1, 20\_\_\_\_\_**

**Application No. \_\_\_\_\_**

Include closest road intersection, creeks, ditches and drains. Show areas where disease is found.  
Use "X" to show sampling sites.

N



S

# PROCEDURE 4 – VISUAL ASSESSMENT FOR STEM ROT

## RICE DISEASE INSPECTION FORM

536

**Burn Year Commencing: September 1, 20\_\_\_\_\_**

TEST PROGRAM – NOT AN OFFICIAL DOCUMENT - THIS IS NOT A PERMIT TO BURN

Grower Name: \_\_\_\_\_ Grower ID Number: \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip \_\_\_\_\_  
 Bus. Ph# (\_\_\_\_)\_\_\_\_-\_\_\_\_ Home Ph# (\_\_\_\_)\_\_\_\_ Fax (\_\_\_\_)\_\_\_\_\_

Total Planted Rice Acres: \_\_\_\_\_

Attach a map for each field showing inspection sites. Refer to inspection procedures on the reverse side.

Field ID	Acres	Last Burn Date	Last Date Treated	Drain Date	Extent of Stem Rot (Acreage estimate for each location identified on the attached map)							Describe Disease(s) in Field
					Loc 1	Loc 2	Loc 3	Loc 4	Loc 5	Loc 6	Avg	

I certify that there is significant presence of Stem Rot in the above-described fields that will likely cause a significant, quantifiable yield reduction in the current and/or next growing season.

\_\_\_\_\_  
Signature of Inspector

\_\_\_\_\_  
Name of Agency

\_\_\_\_\_  
Name of Inspector

\_\_\_\_\_  
Address

\_\_\_\_\_  
Title of Inspector

\_\_\_\_\_  
PCA Lic # and categories

\_\_\_\_\_  
Date of inspection

\_\_\_\_\_  
Rice Disease Identification Training Date

\_\_\_\_\_  
Rice Disease Training Certificate Number

## DRAFT

**VISUAL PROTOCOL FOR DETERMINING THE SIGNIFICANT PRESENCE  
OF THE STEM ROT PATHOGEN  
IN RICE FIELDS**

The first signs of stem rot in the field are lesions on the rice leaf sheath at the water level. These lesions increase in size, enlarging up and down the leaf and towards the center of the cull as the season progresses. The outer infected sheaths eventually die and slough off. When the infection spreads into the cull, the inner tissue turns dark brown to black and mycelia and sclerotia often become visible. Infections very early in the season kill tillers and inhibit panicle formation, thus reducing grain yield and quality. Lodging of infected plants may be evident later in the season. Later infections contribute greatly to the increase of inoculum and thus to the potential for losses in future crops. (source: IPM for Rice, Second Edition, UC)

**Visual Determination Protocol:**

Visual inspections and determinations will be performed by trained/certified personnel (inspector). A visual inspection shall consist of peripheral inspection of the entire field for macro symptoms and a micro symptom inspection of an area of choice in the field. A map shall be provided of the field that indicates the location and extent of macro symptoms and the location of the inspection for micro symptoms. A signed statement by the inspector as to the disease(s) present in the field likely to cause a significant, quantifiable reduction in yield shall be provided. Other documentation such as photographs or plant samples may be submitted. Verification of the determination by the County Agricultural Commissioner (CAC) shall be made at the discretion of the CAC.

- 5) Inspect the field for disease during the growing season – this includes the period up to and including harvest.
- 6) Visually survey entire field from the perimeter and map field, indicating areas of visible decline (macro symptoms<sup>1</sup>); the map should reflect the approximate size of each of the diseased areas. Select a focused inspection site where disease symptoms are apparent and that is representative of the gross symptoms noted in the perimeter survey.

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<sup>1</sup> Macro symptoms are any of the gross signs or conditions, visible on single plants or in parts of a planting, which indicate to the trained pest detector that one of the target pests or any other unusual pest may be present. Examples are: wilted or lodged plants, thin or bare spots in the field, yellowing of foliage, areas where weeds have overgrown the crop. (Adapted from the CDFA Plant Pest Detection Manual)

- 7) At the focused site, visually inspect at least five areas of the site, selected at random, for the presence or absence of disease micro symptoms<sup>1</sup>. (Note, do not consider disease severity, simply note the presence or absence of disease symptoms.) The pattern of inspection can be circular or linear but should include inspection across the entire diameter of the affected zone. A group of at least twenty adjacent stems at each area should be inspected. Estimate and record the percent of infected stems (disease incidence).
- 8) If necessary, repeat the procedure in step three for other areas of the field that exhibit macro symptoms.
- 9) Record the inspection results on the form provided.

**For evaluation purposes, please provide the information requested below:**

**How long did this inspection take? \_\_\_\_\_ hour(s) \_\_\_\_\_ minutes**

How long did it take to fill out the form on the reverse side? \_\_\_\_\_ minutes.

Comments:

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<sup>1</sup> Micro symptoms are signs or manifestations, seen when individual plants are handled and closely examined, which indicate that one of the target pests or any other unusual pest may be present. Examples are: stem, leaf sheath, or culm lesions; inner leaf sheath discoloration; outer leaf sheath sloughing, collapsed stems; presence of sclerotia; unfilled panicles. (Adapted from the CDFA Plant Pest Detection Manual)

**PROCEDURE 4 – VISUAL ASSESSMENT FOR STEM ROT  
RICE FIELD MAP**

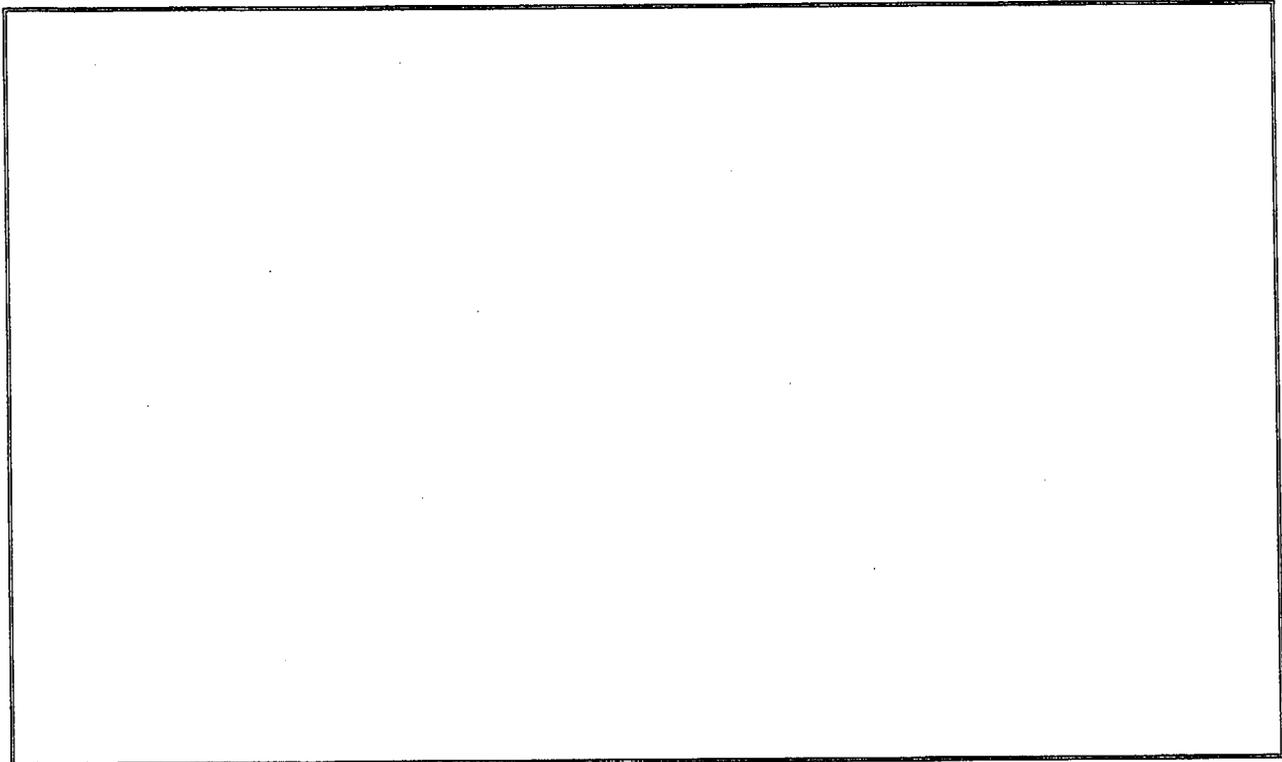
TEST PROGRAM – NOT AN OFFICIAL DOCUMENT – NOT A PERMIT TO BURN

**Burn Year Commencing: September 1, 20** \_\_\_\_\_

**Application No.** \_\_\_\_\_

Include closest road intersection, creeks, ditches and drains. Show areas where Stem Rot is found. Mark the location and extent of macro symptoms. Mark the location of micro symptoms.

N





**APPENDIX E**

**“DISEASE SIGNIFICANCE THRESHOLD”  
CALCULATIONS**



## DISEASE SIGNIFICANCE THRESHOLD CALCULATION

### Applicable Only to Stem Rot (*Sclerotium oryzae*) and Aggregate Sheathspot (*Rhizoctonia oryzae-sativae*)

#### Method for Determining the Disease Significance Threshold for Stem Rot and Aggregate Sheathspot for use in the Conditional Rice Straw Burning Permit Program

Summary: The objective is to satisfy the intent of Health Safety Code section 41865(h)(4) by correlating rice disease incidence level with a quantifiable estimate of an expected reduction in rice yield and a determination of “significant” reduction in yield. The threshold may be compared to the results of any inspection method that quantifies an estimate of percent of diseased plants in a field proposed for burning. It applies Dr. Robert Webster’s conclusions about the impacts of stem rot (disease severity level II or greater), to develop an estimated “brightline” determination of significant rice yield reduction for stem rot and aggregate sheathspot. This will provide the agricultural commissioners with a significance threshold (in terms of percent disease incidence) to compare to inspection reports submitted by applicants.

- Assumptions:
- 1) A uniform incidence of stem rot (severity level II or greater) throughout a field is expected to result in a 4 to 14 percent yield loss (R.K. Webster, pers. comm., 6/1/00). “Uniform incidence”, for the purpose of this method, is considered to mean 100 percent incidence across the total field proposed for burning. The midpoint of 9 percent will be used to characterize the 4 to 14 percent range for this calculation.
  - 2) Average estimated cost [C] and yield [Y] per acre of a typical rice field are expressed as 4-year (1996-99) rolling averages.  
(Data Source: UC Coop. Ext, 1998, Sample Costs to Produce Rice)
  - 3) The average yield of a typical rice field in the Sacramento Valley in 1992 [Y<sub>92</sub>] was approximately 85 hundredweight (cwt) per acre.
  - 4) The average revenue [R] per cwt of rice earned by the typical rice grower in the Sacramento Valley can be estimated and averaged over a 4-year period (1996-99) with each year calculated as follows:
 

$$\text{Market Price} + \text{Actual AMTA Subsidy} + \text{Actual MLA Subsidy}$$
  - 5) Aggregate sheathspot ecologically competes with stem rot in rice fields (R.K. Webster, pers. comm., 6/1/00). Therefore, for the purposes of this calculation, plants collected and determined to have either of the two diseases will be assumed to have equal impacts on yield.

## DISEASE SIGNIFICANCE THRESHOLD CALCULATION

**Applicable Only to Stem Rot (*Sclerotium oryzae*)  
and Aggregate Sheathspot (*Rhizoctonia oryzae-sativae*)**

**Procedure:** Step 1: Calculate average profitability per acre [P] for a typical rice field.

$$P = (R * Y) - C \Rightarrow \text{Assume } \$162 \text{ for this example.}$$

Step 2: Express profitability [P] in terms of cwt per acre.

$$P \text{ (cwt/acre)} = P/R \Rightarrow (\$162/\text{acre})/(\$14.00/\text{cwt}) \Rightarrow 11.6 \text{ cwt/acre}$$

Step 3: Calculate 10 percent profitability impact (PI) in terms of cwt/acre.

$$PI \text{ (cwt/acre)} = P \text{ (in cwt/acre)} * 0.10 \Rightarrow 1.16 \text{ cwt/acre}$$

Step 4: Calculate the significant impact level [SI] by expressing PI as a percentage of total yield per acre for a typical field in 1992 [Y92].

$$SI = PI / Y_{92} \Rightarrow (1.16 \text{ cwt/acre}) / (85 \text{ cwt/acre}) \Rightarrow 0.0136 \Rightarrow 1.36\%$$

Step 5: Estimate a stem rot and/or aggregate sheathspot disease incidence level expected to cause a 1.3 percent reduction in rice yield by extrapolating from assumption #1 (100 percent disease incidence causes a 9 percent reduction in yield). This generates a standard ratio equation with three known unit values and one unknown unit value. We are solving for the percent disease incidence level that we estimate to cause a 1.3 percent reduction in yield. This value becomes the disease significance threshold (X) or the “brightline” that the agricultural commissioners can evaluate inspection report results against.

$$\text{Ratio looks like: } (SI/X) = (9/100) \Rightarrow (1.36\%/X) = (9/100)$$

$$\text{To solve for X use the equation } X = (1.36 * 100) / 9 \Rightarrow 15\%$$

Therefore, the Stem Rot and/or Aggregate Sheathspot  
Disease Significance Threshold (X) = 15%

## DISEASE SIGNIFICANCE THRESHOLD CALCULATION

**Applicable Only to  
Neck Blast (*Pyricularia grisea*)**

### Method for Determining the Disease Significance Threshold for Rice Blast for use in the Conditional Rice Straw Burning Permit Program

Summary: The objective is to satisfy the intent of Health Safety Code section 41865(h)(4) by correlating rice disease incidence level with a quantifiable estimate of an expected reduction in rice yield and a determination of “significant” reduction in yield. The threshold may be compared to the results of any inspection method that quantifies an estimate of percent of diseased plants in a field proposed for burning. It applies Dr. Robert Webster’s conclusions about the impacts of neck blast to develop an estimated “brightline” determination of significant rice yield reduction for blast. This will provide the agricultural commissioners with a significance threshold (in terms of percent disease incidence) to compare to inspection reports submitted by applicants.

- Assumptions:
- 1) A uniform incidence of neck blast throughout a field is expected to result in a 75 percent yield loss (R.K. Webster, pers. comm., 7/13/00). “Uniform incidence”, for the purpose of this method, is considered to mean 100 percent incidence across the total field proposed for burning.
  - 2) Average estimated cost [C] and yield [Y] per acre of a typical rice field are expressed as 4-year (1996-99) rolling averages.  
(Data Source: UC Coop. Ext, 1998, Sample Costs to Produce Rice)
  - 3) The average yield of a typical rice field in the Sacramento Valley in 1992 [Y<sub>92</sub>] was approximately 85 hundredweight (cwt) per acre.
  - 3) The average revenue [R] per cwt of rice earned by the typical rice grower in the Sacramento Valley can be estimated and averaged over a 4-year period (1996-99) with each year calculated as follows:

Market Price + Actual AMTA Subsidy + Actual MLA Subsidy

## DISEASE SIGNIFICANCE THRESHOLD CALCULATION

### Applicable Only to Neck Blast (*Pyricularia grisea*)

**Procedure:** Step 1: Calculate average profitability per acre [P] for a typical rice field.

$$P = (R * Y) - C \Rightarrow \text{Assume } \$162 \text{ for this example.}$$

Step 2: Express profitability [P] in terms of cwt per acre.

$$P \text{ (cwt/acre)} = P/R \Rightarrow (\$162/\text{acre})/(\$14.00/\text{cwt}) \Rightarrow 11.6 \text{ cwt/acre}$$

Step 3: Calculate 10 percent profitability impact (PI) in terms of cwt/acre.

$$PI \text{ (cwt/acre)} = P \text{ (in cwt/acre)} * 0.10 \Rightarrow 1.13 \text{ cwt/acre}$$

Step 4: Calculate the significant impact level [SI] by expressing PI as a percentage of total yield per acre for a typical field in 1992 [Y<sub>92</sub>].

$$SI = PI / Y_{92} \Rightarrow (1.16 \text{ cwt/acre})/(85 \text{ cwt/acre}) \Rightarrow 0.0136 \Rightarrow 1.36\%$$

Step 5: Estimate a neck blast incidence level expected to cause a 1.36 percent reduction in rice yield by extrapolating from assumption #1 (100 percent disease incidence causes a 75 percent reduction in yield). This generates a standard ratio equation with three known unit values and one unknown unit value. We are solving for the percent disease incidence level that we estimate to cause a 1.36 percent reduction in yield. This value becomes the disease significance threshold (X) or the “brightline” that the agricultural commissioners can evaluate inspection report results against.

$$\text{Ratio looks like: } (SI/X) = (75/100) \Rightarrow (1.36\%/X) = (75/100)$$

$$\text{To solve for X use the equation } X = (1.36 * 100) / 75 \Rightarrow 1.8\%$$

Therefore, the Neck Blast Disease Significance Threshold (X) = 1.8%

**APPENDIX F**  
**ECONOMIC ANALYSIS WORKSHEETS**



**Conditional Rice Straw Burning Permit Program:  
Annual (Present Value) Cost Estimate for Initial Two Years (2001-2002)**

Agricultural Commissioner Section								Grower Section	
County	# Inspectors	% Inspect	Avg Hr Rate	% Fields	Insp Cost	Review Cost	Train Cost	Insp Cost	Total Cost
Butte	4	5%	\$50	18%	\$1,800	\$11,988	\$176	\$9,590	\$23,554
Colusa	6.5	5%	\$45	28%	\$2,520	\$16,783	\$257	\$14,918	\$34,479
Glenn	5	5%	\$45	16%	\$1,440	\$9,590	\$198	\$8,525	\$19,753
Placer	2	5%	\$56	3%	\$336	\$2,238	\$99	\$1,598	\$4,271
Sacto	3	5%	\$63	2%	\$252	\$1,678	\$166	\$1,066	\$3,162
Sutter	7	5%	\$30	21%	\$1,260	\$8,392	\$185	\$11,189	\$21,025
Tehama	1	5%	\$25	0.1%	\$50	\$33	\$22	\$53	\$159
Yolo	4	5%	\$53	5%	\$530	\$3,530	\$187	\$2,664	\$6,910
Yuba	5	5%	\$52	7%	\$728	\$4,848	\$229	\$3,730	\$9,535
<b>Total Program Cost:</b>					<b>\$8,916</b>	<b>\$59,081</b>	<b>\$1,518</b>	<b>\$53,333</b>	<b>\$122,848</b>
<b>Estimated Constants &amp; Factors</b>									
Total SVAB Fields				8000	fields	<b>Cost/Acre/Field Burned:</b>			\$0.98
Only 25% Fields Eligible for Burning				2000	fields				
Grower Time for Self- or Contracted-Insp				1	hour	<b>Cost/cwt/Acre:</b>			\$0.01
Avg Hourly Service Charged by PCA's				\$30	per hour				
Estimated Value of Grower Self-Inspection				\$20	per hour				
Ag Com Staff Turn-over Factor				1.1					
Ag Com Time for "Desktop" Review				2/3	hour				
Ag Com Time for Spot Check Insp & Travel				2	hours				
<b>Special Notes &amp; Assumptions</b>									
<i>Ag Com Training Cost Amortized over a 5-year Period with Following Assumptions:</i>									
- Full Staff Initially Trained (in 4-hour course).									
- 10% Staff Turn-over Requiring Initial Training (1.1 Factor on "Inspectors" Column in Calculating "Training Cost" Column).									
<i>Ag Com Staff Time to Conduct Tasks:</i>									
- "Desktop" Review of all Applications = 2/3 hours.									
- Spot Check Inspection Role in Field = 2 hours.									
<i>Grower Self-Inspections &amp; Contracted Inspections:</i>									
- Assumes 1/3 of Growers will Elect Self-Inspections and 2/3 of Growers will Elect PCA Contracted-Inspections.									
- Assumes Minimal Travel Time (as Compared to Ag Com Staff).									
Solano and Shasta Counties have No Affected Rice Acreage.									

**Conditional Rice Straw Burning Permit Program:  
Annual (Present Value) Cost Estimate for Year 2003 & Beyond**

550

Agricultural Commissioner Section								Grower Section	
County	# Inspectors	% Inspect	Avg Hr Rate	% Fields	Insp Cost	Review Cost	Train Cost	Insp Cost	Total Cost
Butte	4	5%	\$50	18%	\$1,350	\$9,000	\$176	\$6,393	\$16,919
Colusa	6.5	5%	\$45	28%	\$1,890	\$12,600	\$257	\$9,945	\$24,692
Glenn	5	5%	\$45	16%	\$1,080	\$7,200	\$198	\$5,683	\$14,161
Placer	2	5%	\$56	3%	\$252	\$1,680	\$99	\$1,065	\$3,096
Sacto	3	5%	\$63	2%	\$189	\$1,260	\$166	\$710	\$2,325
Sutter	7	5%	\$30	21%	\$945	\$6,300	\$185	\$7,458	\$14,888
Tehama	1	5%	\$25	0.1%	\$38	\$25	\$22	\$36	\$121
Yolo	4	5%	\$53	5%	\$398	\$2,650	\$187	\$1,776	\$5,011
Yuba	5	5%	\$52	7%	\$546	\$3,640	\$229	\$2,486	\$6,901
<b>Total Program Cost:</b>					\$6,688	\$44,355	\$1,519	\$35,552	\$88,114
<b>Estimated Constants &amp; Factors</b>									
Total SVAB Fields				8000	fields	<b>Cost/Acre/Field Burned:</b>			\$0.70
Only 25% Fields Eligible for Burning				2000	fields				
Grower Time for Self- or Contracted-Insp				2/3	hour	<b>Cost/cwt/Acre:</b>			\$0.01
Avg Hourly Service Charged by PCA's				\$30	per hour				
Estimated Value of Grower Self-Inspection				\$20	per hour				
Ag Com Staff Turn-over Factor				1.1					
Ag Com Time for "Desktop" Review				1/2	hour				
Ag Com Time for Spot Check Insp & Travel				1 1/2	hours				
<b>Special Notes &amp; Assumptions</b>									
<i>Ag Com Training Cost Amortized over a 5-year Period with Following Assumptions:</i>									
- Full Staff Initially Trained (in 4-hour course).									
- 10% Staff Turn-over Requiring Initial Training (1.1 Factor on "Inspectors" Column in Calculating "Training Cost" Column).									
<i>Ag Com Staff Time to Conduct Tasks:</i>									
- "Desktop" Review of all Applications = 1/2 hours.									
- Spot Check Inspection Role in Field = 1 1/2 hours.									
<i>Grower Self-Inspections &amp; Contracted Inspections:</i>									
- Assumes 1/3 of Growers will Elect Self-Inspections and 2/3 of Growers will Elect PCA Contracted-Inspections.									
- Assumes Minimal Travel Time (as Compared to Ag Com Staff).									
Solano and Shasta Counties have No Affected Rice Acreage.									