EPA-450/5-83-005a

EPA-450/5-83-005a

RESIDENTIAL WOOD AND COAL COMBUSTION

TASK 1

Summary of Current and Proposed
State and/or Local Regulatory Activities

DGA
DEL GREEN ASSOCIATES, INC.
TECHNICAL/MANAGEMENT CONSULTANTS

1155-C CHESS DRIVE, SUITE A, FOSTER CITY, CALIFORNIA 94404 (415) 574-4737
WOODBURN, OREGON DENVER, COLORADO

Summary of Current and Proposed State and/or Local Regulatory Activities Pertaining to Residential Wood and Coal Combustion

Prepared by:

DEL GREEN ASSOCIATES, INC.
Environmental Technology Division
P.O. Box 13446
Salem, Oregon 97309

Prepared for:

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Office of Research and Development
Research Triangle Park, NC 27711

Project Officer
Rayburn Morrison

February 1984

DISCLAIMER

This report was furnished to the Environmental Protection Agency by Del Green Associates, Inc., Environmental Technology Division, P.O. Box 13446, Salem, Oregon 97309, in partial fulfillment of Purchase Orders No. 2D3878YASA and 4D1274NASA. The contents of this report are reproduced herein as received from Del Green Associates, Inc. The opinions, findings, and conclusions expressed are those of the authors and not necessarily those of the Environmental Protection Agency. This report may be reviewed at EPA libraries, or may be obtained for a fee, from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

Publication No. EPA-450/5-83-005a

TABLE OF CONTENTS

	page
Executive Summary	1
Introduction	2
Residential Wood Combustion	3
General Regulations That Could Apply	3
Specific Regulations for Residential Wood Combustion	4
New England	4
Southwest	4
Pacific Coast	5
Colorado	6
Montana	8
Types of Regulations/Programs for Reducing the Impact of Residential Wood Combustion	8
Residential Coal Combustion	13
General Regulations	13
Specific Regulations That Prohibit or Restrict Residential Coal Combustion	14

Appendix I - Jackson County, (Oregon) Board of Commissioners Findings & Recommendations for a Particulate Control Strategy, Ordinance No. 82-6, Jackson County Board of Commissioners

Appendix II - Resolution No. 77-104-Pitkin County, Colorado (Aspen)

Appendix III - BeaverCreek Resort Company - Regulations

Appendix IV - Oregon Staff Reports - Amendments to Sulfur Content of Coal Rule

Appendix V - New Jersey State Air Laws - Subchapter 10 Sulfur in Coal

Appendix VI - Maine Air Pollution Laws - Section 603 Low Sulfur Fuel

Appendix VII - Telephone Contacts

LIST OF TABLES

		page
Table 1	Summary of Regulations for Woodburning Devices	11
Table 2	Summary of Existing Control Strategies	12
Table 3	State and Local Air Pollution Authorities Having Sulfur Content Limitations for Coal	15
Table 4	Typical Coal Characteristics	16

EXECUTIVE SUMMARY

Several areas of the country are experiencing significant increases in air pollution levels as a result of emissions from residential wood combustion. Areas identified in the West include parts of Alaska, Washington, Oregon, California, Nevada, Arizona, Colorado ,and Montana. Several of the New England states report increases in residential wood combustion, but these reported increases occur in rural areas where the concentration of homes with woodburners is not great enough to cause ambient standard violations. The most common regulations or programs dealing specifically with residential wood combustion involve restricting the number or type of new combustion units, prohibiting burning during air pollution episodes, and conducting public education campaigns. Several of the agencies contacted expressed interest in setting emission standards and using these to certify stoves, if and when sufficiently accurate source test data become available.

Residential coal combustion was not identified as a current problem. However, several areas now experiencing high levels of residential wood combustion are concerned about possible shifts to coal as wood becomes less available or more expensive. Oregon has recently placed restrictions on the sulfur and volatile matter content of coal sold or used, such that currently available coal is effectively banned. Two Colorado ski communities have totally banned residential coal combustion. Several metropolitan areas have also restricted the sulfur content of coal and effectively banned the residential use of coal, but apparently more as a general preventative measure than as a response to an imminent problem.

Numerous states have regulations that were designed to regulate industrial and commercial sources that could technically apply to individual residences. These regulations include opacity standards, total particulate (pounds per million BTU input), and sulfur dioxide (pounds sulfur dioxide per million BTU input). No areas reported using these regulations for residential combustion sources, however. A few states specifically exempt residential space heating from all existing regulations.

INTRODUCTION

With the rapidly rising prices of conventional fuels, several areas of the country are seeing a return to wood and coal use for residential space heating. Residential coal combustion in particular has been associated in the past with some of the most serious air pollution episodes recorded. Residential wood combustion is currently associated with a few areas having visibility impairment and excessive ambient particulate and carbon monoxide levels. The objective of this study is to review those state or local regulations that either directly or indirectly regulate residential coal combustion or residential wood combustion.

In order to determine which state and local air pollution agencies have applicable regulations, a number of information sources were used. The state regulations (as printed in the Environment Reporter) were briefly reviewed to determine the types of regulations that might apply. This review was by no means comprehensive because of time constraints. Numerous papers and project reports (believed to be essentially all the current literature) on the subject of residential wood combustion control strategies were reviewed. Based on the information from these two sources, each of the ten EPA regions were contacted to confirm that the known regulations were current, and to determine what other regulations were in effect or under development. State and local agencies then were contacted as necessary to follow leads and to resolve any questions. In addition to determining current regulations that affect residential coal and wood combustion, an attempt was made to determine areas which anticipate significant air pollution increases due to residential wood and coal combustion (RWCC) and may be addressing these sources in the near future.

RESIDENTIAL WOOD COMBUSTION

General Regulations That Could Apply

Almost all state and local air pollution regulations are designed to control emissions from industrial or commercial operations, not individual residences. Some of these regulations could technically be applied to some or all woodburning appliances, but are rarely if ever used in this way. The three types of regulations that could technically apply are total particulate emissions (pounds/million BTU), particulate concentrations (grains/standard cubic foot), and opacity.

Most states have regulations for total particulate emissions from "fuel burning equipment". The definition provided in each state's regulations determines whether or not the emission regulation applies to a specific piece of equipment. The state of South Dakota's definition is typical:

> "Fuel burning equipment, a furnace, boiler, apparatus, stack, or appurtenances to them used in the process of burning fuel or other combustible material for the primary purpose of producing heat or power by indirect heat transfer;"

By this definition, wood fired furnaces and fireplaces with heatolators would both technically be covered, since they use the heat from combustion gases to heat air that is then blown into the areas to be heated. Both these units would produce heat by indirect heat transfer, as would any other wood heating unit having heating chambers and fans to circulate the warmed air.

Particulate concentration regulations may be applied to fuel burning equipment in a few states. Compliance with these two regulations on particulate emissions cannot be determined without very expensive stack sampling (costing about $1,500 per test) which is clearly not practical for either an air pollution control agency or an individual homeowner. There was no indication from any of the people contacted during this study that these regulations are used for individual residences, nor are they projected to be used for residential wood combustion units in the near future.

Opacity regulations are more easily and inexpensively enforced, requiring only a certified observer and the time necessary to take the reading. The opacity regulations range from 20% to 40%, either averaged over a six-minute period or with a time exemption (i.e., 3 minutes per hour allowed above the opacity limit). These regulations are probably too stringent to apply to woodstoves. For example, the Alaska Department of Environmental Conservation estimates about 20-30% of the wood stoves cannot meet a 70% opacity standard due to the common practice of burning wet wood. One major disadvantage to opacity regulations is that they can only be

enforced during daylight hours, whereas most woodburning occurs after people return home from work. Again, none of the people contacted indicated general opacity regulations are being used for controlling emissions from individual residences.

In a few states, residential fuel burning is specifically exempted from all air pollution regulations. In some other states, the particulate emission limits only apply to larger units (i.e., greater than one million BTU/hr design capacity). However, most of the states do not specify exemptions for smaller units. No list of states exempting small units has been developed because a detailed, careful reading of each state's regulations and contact with each state would have been required. This was clearly beyond the scope of this project.

Specific Regulations for Residential Wood Combustion

Many areas across the country reported an increase in residential wood combustion and some scattered complaints by the public concerning wood smoke. In contrast to residential coal combustion, wood combustion has already become widespread in some sections of the country. Possibly because of the adverse public reception of regulations on residential wood combustion, the only areas actually regulating this source are those areas showing non-compliance with ambient standards and some ski areas dependent on the tourist trade. A discussion of those areas experiencing problems from high levels of residential wood combustion and their means of dealing with the resultant pollutants follows.

.New England

Residential wood combustion is common in New England, but occurs largely in rural areas. It has not yet been observed to contribute to non-attainment in the more populated areas, and no control strategies are known to be under consideration at this time. Vermont reports they are developing a public information program, but no formal control measures.

.Southwest

Albuquerque, New Mexico suspects residential wood combustion could be a major factor in their non-attainment status for carbon monoxide (CO) and Total Suspended Particulate (TSP), but has not completed the necessary studies to document this. They do have a voluntary program for curtailing fireplace use during high CO levels. A light signal atop a downtown building is used during November through January to indicate when driving and fireplace use should be limited (red light when CO levels above 13 ppm, flashing red when CO levels above 26 ppm on an hourly basis). Washoe County (Reno), Nevada reports that they feel residential wood combustion contributed to CO and visibility problems but doesn't expect to go beyond a public education program on proper burning practices and asking residents not to burn wood during high pollution levels.

.Pacific Coast

Fresno County, California has identified residential wood combustion as a significant contributor (10% of total) to the CO non-attainment status. The California Air Resources Board is just starting an emission testing program--they expect to develop control strategies in a year or more after the testing program is completed. These possible control strategies would then be available to Fresno.

Juneau and Fairbanks, Alaska have also experienced high particulate levels as the result of residential wood combustion. These areas do not get good ventilation and have approached the health hazard levels for particulate largely because of residential wood combustion. A state regulation has been passed effective November 1, 1982, which limits smoke emissions to 70% opacity for not more than 20 minutes per hour, but only during an "air quality alert". An "air quality alert" is defined for the purposes of this regulation as particulate levels predicted to exceed 375 $\mu g/m^3$. The highest level seen last winter was 305 $\mu g/m^3$.

One of the major problems identified by the Alaska Department of Environmental Conservation is the practice of burning green wood. They estimate 20-30% of residences would exceed the opacity limit, largely because of the firing of green wood. They are approaching this problem in two ways: by a public education program, and by working with the U.S. Forest Service to shift public wood gathering from the fall to the spring (about 60% of the firewood burned is from Forest Service land). In the past, the Forest Service only marked wood for gathering in the fall, with much of this wood burned the following winter without proper drying. The Forest Service is now doing some marking in the spring, and the Alaska Department of Environmental Conservation hopes to shift more of the marking activities to the spring.

The level of public acceptance and public interest in the Alaska program is not known at this time. There have been some newspaper articles on the subject, but no citizens came this past summer to the public hearing on the regulation.

Oregon has identified residential wood combustion as a significant contributor to non-attainment status (for secondary standards) in Medford and Portland. The Oregon Department of Environmental Quality is prohibited by state law from regulating residential heating and hence wood combustion, but is expected to try for authority to certify stoves in the upcoming state legislature session (January, 1983).

Jackson County (Medford) Board of Commissioners adopted an ordinance with the following:

- Mandatory weatherization for homes wishing to install woodstoves

- Alternate heat source required where woodstoves are installed

- Prohibit firewood use when suspended particulate exceeds 260 $\mu g/m^3$, except for those homes with no alternate heat source

- Require cost-effective weatherization at time of sale or rental, after January, 1984, if primary ambient particulate standards are not met.

The Jackson County ordinance plus an earlier document on proposed control strategies are included in Appendix I.

The Seattle area expects residential wood combustion to be identified as a major air pollution problem in ambient testing currently being completed. No control strategies will be developed until this happens.

.Colorado

Different areas in Colorado have enacted regulations affecting residential wood combustion. Most of these areas are ski communities where ventilation is poor and residential wood combustion is common.

Telluride, Colorado adopted an ordinance four years ago restricting new solid fuel burners to one per structure, no matter how many living units are in the structure (i.e., only one wood stove/fireplace in a 17-unit condominium). The success of this ordinance has not been evaluated, but it is thought to have helped. The area still has a serious air pollution problem, and is looking at further control strategies for this non-attainment area. The major control strategies under consideration are stricter insulation standards and protecting solar access, and requiring installation of clean burning stoves of not more than 50% greater emissions than the cleanest available combustion devices.

Pitkin County (Aspen), Colorado adopted ordinances in 1977 limiting the number of new fireplaces and requiring design standards for fireplaces including glass doors and outside combustion air (see Appendix II). Woodstoves were excluded because at the time it was not known how polluting they were compared to fireplaces, and the use of wood stoves was thought to be preferable to fireplaces because of their better efficiency. The City of Aspen did not adopt similar regulations because it was anticipated that very little additional growth would occur within city limits. The city is now proposing to regulate woodstoves in addition to fireplaces during their January 24, 1983, meeting. Public education is an important part of their program, and public acceptance is reported to be very high. Actual performance standards are much preferred by the City, and once reliable test

data is available (expected soon) the City intends to switch over to equipment performance standards.

Vail, Colorado passed an ordinance restricting the number of new solid fuel burning devices to one per dwelling unit, and placing restrictions similar to Pitkin County on fireplace construction. Voluntary curtailment is requested when either carbon monoxide levels or coefficient of haze index exceeds specified limits.

Snowmass Village, Colorado allows only one solid fuel burning device per dwelling unit. Also, only one unit is allowed per restaurant or lodge.

Beavercreek Resort Company (near Avon, Colorado) has adopted regulations for their new development including restrictions on fireplace construction, prohibitions on starting or continuing fires during adverse air pollution levels, a ban on woodstoves, and monitoring requirements for fireplaces. These regulations are to go into effect when 500 units are completed (not expected before fall, 1983). The elaborate monitoring equipment is possible since this is a development of very expensive homes. The specific provisions are included in Appendix III and are briefly listed here:

- Outside combustion air intake and glass doors for all fireplaces.
- Fireplaces cannot be installed without the permission of the company.
- Each fireplace is equipped with a heat sensor wired to the development's central communication system. Also, each fireplace must have a light connected to the central communication system, for notification to stop burning.
- No new fires can be started, or new wood added after the company orders burning stopped. This will occur when, in the Company's opinion, continued burning could result in violation of Colorado standards.
- Wood stoves are prohibited.
- Condominiums can have a maximum of one fireplace per three units.

Crested Butte, Colorado limits woodstoves to one per new building, provided the building meets very stringent insulation standards (the entire building must meet the standard of R-22, which requires night insulation or solar shades). This

strategy basically has stopped the air pollution levels from getting much worse, but is not improving the air quality. The City is keeping track of developments in stove performance and control strategies and may require further action in the future.

The Denver area is suspected of being significantly impacted by residential wood combustion. The necessary samples to "fingerprint" the contribution of wood smoke have been collected, but not yet analyzed.

A citizen panel has been appointed by the Colorado Air Quality Control Commission and is now evaluating control strategies for residential wood combustion. This study is due in January or February, 1983. Based on the results of this study, the state board will determine which, if any, of the strategies to adopt and where they should apply.

.Montana

Missoula, Montana has adopted some regulations on curtailment of burning at certain particulate levels. At a Stage 1 alert (150 $\mu g/m^3$), voluntary burning curtailment is requested. At a State 2 warning (300 $\mu g/m^3$), curtailment is mandatory. There were 12 or 13 Stage 1 alerts last year, and it is the County Health Department's feeling that there was some cooperation. Since most woodburning occurs after people get home from work (when it is dark), it is difficult to evaluate the level of cooperation. A limited survey in 1982 showed about 36% fewer households burned during the afternoon of a Stage 1 alert. However, the feeling is that this may be a low estimate, since relatively little burning is done in the afternoons and another survey shows higher levels of cooperation. In a 1980 survey, 70% of the respondents said they did not burn during alerts. The plan for a Stage 2 warning is to tell individuals who are burning to stop, and then to check after four hours to confirm that burning has stopped.

Types of Regulations/Programs for Reducing the Impact of Residential Wood Combustion Currently in Effect

Four major approaches to minimizing the impact of residential wood combustion were identified in this analysis. These are:

- Limiting the number of new burners installed.
- Setting design standards or emissions limits.
- Restricting burning during high ambient pollution levels.
- Public education or other voluntary programs to encourage proper operation of woodburning units, including burning properly dried wood.

The five Colorado ski communities all chose to limit the number of new fireplaces and/or wood stoves that could be installed. This approach is reported to be somewhat effective in reducing the increase in adverse impacts, but does not reduce the overall wood burning levels. Three of these communities also have design standards for fireplaces which make the units energy efficient. This has the effect of reducing overall space heating requirements, which could presumably reduce the amount of wood burned--however, the design standards have much more importance as an overall energy conservation strategy than in reducing air pollution levels.

Alaska is the one area with emission limitations. This lenient opacity standard only applies during very high particulate levels (375 $\mu g/m^3$) and has not yet been invoked. Opacity limits have the inherent weaknesses of: only being enforceable during daylight hours, whereas much burning occurs in the evening; needs certified observers; and involves enforcement against individuals. Several areas expressed interest in emission levels as a way to certify brands and types of woodburning devices, but not for individual units. Several groups are doing extensive stove testing now and in the future (Tennessee Valley Authority, Oregon Department of Environmental Quality, California Air Resources Board and U.S. Environmental Protection Agency). These new emission standards would probably be applied to new, not existing, units.

Five areas have either voluntary or mandatory bans on woodburning when air pollution reaches specific levels. Three of the areas, Alaska, Pitkin County, and BeaverCreek Resort Company (Colorado), have not yet invoked their regulations. Missoula, Montana has reached the triggering ambient levels for voluntary curtailment. A survey by them of 1,200 homes showed about one-third of the homes did stop burning wood during a period when voluntary curtailment was requested. As with the opacity standards, it is difficult to determine who is burning after dark, when much of the woodburning normally occurs. Jackson County, Oregon (Medford) adopted an ordinance requiring mandatory curtailment if 260 $\mu g/m^3$ particulate level is exceeded, effective 10/24/82.

Public education programs on proper burning techinques are common in areas with heavy wood burning. Missoula, for example, has an active program which includes pamphlets, a teacher's packet, public service announcements, and an active speakers bureau. Proper operating practices and proper storage and drying of wood are stressed. While the actual impact of such programs is difficult to quantify, they have the distinct advantage of a high level of public acceptance.

In addition to public education encouraging proper drying of wood, some areas are working with local foresters to shift

wood gathering activities to the spring. This allows enough time for the wood to dry before the following heating season, where fall firewood gathering does not allow enough drying time. This type of control strategy is relatively easy to enact, requiring only an interagency agreement between the air pollution control and forestry agencies. Obviously, it will be most effective in areas such as Oregon and Alaska that have public forest lands as the source of most firewood.

The only attempt to quantify the effectiveness of the various control strategies found during this study was the Missoula survey on voluntary curtailment. Other areas either have not fully enacted their programs, or reported simply that they thought their programs were slowing down the ambient air quality degradation. The Jackson County (Medford, Oregon) document on proposed control strategies does attempt to estimate the effect of the various strategies on ambient levels in that airshed--however, these strategies have not yet been tried and the actual impact is unknown.

A summary of the woodburning regulations by location is presented in Table 1, and by type of regulation in Table 2.

TABLE I

Summary of Regulations for Woodburning Devices

AREA	CONTROL MEASURES					COMMENTS
	Limit No. of Burners	Design Standards	Burning Curtailment Voluntary	Burning Curtailment Mandatory	OTHER	
Juneau and Fairbanks, Alaska	----	----	----	----	70% opacity for not more than 20 minute/hour when TSP > 375 $\mu g/m^3$	Public education and shift to spring firewood gathering are being pursued.
Telluride, Colorado	One solid fuel burner/new structure	----	----	----	----	----
Pitkin Cty, Colorado (Aspen)	One fireplace/new structure	Glass doors and outside air for combustion	----	----	----	Woodstoves exempt.
Vail, Colorado	One solid fuel burner/new structure	Glass doors, outside combustion air, heat transfer device	COH >1.085/2 hrs; CO> 9 ppm/8 hrs CO >35 ppm/1 hr	----	----	Woodstoves exempt now, but are expected to be included in the near future.
Crested Butte, Colorado	One burner/new structure	----	----	----	----	Extremely stringent insulation standards must be met.
Missoula, Montana	----	----	150 $\mu g/m^3$ TSP	300 $\mu g/m^3$ TSP	----	Major public education program.
Beaver Creek Resort Co. (Colorado)	One fireplace/three units for condominiums	Glass doors, outside combustion air	----	At company discretion	Woodstoves are prohibited because of excessive emissions	Each fireplace must have heat sensor, light connected to central communication center. When ambient air pollution levels are too high, light goes on and burning must stop.
Jackson County Oregon (Medford)	----	----	At 260 $\mu g/m^3$ TSP when air stagnation advisory issued	----	Alternate space heat source required for new stove installation. Cost-effective weatherization required upon house sale or rental	Weatherization and alternate heating system required.

TABLE 2

Summary of Existing Control Strategies

Control Strategy	Areas Using Control Strategy	Significant Advantages	Significant Disadvantages	Comments
Limit number of fireplaces/woodstoves	Colorado ski communities (5)	Restrict amount of burning that can occur	Does not reduce existing pollution levels	----
Require heavy insulation before woodburning device can be installed	Crested Butte, Colorado	Reduces heat requirements, should reduce total wood burned	Does not reduce existing pollution levels	----
Burning curtailment during air pollution episodes	Vail, Beavercreek, Missoula, Albuquerque	Directly reduces emissions during high ambient levels	Difficult to enforce since much of burning occurs after dark	May be voluntary or mandatory at specified levels of carbon monoxide, TSP, or coefficent of haze
Design standards - outside combustion air and glass doors	Aspen, Beavercreek, Vail	----	Mostly affects energy efficiency, no direct impact on emissions	----
Emission limits	Juneau and Fairbanks, Alaska	Should restrict burning of green wood during air pollution episodes	Difficult to enforce since much of burning occurs after dark	Limited to less than 70% opacity except for 20 minutes per hour, initiated when TSP levels are projected to exceed 375$\mu g/m^3$.
Public education	Vermont, Reno, Alaska, Oregon, Aspen[1]	Very well received by public	Impact on emissions uncertain; depends on public cooperation	Direct impact on emissions uncertain.
Forest Service - shift firewood gathering time to spring	Alaska	Will ensure wood burned has had time to be properly dried	----	----
Ban on woodstoves	Beavercreek Resort Company (Colorado)	Woodstoves emissions are considerably dirtier than fireplace emissions	----	Probably would not be well received in most communities.

[1] This is not expected to be a complete list of areas having public education programs on residential wood combustion.

RESIDENTIAL COAL COMBUSTION

None of the Regional or state offices contacted reported an existing air pollution problem with residential coal combustion. Only Region X and a few areas indicated any concern with a near term potential problem from widespread residential coal combustion.

Those areas now showing concern are those currently experiencing high pollution levels from residential wood combustion. The reason for this connection between a current wood combustion problem and fear of a future coal combustion problem appears to be the number of combination wood/coal burners being sold, and the fear that as the relative cost/availability of wood and coal changes, there will be a massive shift to coal. For example, the Oregon Department of Environmental Quality cites a recent issue of Wood and Energy journal containing 36 ads for solid fuel stoves, of which 27 were combination wood and coal burning units. (See Appendix IV). Another factor for those areas concerned about residential coal combustion is the difficulty already experienced in regulating a residential heating practice once it is established--clearly it is easier to prevent residential coal combustion from getting started than to try to stop it after coal burners have been installed and coal merchants geared up for this market. The one area that shows an increase in residential coal combustion is New England. However, no one contacted from that area indicated a serious air pollution problem is expected from coal combustion.

General Regulations

As discussed under the Residential Wood Combustion section, most states have regulations designed for industrial and commercial sources that could potentially be applied to residential coal combustion. The general types of regulations are:

- Limit on sulfur content for coal sold or used
- Opacity limits
- Particulate limits for indirect fired combustion sources (pounds particulate/million BTU input)
- Sulfur dioxide limits for indirect fired combustion sources (pounds sulfur/million BTU)
- Particulate concentrations (grains/standard cubic foot)

The last three regulations require expensive stack sampling to determine compliance. While emissions could be estimated using established emission factors and fuel analysis, such an estimation could not be used to actually determine violations. This ability to accurately determine violations at a "reasonable" cost

in money and effort is critical in evaluating possible regulations. Source tests for individual stove stacks clearly is not practical. No areas reported using these regulations on individual residences.

Opacity standards could be applied against residences, but are not reported to be used. Limiting the sulfur content of coal could be one means to at least limit the amount of sulfur dioxide emitted. Table 3 lists the states and local areas having sulfur content regulations for coal sold or used. Table 4 lists the sulfur content of different types of coal available in different areas for comparison purposes. As can be seen, the sulfur content regulations generally do not have the effect of banning coal, but rather encourage the use of cleaner coals. Appendices V and VI contain example coal content regulations for New Jersey and Maine, respectively.

Specific Regulations That Prohibit or Restrict Residential Coal Combustion

In some areas, the sulfur content has the effect of prohibiting the use of currently available coal. Oregon has one of the toughest regulations, and it is aimed directly at stopping residential coal combustion before it can become widespread. Wood stove sales have been extensive in the last five years. Over the next twenty years or so, wood availability is expected to decrease because of a leveling off and decline in logging activities (much of the firewood gathered is a by-product of such activities). At the same time, competition from other uses of slash (such as for pulp production) is expected to increase which will have the effect of raising the cost of firewood. While coal is not currently abundantly available in Oregon, major coal export facilities are under construction and it is expected that large amounts of coal from other Western states will start passing through Oregon. Because of the fear of a widespread switch from the scarcer, more expensive wood to coal, Oregon has set restrictions on coal such that currently available coal could not be used. Appendix IV includes the Oregon Department of Environmental Quality staff papers supporting adoption of this regulation.

Vail and Crested Butte, Colorado have also experienced adverse air pollution from residential wood combustion, and have banned any residential burning of coal. Aspen and Telluride (ski communities in Colorado) have also considered outright bans on residential coal combustion, in addition to the current limitation on the number of solid fuel burners (see Residential Wood Combustion discussion). All four of these communities depend on the natural beauty of their areas to attract tourists, and are very concerned about practices such as residential wood or coal combustion that could impair their attractiveness to tourists. Missoula, Montana, another area heavily impacted by residential

TABLE 3

State and Local Air Pollution Authorities
Having Sulfur Content Limitations for Coal

State/Local	Limitation
Region I	
Connecticut	1.0% sulfur - entire state
Maine	1.0% to 2.5% sulfur depending on location
Massachusetts	0.28 to 1.21 pounds sulfur/million BTU heat release protential, depending on location[1]
New Hampshire	1.5# sulfur/million BTU heat release (after 1970)
Rhode Island	0.55 pounds sulfur/million BTU heat release potential[2]
Vermont	2% sulfur
Region II	
New Jersey	0.2% to 1.0% depending on type of coal and location
New York	0.2% to 1.4% pounds sulfur/million BTU potential heat release depending on location
Region III	
Delaware	1% sulfur in New Castle County
Washington, D.C.	1% sulfur
Philadelphia	0.6% sulfur for existing units (10/01/80), 0.3% sulfur for new units
Region IV	
NONE	
Region V	
Wisconsin	1.11# sulfur/million BTU for southeast Wisconsin[3]
Region VI	
NONE	
Region VII	
Missouri	2.0% sulfur - St. Louis metropolitan area
Region VIII	
Utah	1.0# sulfur/million BTU
Region IX	
California	0.5% sulfur - San Francisco, Sacramento, and San Diego areas
Hawaii	2.0% sulfur
Region X	
Idaho	1.0% sulfur
Oregon	0.3% sulfur, 5.0% volatile content - Portland, Eugene-Springfield, Medford-Ashland, and Salem 1.0% sulfur for rest of state
Washington	Seattle area - 1.0% sulfur. Northwest area - 2.0% sulfur

[1] Corresponds to 0.35% to 1.5% sulfur content, assuming 12,500 BTU/pound coal.

[2] Corresponds to 0.7% sulfur content, assuming 12,500 BTU/pound coal.

[3] Corresponds to 1.4% sulfur content, assuming 12,500 BTU/pound coal.

TABLE 4

Typical Coal Characteristics*

COAL RANK				Coal analysis, bed moisture basis			
Class	Group	State	County	Volatile Matter	Ash	Sulfur	Btu
I. Anthracitic	1. Meta-anthracite	PA	Schuylkill	1.7	9.7	0.77	12,745
	2. Anthracite	PA	Lackawanna	6.2	11.9	0.60	12,925
	3. Semianthracite	VA	Montgomery	10.6	20.2	0.62	11,925
II. Bituminous	1. Low-volatile bituminous coal	W.VA	McDowell	16.6	5.1	0.74	14,715
		PA	Cambria	17.5	10.3	1.68	13,800
	2. Medium-volatile bituminous coal	PA	Somerset	20.8	10.2	1.68	13,720
		PA	Indiana	23.4	10.2	2.20	13,800
	3. High-volatile A bituminous coal	PA	Westmoreland	30.7	11.2	1.82	13,325
		KY	Pike	36.7	3.3	0.70	14,480
		OH	Belmont	40.0	9.1	4.00	12,850
	4. High-volatile B bituminous coal	IL	Williamson	36.2	11.7	2.70	11,910
		UT	Emergy	38.2	6.4	0.90	12,600
	5. High-volatile C bituminous coal	IL	Vermillion	38.8	9.0	3.20	11,340
III. Subbituminous	1. Subbituminous A coal	MT	Musselshell	32.2	7.0	0.43	11,140
	2. Subbituminous B coal	WY	Sheridan	30.5	3.7	0.30	9,345
	3. Subbituminous C coal	WY	Campbell	31.4	4.8	0.55	8,320
IV. Lignitic	1. Lignite A	ND	Mercer	26.6	4.2	0.40	7,255
	2. Lignite B						

* From The Direct Use of Coal - Prospects and Problems of Production and Combustion, Office of Technology Assessment, Congress of the United States, April 1979, page 57.

wood combustion, has attempted to pass a regulation patterned after Oregon's, but has not yet been successful. Washoe County (Reno), Nevada has been impacted by residential wood combustion and has expressed concern about possible switching to coal, but no regulations on residential coal combustion are being developed at this time.

APPENDIX I

Jackson County (Oregon) Board of Commissioners Findings & Recommendations for a Particulate Control Strategy

Ordinance No. 82-6

Jackson County Board of Commissioners

JACKSON COUNTY BOARD OF COMMISSIONERS
FINDINGS & RECOMMENDATIONS
FOR A PARTICULATE CONTROL STRATEGY
NOVEMBER 1981

Control Measures	Projected Air Quality Benefit (ug/m^3) 1984	1992
1. Trackout Controls	0.1	

a. A specific State or County trackout rule should be adopted and enforced to reduce trackout from construction sites, orchards and industrial operations. The rule should specify the responsibility of both the property owner and the vehicle owner or operator to prevent or clean-up trackout.

b. The City of Medford should increase enforcement of its existing ordinance (Medford Code 5-310) or adopt and enforce a more specific trackout ordinance.

2. Street Sanding/Sweeping 0.4

a. Airport fog seeding has major impact on the amount of winter sanding required in the Medford-Central Point area. Fog seeding practices (and the resulting sanding) should be evaluated from an air quality perspective by the Airport Commission.

b) The City of Medford and Jackson County generally limit winter sanding to only the necessary curves, intersections and overpasses. The State also sands some straightaway stretches. The City generally provides quick pickup of sanding material. The County and State generally sweep material off the roadway or allow the material to be dispersed by natural means. AQMA cities, Jackson County and the State should evaluate current street sanding and cleanup practices from an air quality perspective. Improvements should include greater emphasis by County and State on pickup rather than dispersal of road dust.

c) The City of Medford currently uses both a vacuum sweeper and a brush sweeper to pick up road dust in its routine street sweeping program. A six-month study has just begun in Portland to evaluate the air quality advantages/disadvantages of various types of sweepers. the City of Medford should review the results of this study (when available in late 1981) as imput to its long-range sweeping program.

Control Measures	Projected Air Quality Benefit (ug/m^3) 1984	1992
3. Paving Unpaved Roads	0.8	

a. The Medford Area Transportation Study recommends the upgrading of several roadways. If adopted, this would result in the elimination of some unpaved shoulders on portions of Stewart Avenue, McAndrews Road and other streets.

b. The City of Medford should develop an incentive program to pave existing unpaved streets. (A financial incentive program has been used in the past but the program needs to be modified. No funds were budgeted for 1981-82.)

4. Fugitive Emissions Control 1.6

Each industrial site shall develop and implement a plan for minimizing fugitive emissions, including trackout. The plans should be completed by October 1, 1981, and be implemented by April 1, 1982. DEQ should utilize the plan as a basis for compliance action.

5. Operation & Maintenance Program 0.9

Local industries and businesses shall cooperatively develop operation and maintenance (O&M) programs for particulate pollution sources and pollution control devices. Potential components of the programs are:

a. Personnel training in O&M (similar to cooperative boiler operators training course).

b. Seminars by manufacturers on design and O&M.

c. Compilation of preventative maintenance procedures, proper schedules, and maintenance records.

d. Sharing of common breakdowns, problems, etc.

e. Cooperative testing of pollution control units.

f. Compilation of correct operating procedures.

g. Coordinated approach to spare parts availability.

Control Measures	Projected Air Quality Benefit (ug/m^3) 1984	1992

The business and industrial sectors identified as requiring operation & maintenance programs:

- Wood products industry.

- Aggregate Industry.

- Residual oil burner operators.

- Small wood fired boiler operators.

The O&M coordination groups shall be formed by January 1, 1982. O&M standards shall be developed and implemented by July 1, 1982. A progress report shall be submitted from each group to DEQ by January 1, 1983.

6. Air Conveying System Mass Emissions Limit

DEQ should develop production-based mass emission limits for all air conveying systems as a tool in determining plant site emission limits.

7. Upgraded Veneer Dryer Controls — 1984: 0.2 — 1992: 0.7

Currently uncontrolled veneer dryers should be required to meet an emission limit of 0.3 lb/1000 ft^2 (3/8" basis) as an annual average, and 10 percent maximum opacity by January 1, 1984. If the AQMA remains in particulate noncompliance (primary standard), the existing controlled dryers to meet emission limit of 0.3 lb/1000 ft^2 (3/8" basis) as an annual average, and 10 percent maximum opacity upon replacement of existing control devices, or January 1, 1982, whichever occurs first.

8. DEQ Enforcement

DEQ should maintain adequate staff and resources to monitor and enforce the existing and proposed regulations, in terms of compliance date, emission levels, and equipment operation and maintenance.

9. Firewood Moisture Control — 3.3

A strong education program is needed on proper firewood seasoning. Variable firewood cutting

Control Measures	Projected Air Quality Benefit (ug/m^3) 1984	1992

fees should be used as incentives for Spring cutting to provide 6-8 months minimum seasoning prior to burning. The Forest Service and BLM should evaluate the identified alternatives and implement the most appropriate program for shifting wood cutting to the Spring months and making dry material available to the public. The effectiveness of this program should be evaluated by July 1, 1984.

10. Commercial Firewood Moisture Regulation — 0.9

The Forest Service and BLM should outline a specific program for commercial firewood cutting consistent with the objectives of #9 above. Greater flexibility in cutting times may be possible with commercial cutters because of the smaller number of persons and firewood sale areas involved. Oregon law requires firewood advertisements quoting a price to also express quantity in units of a cord or fractional parts of a cord. Ads must also identify the species of wood and whether the wood is unseasoned (green) or dry.

11. Wood Stove Design Standards — Several*

A testing methodology, emission standard and certification program should be established as soon as possible. An emission standard of 5 g/kg appears to be achievable. DEQ should develop the wood stove testing methodology, emission standards and certification program by January 1982. New stoves should be required to meet an adopted emission standard by January 1984 in order to be sold in Oregon.

12. Weatherization

Existing and new homes should be required to meet minimum weatherization standards in order to install a new wood stove. Weatherization standards should be based on the typical cost effective recommendations of energy audits: R-30 attic insulation, R-19 floor insulation, weatherstripping and possibly storm windows. See Energy Conservation Alternative #19 (attached).

Control Measures	Projected Air Quality Benefit (ug/m^3)	
	1984	1992

While developing this policy, the Board of Commissioners recognize that:

a. A County ordinance will be required to implement this control measure,

b. Two public hearings will be included in the ordinance process,

c. An exemption clause is needed for hardship cases,

d. Financial and energy audit assistance is available from utility companies,

e. Weatherization is an essential component of the particulate strategy,

f. Homes are generally more eligible for financial assistance if weatherized prior to the installation of a wood stove,

g. Installation of a wood stove before weatherization can result in an unnecessarily oversized stove.

13. Weatherization

A local program should be established with the goal of weatherization of all AQMA dwellings within five years. Energy Conservation Alternatives #1-14 (attached) should be implemented as soon as possible.

If satisfactory progress is not made on voluntary weatherization, and if the primary particulate standard is not attained by July 1, 1984, then a mandatory program should be implemented. Some possible provisions of a mandatory program are outlined in Energy Conservation Alternatives #15-18 and 20-22.

14. Wood Stove Operation

A strong education program is needed on proper stove operation. Brochures prepared in Portland and Missoula would be useful if modified to be

Control Measures	Projected Air Quality Benefit (ug/m^3) 1984	1992

specific for the Medford area. This information should be included in the firewood seasoning education program.

15. Installation Requirements (Stove Sizing)

As an information service the permit process for installation of a new wood stove should include an evaluation of proper stove sizing. A properly sized stove is essential for obtaining maximum benefit from weatherization and stove operation control measures.

16. Alternate Heat Source

New homes with a wood heating system should be required to have an alternate heat source. Due to the high potential for air pollution in the Medford area, the use of solar energy, electricity and natural gas for home heating should be encouraged.

17. Pollution Episodes

a. Residents of the Medford-Ashland AQMA should be requested to discontinue firewood use during air stagnation advisories if an alternate heat source is available. Firewood use should be prohibited when ambient levels of suspended particulates exceed the health standard (260 ug/m^3) unless no alternate heat source is available. Curtailment of wood stove and fireplace use should become mandatory for those having an alternate heat source on ASA-days if the primary particulate standard is not attained by July 1, 1984. — 2.8

b. In conjunction with the initiation of wood burning curtailment plan, the following curtailment plan for industry should be implemented: — 0.1

- 50% curtailment during particulate alerts;
- 75% curtailment during particulate warnings; and
-100% curtailment during particulate emergencies.

This curtailment plan package is the most practical and equitable for dealing with particulate pollution episodes and must be approved as a package rather than as single components.

Control Measures	Projected Air Quality Benefit (ug/m^3) 1984	1992
18. Open Burning		0.1

Open burning of nonagricultural waste in the Medford-Ashland AQMA should not be allowed on days when the maximum ventilation index (VI) is less than 400; open burning of agricultural waste should not be allowed on days when the maximum VI is less than 180. (About 160 days per year have VI greater than 400; about 240 days have VI greater than 180.) Open burning of nonagricultural wastes will not be allowed in the AQMA from December 1 to January 31. The public should be advised that open burning may also be restricted for substantial periods during the fire season (typically June to October) based on fire safety criteria.

19. Slash Burning

The Oregon Department of Forestry is responsible for the Oregon Smoke Management (SMP). The SMP regulates slash burning on all forest lands of the summit of the Cascades and portions of the Mt. Hood and Deschutes National Forest east of the Cascades. Other forest lands, some of which are relatively close to Medford and can cause slash burning impacts, are not subject to the SMP. Examples of such forest lands are the Winema National Forest (east toward Klamath Falls) and the Six Rivers, Klamath, Shasta-Trinity and Modoc National Forests (south in northern California).

a. The Forest Service, State Forestry or others involved routinely in the monitoring of slash smoke intrusions should document observed intrustions from forest lands outside the SMP area.

b. An inter-state agreement (or inter-region agreement between Regions 5 and 6 of the Forest Service) should be developed to insure that slash burning on public and private lands in northern California is managed to prevent smoke intrusions in the Medford-Ashland area.

c. The Winema National Forest (and private land within this area) should be included in the SMP area and subject to the SMP requirements.

Control Measures	Projected Air Quality Benefit (ug/m^3) 1984	1992

20. Energy Subsidy (Elderly Only)

Project Warm is a program, under ACCESS Inc., that provides free home weatherization to low-income citizens of Jackson and Josephine Counties with priority to senior citizens. It is funded through federal grants that are administered by the Oregon State Community Services Program. Project Warm provides evaluation of homes for energy saving weatherization needs and provides attic insulation, weatherstripping and caulking, storm windows, or minor roof repairs and hot water tank covers.

In addition to this weatherization program, some federal funds have been disbursed through ACCESS Inc. to pay for electricity, natural gas, oil or wood for low income families. Funding for these energy subsidies is questionable from year to year. It results in only temporary economic relief and no reduction in energy use.

It is recommended that funds formerly used for energy subsidies be used to strengthen weatherization programs such as that administered by Project Warm which result in permanent reductions in dollar cost, energy use and particulate emissions.

21. Retrofit Wood Stove Controls — Several*

Several add-on control devices are now being marketed which claim to increase efficiency, reduce particulate emissions and reduce creosote buildup. Costs range from $80 - $320. Further development is expected in the next few years.

A steel mesh filter retrofit device was tested by DEQ and showed some promise in reducing emissions. Another device which includes a catalytic combustion system will be tested by EPA in the next few months.

a. It is not recommended that retrofit control devices be required at this time.

Control Measures	Projected Air Quality Benefit (ug/m^3) 1984	1992
b. Research and development of retrofit control devices should be encouraged. Safety standards should be established for proper installation.		
22. Solar Access & Orientation	0.25	0.5-1.0*

The Medford-Ashland area is one of the best areas in the Pacific Northwest for utilization of solar energy. There can be a significant energy contribution from availale solar radiation by simply orienting structures properly, even if they are not specifically designed to utilize solar energy.

The Governor's Solar Task Force (1980) indicated that solar energy can contribute about 15% of a home's yearly space heating needs by simply orienting a new home to the sun and guaranteeing solar access. Optimum solar orientation for this area involves orienting the long axis of the structure on an east-west alignment and facing within 20 degrees east or 20 degrees west of true south.

The solar energy contribution would reduce fuel use and in the case of wood-oil or gas heated homes, would reduce particulate emissions. The "no-cost" modification of proper solar access and orientation has economic, energy and air quality benefits.

The siting of new homes in Jackson County should include consideration of proper solar orientation. Optimum solar orientation should be required where practicable. Property access to available solar energy should be protected. Education on passive solar energy options should be expanded.

ENERGY CONSERVATION ALTERNATIVES

EDUCATION

1. Establish an aggressive energy conservation marketing program outlining the energy, economic and air quality benefits of weatherization (e.g. Portland Energy Conservation Project, Seattle City Light Comprehensive Residential Weatherization Program).

2. Expand information on passive solar energy (e.g. SUNERGI, PP&L and other sources).

3. Expand advertising of existing low or no interest loan programs, tax credits, rebates, free weatherization for low income families (e.g. PP&L, CP National, Project Warm, Oregon tax credits and federal tax credits).

4. Establish a local "one-step" energy conservation center (e.g. Portland City's Energy Office, Seattle Home Insulation Programs Office).

INCENTIVES

5. Expand staff and services of existing utility weatherization programs to reduce delays and increase participation.

6. Provide state financial backing of no interest loans program available to all dwellings regardless of heat source.

7. Increase tax credit authorization for weatherization (e.g. HB2091); expand to include renters.

8. Establish an energy audit service available to all dwellings regardless of heat source (e.g. Residential Conservation Service as outlined in the National Energy Conservation Act of 1978).

9. Base energy conservation standards or energy audit recommendations on cost-effective (10-year payback) criteria (e.g. SB36).

10. Establish grants to elderly and low income for weatherization (e.g. SB37).

11. Modify and reinstate Oregon low interest loan programs (e.g. SB114).

TRANSITION: VOLUNTARY/MANDATORY

12. Establish advisory energy conservation standards for dwellings; review voluntary compliance after 2 years (e.g. HB2248).

13. Establish local policy to weatherize all dwellings within 5 years; review progress of voluntary program after 2½ years and establish mandatory program if necessary (e.g. Seattle City Light); hold public vote (e.g. Portland).

MANDATORY ACTIONS

14. Require energy audit including energy efficiency rating (EER) prior to sale of dwelling (e.g. Springfield).

15. Require weatherization to cost-effective level (10-year payback) prior to sale of dwelling (e.g. SB36, SB254).

16. Require energy audit prior to rental of dwelling.

17. Require weatherization to cost-effective level prior to rental of dwelling (e.g. SB36, SB254).

18. Require energy audit prior to installation of new wood stove.

19. Require weatherization of cost-effective level prior to installation of new wood stove.

20. Require weatherization of wood-heated dwellings to cost-effective level within 5 years.

21. Require weatherization of all dwellings to cost-effective level within 5 years.

22. Require weatherization of all dwellings to cost-effective level within 3 years.

Attachment 1

Jackson County Commissioners

RECOMMENDED PARTICULATE STRATEGY - SUMMARY

November 1981

Control Measure	Category*	% of Needed Reduction (18 ug/m^3)
1. Trackout Controls	S&RD	0.5
2. Street Sanding/Sweeping	S&RD	2.2
3. Paving Unpaved Roads/Shoulders	S&RD	4.4
4. Fugitive Emissions Control	S&RD/IC	8.7
5. Operation & Maintenance Program	IC	4.9
6. Air Conveying System Mass Emission Limit	IC	**
7. Upgraded Veneer Dryer Controls	IC	1.1
8. DEQ Enforcement	IC	**
9. Firewood Moisture Control	VB	18.0
10. Commercial Firewood Control	VB	4.9
11. Wood Stove Design Standards	VB	**
12. Weatherization (New Wood Stoves)	VB	30.6
13. Weatherization (Existing Homes)	VB	17.5
14. Wood Stove Operation	VB	**
15. Installation Req'ts (Stove Sizing)	VB	**
16. Alternate Heat Source	VB	**
17. Pollution Episode Curtailment	IC/VB	15.8
18. Open Burning Control	VB	0.5
19. Slash Burning Control	VB	**
20. Weatherization Grants (Elderly/Low Income)	VB	**
21. Retrofit Wood Stove Controls	VB	**
22. Solar Access & Orientation	VB	1.4
TOTAL		110% (20 ug/m^3)

* Categories: S&RD=Soil & RoadDust; IC=Industrial Controls; and VB=Vegetative Burning.

** A percentage reduction is not identified for these measures because:

a. The benefit cannot be precisely quantified;
b. Most of the benefit will occur after 1984; or
c. These measures have no direct benefit but are essential to the success of other measures.

AAD166.6A (1)(a)

BEFORE THE BOARD OF COUNTY COMMISSIONERS
STATE OF OREGON, COUNTY OF JACKSON

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
SEP 13 1982
AIR QUALITY CONTROL

ORDINANCE NO. 82-6

AN ORDINANCE PROVIDING FOR CLEANER AIR.

WHEREAS Jackson County finds that prevailing weather patterns in certain areas of the county tend to hold pollutants in the air; and,

WHEREAS smoke and dust are particulates which originate from many sources, and which tend to collect in the air shed of Jackson County; and,

WHEREAS Jackson County wishes to protect the general health, safety and welfare of its citizens by controlling the sources of particulate air pollution.

THE BOARD OF COUNTY COMMISSIONERS OF JACKSON COUNTY ORDAINS:

SECTION 1. TITLE

1.1 This ordinance shall be known as the "Particulate Air Pollution Control Ordinance of Jackson County" and may be so cited and pleaded, and shall be cited herein as "this ordinance".

SECTION 2. GENERAL DEFINITIONS

2.1 Air stagnation advisory: Forecast made by the National Weather Service for poor ventilation conditions.

2.2 Board: The Board of Commissioners of Jackson County.

2.3 Cost-effective level of weatherization: Minimum, cost-efficient standards of weatherization, including standards for materials and installation, which shall be set by the Director of Planning and Development. These standards shall reflect, but not exceed the levels defined in ORS 469.710 (2).

2.4 Medford-Ashland AQMA: That part of Jackson County, Oregon, specifically identified by the Oregon Department of Environmental Quality as an air quality maintenance area -- one of several areas in the state wherein air quality has deteriorated due to unhealthful levels of pollutants in the air. The map of the Medford-Ashland AQMA is attached to this ordinance as exhibit "A" and incorporated herein by reference.

Date Typed: 8/19/82

2.5 Open burning: Includes burning in burn barrels, incinerators, open outdoor fires, and any other burning wherein combustion air is not effectively controlled and combustion products are not effectively vented through a stack or chimney.

2.6 Particulate: Airborne particles ranging from .01 to 1,000 microns in size. These particles are inhaled during breathing and can be harmful.

2.7 Person: Includes individuals, corporations, associations, firms, partnerships, and joint stock companies.

2.8 Primary particulate standard: An average particulate concentration of 260 micrograms per cubic meter of air during a twenty-four hour period.

2.9 Proof of weatherization: Certification, receipts, contracts, or other such documents specifically listing weatherization steps taken by the homeowners, which may be reviewed by building inspectors at the time of solid fuel heating system installation.

2.10 Regulations: Regulations promulgated by the Board pursuant to this ordinance.

2.11 Residential building: An existing building used for permanent or seasonal habitation by one or more persons, containing four or fewer dwelling units, and constructed prior to January 1, 1979.

2.12 Residential woodburning: Utilization of a wood heating device inside a dwelling unit.

2.13 Spaceheating: Raising the interior temperature of a room or rooms.

2.14 Total suspended particulate level: Amount of particulate in ambient air.

2.15 Trackout: The deposition of mud, dirt and other debris on paved public roadways by motor vehicles; the material being so tracked onto public roadways. Trackout can become pulverized and blown into the air by vehicular traffic, where it becomes a part of the total suspended particulate level.

2.16 Ventilation index: The National Weather Service's indicator of the relative degree of air circulation for a specified area.

2.17 Waste: Discarded or excess material, including:

A) Agricultural waste resulting from farming or agricultural practices and operations.

B) Nonagricultural waste resulting from practices and operations other than farm operations, including industrial, commercial, construction, demolition and domestic wastes, and yard debris.

2.18 Wood heating devices: A stove, heater, fireplace, or other receptacle wherein wood is heated to the point of combustion.

SECTION 3. GENERAL EXEMPTIONS

3.1 This ordinance shall not apply:

A) Within incorporated limits of any city.

B) To federal or state lands.

C) To prescribed slash burns regulated by the Oregon State Smoke Management Plan.

D) To cooking fires or ceremonial fires.

SECTION 4. SEVERABILITY

4.1 If any portion of this ordinance is declared to be invalid by a court of competent jurisdiction, such invalidity shall be confined to the section to which such declaration of invalidity relates, and the remainder of this ordinance shall continue to be operative.

SECTION 5. WEATHERIZATION REQUIREMENTS FOR SOLID FUEL HEATING DEVICE INSTALLATION

The purpose of this section is to reduce the amount of particulate pollution resulting from residential woodburning for building heating. Most buildings constructed before 1979 were built to lower weatherization standards than buildings constructed since that date. A highly weatherized and insulated building will require less fuel to attain and hold a given temperature. It will produce less smoke pollution and will also result in a savings of the wood or other fuel resource. Additionally, weatherization prior to or at the time of installation of a solid fuel heating device will generally result in the selection of a device more appropriately sized for the building and will lessen the potential amount of smoke produced. Therefore:

5.1 The installation of a wood stove, fireplace, or any other form of solid fuel, space heating device is allowed if:

A) The space heating device is installed pursuant to the uniform building code and regulations of the Jackson County Department of Planning and Development.

B) The structure contains an alternate form of space heating, including natural gas, propane, electric, oil, solar, or kerosene, sufficient to meet necessary space heating requirements, so that during episodes of high pollution levels, the occupant will be able to heat the home with other than a solid fuel burning, smoke producing method.

C) The residence meets or is proposed to meet within 90 days the cost-effective levels of weatherization as defined in Section 2.3 of this ordinance.

SECTION 6. RESIDENTIAL WEATHERIZATION

The purpose of this section is to minimize particulate emissions from home heating devices by improving home weatherization and reducing energy loss. This section is also intended to encourage homeowners to make use of free energy audits and low-interest financing available from local utility companies. Information concerning free energy audit and low-interest financing programs is available from the Jackson County Department of Planning and Development or directly from the utility companies. It is the County's intent to advertise and make known programs which are already available for weatherizing homes and to assist citizens in taking advantage of those programs.

6.1 It is the goal of Jackson County to assist citizens to weatherize all residences to the cost-effective level by January 1, 1987.

6.2 All residences shall have received an energy audit prior to the time of sale or rental, and such information shall be made available to potential purchasers or renters as a condition of such sale or rental. This section shall become effective six months after adoption of this ordinance.

6.3 In January of 1984, if the primary particulate health standards are not being maintained, all homes with a wood heating system shall be weatherized to cost-effective levels at the time of sale or rental.

SECTION 7. RESIDENTIAL WOODBURNING

The purpose of this section is to reduce the amount of particulate pollution during periods of air stagnation or when pollution levels are critical. Periods of air stagnation occur at various times in a year and can create a severe accumulation of pollutants. Residential woodburning can contribute as much as 50 percent of the particulate pollution during these conditions.

7.1 The county shall, through its air quality information program, advise the public when air stagnation conditions exist or when suspended particulate health standards are exceeded or when suspended particulate health standards are projected to be exceeded.

7.2 The use of residential woodburning devices will be allowed within the air quality maintenance area except on days when it has been determined that the ambient air quality exceeds, or is projected to exceed, the 24-hour total suspended particulate health standard of 260 micrograms per cubic meter.

7.3) The use of residential woodburning devices is prohibited on each day that an air stagnation advisory announcement has been issued by the Department of Environmental Quality. This subsection takes effect on July 1, 1984, if the particulate health standard is not attained in the Medford-Ashland Air Quality Maintenance Area by that date.

7.4 Residences outside of the Medford-Ashland Air Quality Maintenance Area and residences having no other form of space heating are exempt from this section.

SECTION 8. TRACKOUT

The purpose of this section is to lessen the amount of particulate pollution which originates from roads and roadways. Dirt and other debris, which may become deposited upon paved roads, can be ground and pulverized by traffic into minute particles. These particles can then become airborne adding to the particulate pollution problem.

8.1 This section particularly applies to, but is not limited to, construction sites, farm operations, and commercial and industrial operations.

8.2 No person shall trackout mud, dirt or other debris from private or public lands onto paved public roads without taking reasonable precautions to prevent such particulate matter from becoming airborne. These precautions shall include, where appropriate, the prompt removal of such material from the paved road surfaces. This section does not apply to noncommercial uses of public roads.

8.3 No person shall violate the provisions of a stop-work order issued pursuant to subsection 8.4 of this ordinance.

8.4 The county may require the imposition of building permit conditions for the prevention of trackout. Conditions imposed may include, but are not limited to the following:

A) A bond of sufficient amount to be posted by the contractor to assure available funds for roadway cleanup by Jackson County if the contractor is negligent in cleanup of adjacent public roadway.

B) Street sweeping, vacuuming or other means of removing trackout material from public roadways.

C) Installation of wheel washers at exits of major construction sites.

D) Use of temporary or permanent barricades to keep traffic off unpaved areas.

E) Require graveling of access roads on site.

F) Limit the use of public roadways by vehicles.

G) Issue stop work order if trackout occurs and is not promptly corrected.

8.5 Stop work orders issued pursuant to subsection 8.4 of this ordinance shall be posted, where appropriate, at the work site, and mailed by certified mail to alleged violators. Appeals to any such orders shall be conducted pursuant to the provisions of Section 204 of the Jackson County Building Code.

SECTION 9. OPEN BURNING

The purpose of this section is to minimize the accumulation of particulate air pollution resulting from open burning. The public should be aware that open burning may be restricted during the fire season (typically June through October) by the fire districts or other fire regulating authorities. These authorities typically base restrictions of open burning on factors of low humidity, high winds, drought, or other conditions which make outside burning unsafe.

9.1 Open burning of nonagricultural wastes is prohibited in the Medford-Ashland Air Quality Maintenance Area from February 1 to November 30 of each year on days when the ventilation index is less than 400.

9.2 Open burning of nonagricultural wastes is prohibited during December and January of each year due to generally poor smoke dispersion.

9.3 Open burning of agricultural waste is prohibited on all days of the year when the maximum ventilation index is below 200.

SECTION 10. ABATEMENT

10.1 Persons acting in violation of provisions of this ordinance, or of permits issued, shall be subject to appropriate legal proceedings to enjoin or abate such violation(s).

SECTION 11. PENALTIES

11.1 Persons violating subsections 8.2, 8.3, 9.1, 9.2 and 9.3 shall be subject to civil prosecution pursuant to Jackson County Ordinance 81-81.

ADOPTED this 25th day of August, 1982, at Medford, Oregon.

JACKSON COUNTY BOARD OF COMMISSIONERS

Peter Sage, Chairman

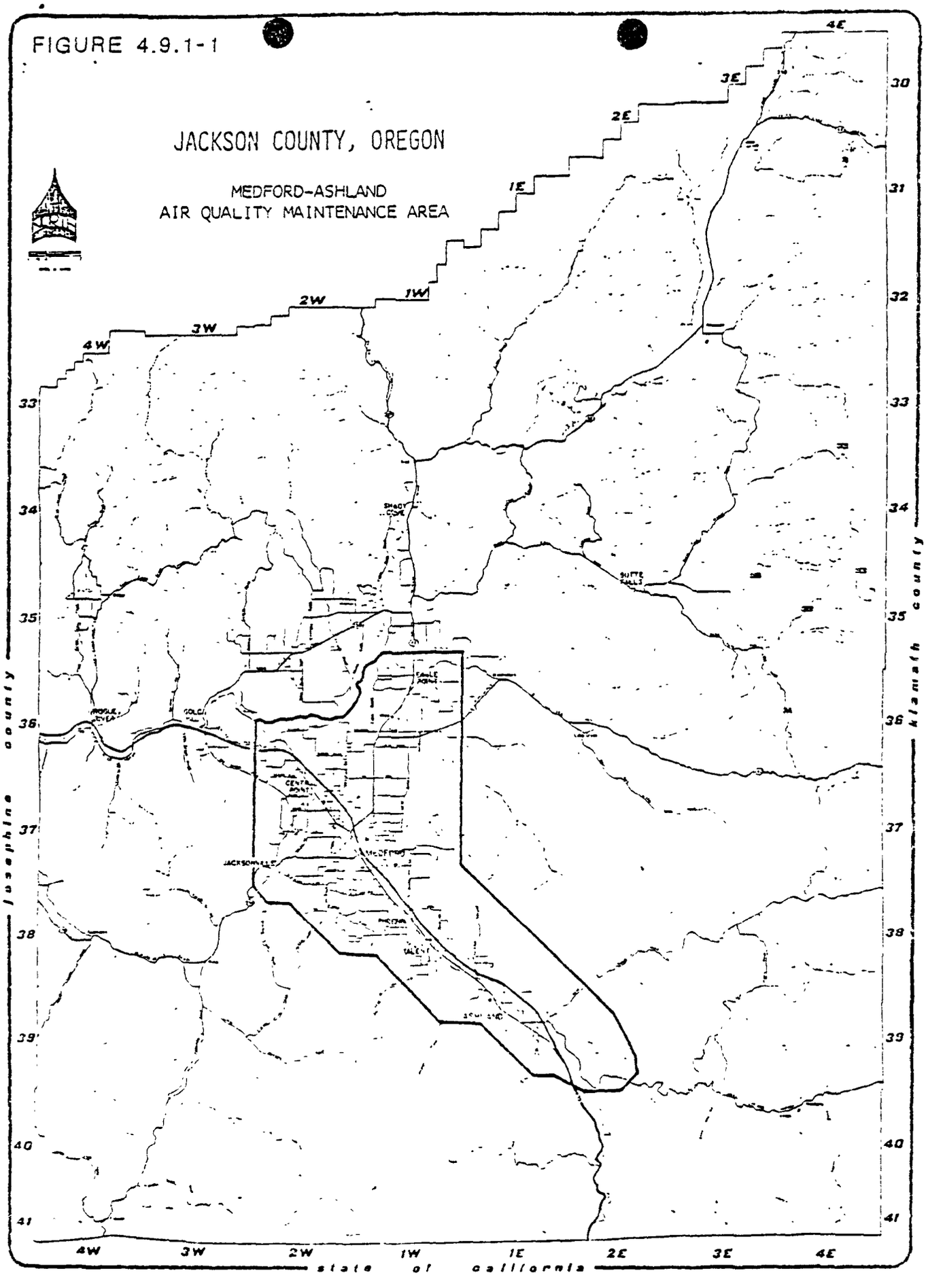
ATTEST:

Donna Blodick
By: Recording Secretary

APPROVED AS TO FORM:

County Counsel

FIGURE 4.9.1-1


JACKSON COUNTY, OREGON
MEDFORD-ASHLAND
AIR QUALITY MAINTENANCE AREA
4E
3E
2E
1E
1W
2W
3W
4W
30
31
32
33
34
35
36
37
38
39
40
41
josephine county
klamath county
state of california

APPENDIX II

Resolution No. 77-104-Pitkin County, Colorado
(Aspen)

RESOLUTION OF THE BOARD OF COUNTY

COMMISSIONERS OF PITKIN COUNTY, COLORADO,

ADOPTING VARIOUS LOCAL AMENDMENTS TO

THE UNIFORM BUILDING CODE, 1976 EDITION

Resolution No. 77- 104

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
DEC 20 1977
AIR QUALITY CONTROL

WHEREAS, the Board of County Commissioners desires, for the benefit of the residents of Pitkin County, to adopt various amendments to the 1976 edition of the Uniform Building Code pursuant to the authority and procedures established in C.R.S. 1973, Section 30-28-204,

NOW, THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Pitkin County, Colorado, that the 1976 edition of the Uniform Building Code adopted by this Board's Resolution No. 77-82 with amendments, be further amended, by

1. The addition of Section 3708 to Chapter 37 ("Masonry or Concrete Chimneys, Fireplaces and Barbecues") to read as follows:

Section 3708 Regulation of Number and Construction of Fireplaces

(a) The number of fireplaces that may be constructed is hereby limited to the following:

(1) Single family dwelling...one fireplace per dwelling unit.

(2) Hotel, motel, inn, lodge...one fireplace per lobby or guest entertainment room; no fireplaces in guest rooms.

(3) Restaurant or bar...one fireplace per restaurant or bar or restaurant/bar combined.

(4) Duplex or tri-plex...one fireplace per unit provided that each unit has 1,000 square feet or more of internal heated floor area with no fireplaces in smaller units.

(5) Four-plex and all other multi-family structures ...one fireplace per 3500 square feet of internal heated floor area to be allocated among the units to be constructed.

(b) All fireplaces shall be constructed such that their operation will increase heat energy supplied to the living area in quantities greater than that lost through air exchange during combustion; and, in addition, be constructed in conformance with any design standards that may be promulgated (or

approved) by the County Engineer which are designed to increase heat energy supplied.

(c) The term "fireplace" as used herein includes a conventional masonry fireplace, a prefabricated zero clearance fireplace, and any similar fireplace whose operation requires it to be built into the structure as a component of the building. Radiant room heaters, heating stoves and similar appliances designed for space heating purposes are not included within the definition of "fireplace" and are not subject to the limitations set forth in subparagraph (a) of this subsection.

2. The addition of subsection (h) to Section 7006 ("Grading Permit Requirements") to read as follows:

(h) Other provisions of this Chapter 70 to the contrary notwithstanding, no permit required herein for excavation, grading, and earthwork construction, including fills and embankments, shall issue if the work is to be done in preparation of the construction of improvements or establishment of a use which is not in conformance with all land use regulations of Pitkin County. In the event that the Building Inspector is unable to determine whether a permit shall or shall not issue under the provisions of this section, he shall direct the applicant to supply those plans and specifications described in Section 7006 (c) hereof requiring as additional information thereon all improvements and uses proposed for the site in anticipation of which the excavation, grading, earthwork construction, including fills and embankments, is to be done.

Approved by the Board of County Commissioners at its regular meeting held August 22, 1977.

Michael Kinsley
Chairman

ATTEST:

E G Stewart
Deputy County Clerk

APPROVED AS TO FORM:

PITKIN COUNTY FIREPLACE DESIGN STANDARDS

INTRODUCTION

The common masonry and free standing fireplace used to heat homes, lodges, etc., produce little more than an aesthetic effect since the combusion of wood and other combustible materials in these devices usually results in a net heat loss rather than a heat gain.

The common fireplace that has changed little in its design over the years is totally out of place in an age where fossil fuels are becoming increasingly scarce and where improved insulation has made it possible to heat homes more efficiently to conserve the dwindling fuel supply. A fireplace in a modern home or lodge allows heat to escape in large quantities thereby defeating the purpose of adequate insulation and efficient heating devices.

Heat losses from fireplaces can be divided into four components. These include: heat loss in exhaust gas up the chimney; heat loss due to infiltration of cold air; heat loss from the fire box; and heat loss from the chimney.

The largest amounts of heat are lost in exhaust gasses and infiltration of cold air. Lesser amounts through the fire box and chimney.

DESIGN STANDARDS

There are predominantly three types of fireplaces. These types include the masonry fireplaces, zero clearance and the free standing metal fireplaces with slight variations in all three types.

There are several methods which the designer can employ to reduce heat loss from fireplaces. The following design standards have been adopted to reduce heat loss through the above-mentioned areas:

I. Masonry and Zero Clearance Fireplaces

A. Doors

All masonry and zero clearance fireplaces shall be designed with glass or other fire resistant material doors to prevent room air from being drawn up the chimney. Glass doors also reduce the amount of cold air infiltration.

B. Heat-o-lators

All masonry fireplaces will be designed to accommodate any one of the several types of Heat-o-lators currently available. Heat-o-lators effectively use the heat energy to heat air circulated around the fire box. This heat would otherwise be lost through the fire box.

C. Combusion Air

All masonry fireplaces shall be designed with an air duct that will provide other than room air for combustion. A normal duct size would be approximately 4" in diameter.

D. In addition to the above standards all masonry and zero clearance fireplaces shall meet all building code requirements.

II. Free Standing Fireplaces

Most free standing fireplaces are as inefficient as the masonry fireplace. Some modification that will improve efficiency can be made. Those modifications include:

1. Installation of glass doors
2. Draw combusion air from other than the space being heated.

Because modification is difficult on free standing fireplaces, no free standing fireplace with an efficiency rating of less than 40 per cent will be permitted. If no efficiency rating is available then the above modifications must be completed before the unit is installed.

The above standards are subject to change as technology progresses and new methods become available that will further improve the heating efficiencies of the above mentioned heating units.

APPENDIX III

BeaverCreek Resort Company
Regulations

3.12 Environmental Monitoring Function: The Resort Company may monitor air and water quality in Beaver Creek to determine trends, to detect violations of state pollution laws and may control and enforce fireplace construction and utilization pursuant to regulations promulgated by the Resort Company from time to time and in accordance with Declarant's Mountain Development Plan as in effect from time to time, a copy of which shall be kept in the offices of the Resort Company.

3.18 Right to Make Rules and Regulations: The Resort Company shall be authorized to and shall have the power to adopt, amend and enforce rules and regulations applicable within Beaver Creek with respect to any Facility or Function, and to implement the provisions of this Declaration, the Articles of Incorporation or Bylaws of the Resort Company, including but not limited to, rules and regulations to prevent or reduce fire hazard; to prevent disorder and disturbances of the peace; to regulate pedestrian and vehicular traffic; to regulate animals; to regulate signs; to regulate use of any and all Facilities to assure fullest enjoyment of use by the persons entitled to enjoy and use the same ; to promote the general health, safety and welfare of persons within Beaver Creek; and to protect and preserve property and property rights. All rules and regulations adopted by the Resort Company shall be reasonable and shall be uniformly applied, except such rules may differentiate between reasonable categories of Sites, Owners, Leasees, Subowners, or Guests. The Resort Company may provide for enforcement of any such rules and regulations through reasonable and uniformly applied fines and penalties, through exclusion of violators from Facilities or from enjoyment of any Functions, or otherwise. Each Owner, Leasee, Subowner and Guest shall be obligated to and shall comply

with and abide by such rules and regulations and pay such fines or penalties upon failure to comply with or abide by such rules and regulations and such unpaid fines and penalties shall be enforceable in accordance with Section 5.4.

7.2 Land Use Restrictions: In addition to the restrictions found in this Section VII, all or any portion of the Property to be sold or leased by Declarant shall be further restricted in its use, density or design according to one or more Supplemental Declarations of Land Use Restrictions for Beaver Creek recorded with the Clerk and Recorder of Eagle County, Colorado, prior to the time Declarant transfers or conveys any such Property to the Resort Company or to any third party.

7.5 No Noxious or Offensive Activity: No noxious or offensive activity shall be carried on upon any Property nor shall anything be done or placed on any Property which is or may become a nuisance or cause any significant embarrassment, disturbance or annoyance to others.

7.8 No Annoying Lights, Sounds or Odors: No light shall be emitted from any Property which is unreasonably bright or causes unreasonable glare; no sound shall be emitted from any Property which is unreasonably loud or annoying; and no odor shall be emitted from any Property which is noxious or offensive to others.

7.13 Restriction on Fireplaces: Except as permitted in writing by the Review Board there shall be no fireplaces in any Lodge or dwelling unit (as that term is defined in the Master Plan). Each fireplace built shall have an outside air intake and be provided with glass doors at the hearth except as otherwise authorized in writing by the Review Board. No fireplace shall be operated during periods of adverse meterological conditions or adverse air

pollution conditions as determined by the Resort Company. There shall be no fireplaces permitted in any building or structure other than those specifically set forth in this Section 7.13.

PROPOSED

REGULATIONS

REGARDING THE CONTROL

OF

FIREPLACE BURNING

IN

BEAVER CREEK

Pursuant to the authority granted to the Beaver Creek Resort Company in the Amended and Restated General Declaration for Beaver Creek, Eagle County, Colorado, including but not limited to the provisions of paragraphs 3.12, 3.18, 7.2, 7.3, 7.8 and 7.14, and in order to control fireplace burning and to ensure that all owners, subowners and guests of Beaver Creek may enjoy the use of fireplaces without violating the Colorado Air Pollution Control Division's air quality standards, the Board of Directors hereby adopts the following regulations:

I. REGULATION: Every fireplace shall be equipped, at the owner's cost, with a flue temperature switch with a form C contact, wired to the central communication system terminal location within the building. Said switch shall be maintained in working order at owner's expense at all times.

REASON: The flue temperature switch will detect fireplace operation.

II. REGULATION: A red pilot light shall be mounted, at the owner's expense, on or immediately adjacent to each fireplace and wired to the central communication system terminal location within the building. Said pilot light shall be maintained in working order at owner's expense at all times.

REASON: The pilot light will advise the dwelling unit owner, subowner or guest to stop fireplace burning whenever in the Resort Company's opinion, continued burning may violate State Air Pollution Control Division standards.

III. REGULATION: When the fireplace pilot light is activated, the owner, subowner or guest is prohibited from starting a new fire. If the owner, subowner or guest already has a fire burning in his fireplace and the pilot light is activated, the owner, subowner or guest is prohibited from adding fuel to the fire.

REASON: Fireplace pilot lights will be activated when, in the judgment of the Resort Company or the Eagle County Environmental Health Officer or his designated representative, the level of particulate matter concentration in the Beaver Creek Air Shed is in danger of exceeding the State Air Pollution Control Division's allowable concentration.

IV. REGULATION: In the event that a new fire is started in a fireplace while the fireplace pilot light is lighted or an existing fire in a fireplace is not extinguished within three hours of the lighting of the fireplace pilot light, (a) Resort Company personnel may enter the premises in which such fireplace is located and extinguish the fire, and (b) a fine shall be levied against the owner, subowner and/or guest of the dwelling unit or commercial space in which the fireplace is located in accordance with the following schedule:

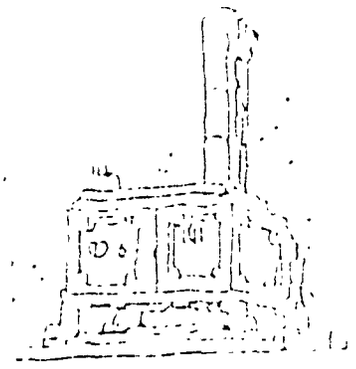
1st offense	warning
2nd offense	$100
3rd offense	$250
4th offense	$500

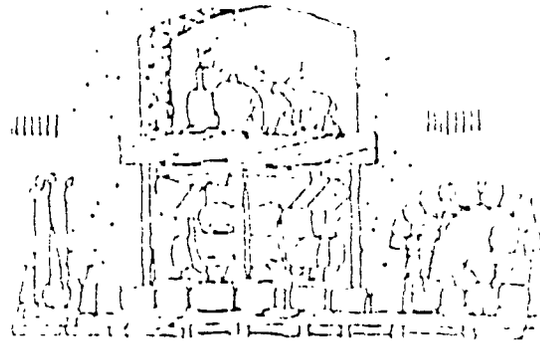
REASON: The Resort Company must ensure that the visitors and residents of Beaver Creek may enjoy the use of fireplaces without violating the Colorado Air Pollution Control Division's air quality standards.

V. AMENDMENT: These regulations may be amended at any time by the Resort Company's Board of Directors if such amendment is approved by the Colorado Department of Health.

EXCERPT FROM DESIGN REVIEW BOARD GUIDELINE

FIREPLACES AND WOOD STOVES





Each fireplace shall have a flue temperature sensor device and an indicator light, both of which are connected to the Beaver Creek Communications Center. The flue temperature sensor will inform the Communications Center whether the fireplace is in operation, and the indicator light will allow the Communications Center to provide an alert when the burning is not allowed.

All fireplaces shall be a type determined by the Beaver Creek Resort Company to be the most efficient with regard to operating and emission standards. Fireplaces shall have glass doors, outside combustion air supply, and heat conveying features.

Due to high level emission levels, wood burning stoves are prohibited without written approval of the Beaver Creek Resort Company.

Condominiums shall have a maximum of one fireplace or wood stove per three units, unless a written variance is obtained from the Design Review Board. The Design Review Board shall allocate the number of fireplaces allowed within hotel and lodge rooms.

All fireplace allocations shall be obtained in writing from the Design Review Board.

APPENDIX IV

Oregon Staff Reports--
Amendments to Sulfur Content of Coal Rule

VICTOR ATIYEH
GOVERNOR

Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207
522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. F , October 9, 1981, EQC Meeting

Request for Authorization to Hold a Public Hearing to add Amendments to Sulfur Content of Fuels, Coal, Rule, 340-22-020, to Limit Sulfur & Volatile Content of Coal Used for Residential Space Heating

Background

The recent increase in use of wood as a residential heating fuel and the associated air quality impacts have led the Department to an in-depth study of the potential impact of similar increases in coal use. This matter has been researched by the Department for over 1 year, aided by the input of a Coal Health Effects Review Committee. This committee was composed of doctors and medical officials representing prominent national, state and local health agencies. The findings and recommendations of the Health Committee are contained in Attachment 1. The Portland Air Quality Advisory Committee also studied this issue and their recommendations are contained in Attachment 2. Both groups recommended banning use of coal as a residential heating fuel in problem airsheds.

Evaluation

The findings of the Health Committee and the Department may be summarized and evaluated as follows.

Coal Use Potential

A. Coal is presently being imported to Oregon from western and eastern states and almost 1% of Oregon households now use it as a space heating stove fuel.

B. The potential for much greater use of coal as a residential space heating fuel in Oregon exists considering:

1. Many Oregonians are recognizing solid fuel space heating as a desirable practice with 15% of households burning wood as a primary heat source and another 39% as a secondary heat source.

2. Readily available wood fuel is becoming scarce with prices topping $100 per cord in the Portland area and cutting permits backlogged or not available in several areas including the Mt. Hood & Zig Zag Districts.

3. Coal, as a residential heating fuel, is becoming more attractive than wood because of its low price, availability, low chimney fire potential, and far less bulkiness and ability to burn numerous hours without recharging when compared to wood.

4. Coal conversion units for wood stoves are starting to be marketed along with new coal stoves and, for example, 27 of 36 stove ads in the nationally acclaimed Wood and Energy Journal were for combination coal/wood heaters. The largest Oregon wood stove manufacturer, in fact, now markets a coal stove model, and several others are developing coal grate inserts for existing wood stoves. See Attachment 3.

5. Coal is projected to be entering Oregon in much larger quantities in the near future with imminent construction of coal export terminals and conversion of large pulp mill power plants to coal firing.

6. Future pricing of space heating fuels is expected to significantly increase the shift towards solid fuels as a residential heat source, considering 1) natural gas deregulation is expected to raise Oregon rates 66%; 2) inverted electric rates will provide a major incentive to cut down electrical consumption; 3) present oil prices make it the highest cost fossil fuel with no price reduction expected in the future.

7. Coal developers are searching out means to expand the residential coal supply in consideration of abundant domestic coal reserves. Residential coal prices are also expected to remain substantially below other conventional energy sources because of the abundant reserves.

Air Quality Impacts

A. Available information on residential coal heaters indicate total particulate emissions are as high as present wood heaters. Sulphur dioxide emissions from coal burning are much greater than from wood and can be about 3 times those allowed by Oregon rules for residential fuel oil. Polycyclic organic matter, which includes potential carcinogens, from residential coal units is higher than from wood burning units and up to 4 orders of magnitude greater than from industrial and electric generating facilities which have optimum combustion conditions and control equipment.

B. Detailed projections of air quality impacts from various residential coal use scenarios were developed for the Health Effects Advisory Committee (Appendix 2 of Attachment 1) based on present 1% household coal use, a nominal 5% household use, and a 54% household use based on all projected wood heating households in 1987 converting to coal. The results, using the Portland airshed as a model, indicated:

1) Total particulate and SO_2 impacts due to plume downwash in neighboring property could substantially contribute to violation of national health standards.

2) Areas of existing high air pollution could experience unacceptable increases of total particulate, sulphur dioxides, sulfates and polycyclic organic matter in the middle to high range of projected coal use.

3) Significant increases in soiling, odors and visibility loss and other nuisance conditions would be expected to occur.

Health Effects

A. Residential coal burning has been associated with the most severe air pollution episode in the world, the notable London "smog" of 1952.

B. Although not posing nearly the threat to health as cigarette smoking, the Coal Health Effects Review Committee concluded that increased residential coal burning would: 1) hinder efforts to attain existing health standards; 2) cause acute lung symptoms for some citizens; 3) cause an unacceptable increase in polycyclic organic matter (potential carcinogens).

C. The Health Effects Review Committee unanimously recommended that DEQ prohibit coal burning in residential urban areas, especially those experiencing poor ventilation. The Portland Air Quality Advisory Committee made a similar recommendation.

Control Alternatives

A. Do nothing until problem actually becomes severe. This was considered unacceptable to the Committees' and the Department since it was considered preferable to prevent new air quality problems and to lessen the economic impact on small businesses and individuals by imposing regulations before major investments in equipment and marketing systems for residential coal use were developed.

B. Ban residential coal use. This was considered unacceptable to the Department since it would provide no incentive or latitude for industry to develop clean burning residential coal which didn't excessively pollute. Outright banning of residential coal use may also be subject to legal challenge considering present statutory provisions.

C. Develop emission standards for new coal burning devices. This was considered unacceptable by the Department since it could not address the use of coal in existing stoves and would not address the sulphur dioxide problem in the near future because of lack of promising sulphur dioxide control technology. In addition, DEQ is prohibited by statute from embarking on such a program.

D. Develop coal-sulphur regulations. This was considered unacceptable in and by itself by the Department on the grounds it would not address the smoke and POM emission problem associated with residential coal burning.

E. Develop a volatile content of coal regulation. This was considered unacceptable in and by itself by the Department on the grounds it would not address the sulphur dioxide emission problem associated with residential coal burning.

F. Develop a "clean coal regulation" based on a 0.3% sulphur and 5% volatile content. This was considered by the Department as the most desirable approach to the issue considering that technology is available to desulphurize and devolatilize coal to these levels. Such coal would have emissions in the range of those from light distillate residential fuel oil allowed under Department rules. Such a regulation would have the immediate effect of a spaceheating coal use ban but would provide a means to utilize "clean" coal as a residential heating fuel in the future if energy & economic conditions otherwise warrant it. The most logical areas to apply such a regulation to would be the state's four air quality maintenance areas. Other areas which might be considered in the future would include Bend and Pendleton where wood space heating is beginning to cause significant air quality problems.

Summation

1. Oregonians have demonstrated a significant shift towards solid fuel stove heating as exemplified by the massive increase in wood space heating.

2. The potential exists for major increases in use of coal as a residential solid heating fuel considering: 1) wood is becoming more expensive and more difficult to obtain; 2) coal is becoming more attractive as a residential solid heating fuel, considering its cost, availability, handling and burning characteristics; 3) coal shipments to Oregon will substantially increase in the near future as coal export terminals and industrial coal conversions are constructed; 4) manufacturers are rapidly tooling up to increase marketing of

residential coal burning devices; 5) present and future energy prices will continue to accelerate pressures towards increased residential solid fuel use.

3. Projected air quality impacts from residential coal burning indicate: 1) achieving and maintaining compliance with air quality standards would be more difficult; 2) sulphur dioxide, sulfates and carcinogens would be increased in areas like Portland to a point considered unacceptable by local health experts; 3) nuisance conditions such as smoke, odor, soiling and visibility loss would be greatly accentuated.

4. The Health Effects Review Committee and Portland Air Quality Advisory Committee recommended banning of residential coal use in urban areas. Waiting to regulate after a serious problem occurred was considered unwise by the Committees' on the grounds that adverse health effects should not be allowed to occur and significant economic hardship would result by regulating after a major market had been developed.

5. The Department believes the most prudent approach to the residential coal burning issue is to take preventative control measures and develop a clean coal regulation based on a 0.3% sulphur, 5% volatile content limit. While such coal is presently not available in this country, technology exists to meet these requirements. This technology might be applied if energy and economic conditions become more favorable toward residential coal use. Emissions from coal meeting these specifications would be in the same range as those of residential heating oil. Making such a rule effective by July 1, 1983 in air quality maintenance areas should allow those small number of existing coal users adequate time to develop alternative heating systems.

Director's Recommendations

Based on the Summation, it is recommended that EQC authorize a public hearing on the attached amendments to the Deparment's coal rule OAR 340-22-020 Attachment 4.

Bill

William H. Young

Attachments: 1. Coal Health Effects Review Committee Report
2. Portland Air Quality Advisory Recommendations
3. Typical Journal Advertising/Articles On Coal Heating
4. Proposed Amendment to OAR 340-22-020
5. Statement of Need for Rulemaking
6. Public Notice

JFK:a
AAD135.2 (1)
229-6459
9/10/81

COAL HEALTH EFFECTS REVIEW COMMITTEE

SUMMARY REPORT

To The

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

April 21, 1981

Chairman: Dr. Max Bader

Members: Dr. John Aitchison
Ms. Frances Costikyan
Dr. Miles Edwards
Dr. Larry Foster
Dr. James F. Morris
Dr. Edward Press
Dr. Charles P. Schade
Prof. Trygve P. Steen

SUMMARY REPORT

TO THE

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

COAL HEALTH EFFECTS REVIEW COMMITTEE*

In October, 1980, the Committee was organized to examine and make recommendations on the risks to health of Oregonians which might result from coal combustion products in the ambient air due to increased coal use in home stoves. The Committee met on 9 occasions to review technical information supplied by its membership and by the Department of Environmental Quality (DEQ).

SUMMARY OF FINDINGS

GENERAL OVERVIEW

Specific recommendations of the Committee should be considered within the following context:

1. Contrary to the general perception of Oregon as an area with remarkably pure air, many parts of the state are more prone to atmospheric conditions (air stagnation) which can result in pollution build-up than many other parts of the world where serious problems have developed. These areas in Oregon include the Portland, Eugene-Springfield, and Medford-Ashland areas. The inhabitants in these regions are already subject to increased health risks due to air pollution. Therefore, these areas need to continue efforts to improve air quality.

2. Coal burning in hand-fired household stoves and fireplaces discharges sulfur dioxide, sulfates, particulates, and benzo(a)pyrene and other polycyclic organic material into the atmosphere. More residential coal burning would increase the concentration of these chemicals in the ambient air and result in their inhalation and deposition into the bronchi and the lungs, and for some materials, absorption and spread through the blood vessels.

3. Polluting agents in the air may interact to create a health hazard, even though taken individually they are not a hazard at a given concentration.

4. Time, dose, and host susceptibility factors are critical to the ability of agents to cause cancer and other illness. Young children are particularly vulnerable to low doses and because they are young,

*Membership of the Committee is presented in Appendix 1.

will be exposed over long periods of time. Even more than adults they should not be subjected unnecessarily to agents which may result in later development of disease.

5. Home stove and fireplace use increases the risk of fire and other safety problems.

6. Aesthetic factors, impaired visibility, acid rain, vegetation destruction, and odor affect the quality of life and can impact on health by affecting mental outlook, the food chain, and recreational activities.

7. Alternatives to burning coal in residential units are available. Large scale boilers or furnaces can burn coal much more efficiently than hand-fired units and reduce the formation rate of B(a)P and other POMs by several orders of magnitude, and with effective pollution control devices can reduce the release of other pollutants such as sulfur dioxide, sulfates, and particulates. Thus there is no reason to expose the general public unnecessarily to increased health risks which may result from increased residential coal burning.

SPECIFIC FINDINGS AND RECOMMENDATIONS

The committee recommends that residential coal burning should not be allowed in densely populated areas of Oregon with pollution problems. The basis for this recommendation is the Committee's concern for adverse health impacts from increased levels of sulfur dioxide, sulfates, total suspended particulates, and polycyclic organic materials. Projections of pollutant increases are presented in the DEQ report entitled "Range of Concentrations to be Analyzed as Part of the Assessment of Health Impacts Due to Residential Coal Burning," which is included in Appendix 2.

1. Sulfur Dioxide (SO_2) - The D.E.Q. 24-hour standard of 260 micrograms/cubic meter (ug/m^3)* and the 60 ug/m^3 annual standard should not be exceeded; levels as low as 100 ug/m^3 for a 24-hour period can cause acute respiratory effects in some people.(1)

* Many pollutant concentrations are expressed in the form of micrograms, or one-millionth of a gram (454 grams = 1 pound), per cubic meter of air. The abbreviated notation which will be used throughout this report is ug/m^3.

(1) Stebbings, J., and C. Hayes. Panel Studies of acute health effects of air pollution. I. Cardiopulmonary symptoms in adults, New York, 1971-1972. Environ. Res. 11:89-111, 1976

2. Sulfates (SO_4) - The level should be kept below a 24-hour average of 15 ug/m^3. Asthmatics and the elderly may develop respiratory symptoms at 24 hour average levels of 6-10 ug/m^3.(2) Long term exposure to the latter concentrations probably contributes to chronic lung disease.

3. Total Suspended Particulates (TSP) - The 24-hour standard of 150 ug/m^3 and the annual standard of 60 ug/m^3 should be maintained to avoid known and potential interactions with other agents in the air which adversely affect health. Particulates from residential coal burning may also create aesthetic problems by reducing visibility and depositing soot.

4. Benzo(a)pyrene (B(a)P) - This known cancer causing agent is an index for similar agents in the air. No exposure standard has been established. Coal burned in residential units is especially likely to be a major source of B(a)P.

5. Carbon Monoxide - Residential coal use, as a replacement for wood, would not significantly affect carbon monoxide concentrations which have been decreasing over the last five years.

6. Ozone - This is a summer problem that would not be affected by residential coal burning.

7. Nitrogen oxides -Residential coal burning produces about the same amount of nitrogen dioxide per BTU as residential oil or gas combustion and thus is not likely to cause any significant increases in concentrations.

ADDITIONAL RECOMMENDATIONS

1. Coal use in Oregon should be restricted to low sulfur and low ash content coals. Preferably, coal use should be limited to electricity generating plants and industrial users which employ adequate pollution controls.

2. D.E.Q. should undertake further B(a)P monitoring to update its information base for both indoor and outdoor B(a)P levels and for residential heating device emission rates.

3. D.E.Q. should encourage the public to increase energy conservation efforts and to stop cigarette smoking.

(2) U.S.E.P.A., Position Paper on Regulation of Atmospheric Sulfates. Research Triangle Park. Publication Number EPA - 450/2-75-007. September, 1975.

COAL HEALTH EFFECTS REVIEW COMMITTEE

Introduction

Oregon may soon become a major western United States terminus for coal shipments to Asia. This may make coal much more available in this state. As a result, it may become a less expensive alternative to other fuels for home heating.

Stoves used for home heating generally do not burn coal cleanly. Use of coal for home heating in a significant number of urban homes could lead to substantial deterioration in air quality. This deterioration would be most serious in areas, such as Portland, Eugene, and Medford, where meteorologic inversions are common.

Among coal combustion products of concern to the Oregon department of Environmental Quality (DEQ) are total suspended particulates, sulfur dioxide, sulfates, carbon monoxide, ozone, nitrogen oxides, and benzo(a)pyrene and other polycylic aromatic hydrocarbons. These agents can harm both the liveability of an area and the health of people living there.

To help the Environmental Quality Commission reach its determination on what, if anything, should be done to regulate coal usage in Oregon, D.E.Q. formed a Coal Health Effects Review Committee. The Committee's task was to define the known and potential health effects which might result from acute and long-term exposure to these coal combustion products in the

ambient air. The committee considered health effects of different concentrations of coal combustion products upon both healthy people and "high risk" groups including the very young, the elderly, asthmatics and others with very vulnerable lungs, and persons with underlying diseases such as chronic bronchitis and emphysema. The Committee's findings are provided in this report along with several suggestions which it feels deserve consideration.

Overview

The Coal Health Effects Review Committee provides the following general context for its specific findings concerning the known and potential health effects of those air quality factors which it has reviewed. First, it is important for the citizens of Oregon to recognize that many parts of the State are just as prone, if not more prone, to adverse atmospheric conditions that can result in pollution build-up as others areas of the world which have suffered serious pollution problems. Among areas which are already subject to increased risks to health from air pollution during their frequent meteorologic inversions, are Portland, Eugene, and Medford. Air quality in those areas still needs to be improved and must not be permitted to decrease significantly without a most compelling justification. The Committee is aware of no such justification. The

Committee believes that even in a severe national energy shortage, there are preferable alternatives to burning coal in individual dwellings. One alternative is use of coal in large industrial boilers which can burn it more cleanly and control the emissions more efficiently. Gas and oil fuels used by those mid-range industrial boilers could then be diverted to residential heating usage. Another option, given construction time, is burning the coal in large heat and electricity generating plants, where polluting emissions can also be much more effectively controlled. Some coal use is clearly not necessary to serve as an energy source for heating during short term crisis situations such as those which may follow ice storms.

Second, the Committee underscores the need to recognize that there may be interaction between polluting chemicals in the air which may either increase or reduce their effects on health. For example, airborne particulates significantly increase the adverse health impacts of both sulfur oxides and polycyclic organic materials. Although all interactions are not fully understood the Committee considers it prudent to take a conservative approach to protecting human health.

Third, the Committee has considered the present biologic controversy over whether a threshold exposure to an agent must be exceeded for it to cause cancer or other illnesses. Although no clear answers exist to the threshold question, time-dose-host susceptibility factors all affect the ability of agents to cause disease. Young children are the most susceptible to eventually developing chronic illness due to air pollution, because they are likely to be exposed to low doses acting over very long periods of time and because of their vulnerability to lung damage during growth and development of the respiratory system. Therefore, common sense suggests avoidance of unnecessary build-up of air pollutants which, in higher concentrations, are known to affect health, and which at low doses clearly affect aesthetic qualities, if not health. In that context the threshold question becomes largely academic.

The effects of agents which cause cancer and chronic obstructive pulmonary disease are cumulative. Therefore, if prolonged (over 1 year) excessive levels of air pollutants are forecast, a long term strategy aimed at keeping pollutant concentrations down to acceptable levels is essential. However, the Committee does not wish to preclude the option of using low sulfur coal in areas where allowing that freedom of choice will not significantly affect air quality that already meets State standards.

Finally, the Committee wishes to call attention to fire, safety, and aesthetics issues which it has not specifically addressed. Increased residential use of stoves and fireplaces which are fueled by wood or coal significantly raises the risk of fire in those homes, a risk to health which is probably greater than that from carcinogens in the air. In addition, as homes are sealed tighter for weatherization, the hazard of carbon monoxide poisoning and other indoor air pollution increases. Also, aesthetic factors, impaired visibility, effects of acid rain, destruction of vegetation, and odors can affect health indirectly.

The Committee wishes that it could base all of its specific findings and recommendations on solid, irrefutable facts. In environmental health, this is often not possible and best judgments must therefore be made. The Committee's findings with respect to sulfur dioxide have extensive support in the medical literature. Its findings concerning benzo(a)pyrene and similar agents are substantially based upon deductive reasoning using studies reported in the medical literature that were not specifically related to the problem at hand. Nevertheless, the lack of better information is not justification for ignoring that which is available. The additional information would merely be helpful in establishing more precise limits.

FINDINGS AND RECOMMENDATIONS

I. Findings and Recommendations Regarding Specific Pollutants

Total Suspended Particulates — TSP are a mixture of manmade and natural materials that contain silicon, sulfur, nitrogen, carbon, and lead and vary from area to area. Particulates with a diameter less than 10 micrometers will enter the lower airways of the lungs.[3,4] TSP represents an index of pollution rather than a specific pollutant. Twenty-four hour concentrations are usually safe below 150 ug/m^3 for the general population.

The committee endorses the Oregon particulate standards of 150 ug/m^3 on a 24-hour basis and 60 ug/m^3 on an annual basis and urges DEQ to continue in its attempts to attain and maintain TSP standards. The committee notes that although the relative amounts of particulates as expressed as mass per BTU of wood or coal burned are approximately the same, particulates resulting from residential coal combustion can be expected to be more hazardous to health due to much higher levels of benzo(a)pyrene, sulfur dioxide, sulfates and heavy metals such as mercury. Since the Portland, Medford/Ashland, and Eugene/Springfield areas already exceed particulate standards, the introduction into these airsheds of an additional source of harmful particulates would make future efforts to attain standards even more difficult.

Sulfur Dioxide - Standards are difficult to establish because of the complex chemistry of sulfur oxides (SO_2) and the variability of human response to them. SO_2 can be transformed into other forms such as particulate aerosols which may be biologically more damaging than SO_2. Thus like TSP, SO_2 levels serve as indices of pollution.

---

(3) International Radiological Protection Commission, Deposition and Retention Models for Internal Dosimetry of the Human Respitatory Tract, Task Group on Lung Dynamics. Health Physics 12:173-207, 1966.

(4) Stuart, Bruce O., Deposition and Clearance of Inhaled Particulates. Environmental Health Perspectives 16:46, 1976.

The committee recommends that the present Oregon SO_2 standards of 260 ug/m^3 over a 24 hour period and 60 ug/m^3 annual average be maintained. Because exposure to SO_2 causes adverse physiological effects to the respiratory system and impairs ventilation at levels as low as 100 ug/m^3,[5] the DEQ is encouraged to take preventive actions to ensure that the 24-hour Oregon SO_2 standard is not exceeded even during episodic conditions.

Twenty-four hour SO_2 concentrations in the Portland area already exceed 200 ug/m^3 on some peak days. The increased SO_2 concentrations which could occur with heavy coal burning or from internal smoke leaks or downwash conditions (from an individual unit) combined with already existing ambient levels on peak days would cause acute lung symptoms for some citizens whose airways are especially sensitive to SO_2.

Sulfates - The Committee recommends that DEQ should attempt to manage the airshed such that peak 24-hour SO_4 concentrations are maintained below 15 ug/m^3. The Committee adopts this position with the knowledge that there is currently no Oregon or Federal SO_4 standard, and on the basis that some adverse health effects have been observed to occur at concentrations below 15 ug/m^3. For example, effects on the elderly have been reported at 24-hour concentrations of 8-10 ug/m^3 and effects on asthmatics at 6-10 ug/m^3.[6] The Portland area already experiences winter monthly average sulfate concentrations of 7 ug/m^3; sulfates from residential coal burning would be concentrated in populated areas.

Carbon Monoxide - The amount of carbon monoxide (CO) which would enter the atmosphere is about the same whether coal or wood is burned. CO levels have been decreasing despite increased wood usage in recent years. Thus, carbon monoxide is not considered to be a problem affected by coal use in residences.

Ozone - This is a summer pollutant problem which would not be affected by residential coal use.

Nitrogen oxides - Residential coal burning produces about the same amount of nitrogen dioxide (NO_2) per BTU as residential oil or gas combustion and thus is not likely to cause any significant increases in NO_2 concentrations.

(5) Stebbings, J., and C. Hayes. Panel Studies of acute health effects of air pollution. I. Cardiopulmonary symptoms in adults, New York, 1971-1972. Environ. Res. 11:89-111, 1976.

(6) EPA Position Paper on Atmospheric Sulfates. 1975. (See Footnote 2.)

Benzo(a)pyrene and Polycyclic Organic Materials - Polycyclic organic matter (POM) includes benzo(a)pyrene (B(a)P) and other polycyclic aromatic hydrocarbons. B(a)P is an indicator, or marker for the presence of POM in air. B(a)P, as well as some other polycyclic aromatic hydrocarbons included in POM, act as initiating agents for cancer in animals[7] and man.[8]

In the late 1960's, annual average concentrations of B(a)P generally ranged from 2.3 to 4.8 nanograms/cubic meter (ng/m^3)* in Portland, Eugene, and Medford.[9] A high value of 8.2 ng/m^3 B(a)P was recorded in Medford in 1968. Although annual average B(a)P concentration data are not available in Oregon after 1970, nationally the average of 28 urban sites for which such data are available (including some Pacific Northwest locations, i.e. Seattle) dropped from 2.4 ng/m^3 to .6 ng/m between 1970 and 1976.[10] Current levels in Oregon are not known but there is evidence[11,12] to suggest B(a)P concentrations have climbed since 1976 and that they may be as high as or higher

* Concentrations of benzo(a)pyrene are commonly expressed in units of nanograms per cubic meter (ng/m^3) or one-billionth of a gram per cubic meter.

(7) Health Assessment Document for Polycyclic Organic Matter. U.S. Environmental Protection Agency. Research Triangle Park, North Carolina. Publication No. EPA-600/9-79-008. Pages 6-85 to 6-133, 1979.

(8) Health Assessment Document for Polycyclic Organic Matter. Pages 5-186 to 6-220. 1979. (See Footnote 7.)

(9) Scientific and Technical Assessment Report on Particulate Polycyclic Organic Matter (PPOM). U.S. Environmental Protection Agency. Washington, D.C. Publication No. EPA-600/6-75-001. 1975. *In:* Health Assessment Document for Polycyclic Organic Matter, pages 5-9, 1979.

(10) Health Assessment Document for Polycyclic Organic Materials. Pages 5-13 to 5-14. 1979. (See Footnote 7.)

(11) Nilsson, Jan, Combustion of Wood/Environmental Restrictions in Sweden. National Swedish Environmental Protection Board. February, 1980. The report states that typical B(a)P levels within 30 meters of a wood stove are 10-20 ng/m^3.

(12) Pajer, Mike, Summary of Medford Historical Benzene-Soluble Organic Data, Oregon Department of Environmental Quality, 5-13-80. Data shows a 102% increase in annual average Medford levels of benzene-soluble organics between 1971 and 1979.

than 1968 levels due to significant increases in residential woodburning. If the medium projected level of residential coal burning were to occur in the Portland airshed, the annual average B(a)P air concentration would increase by 3.9 ng/m^3 in the highest concentration 2x2 kilometer grid in which 9,000 people reside* (see Appendix 2). Where residences are close together and because of local downdraft conditions or indoor smoke leaks, concentrations could be much higher.

The Committee cannot predict precisely what health impacts would result from B(a)P and other POMs introduced by increased residential coal burning. The Committee recognizes the complexity of analyzing environmental causes of cancer and dose response factors.[13] The absence of an association of lung cancer with past levels of B(a)P and POMs may be due to masking of their effects by the much larger effect of cigarette smoking. However, it is known that persons who smoke a few cigarettes daily, each of which may result in B(a)P exposure equivalent to an annual average exposure of .67 ng/m^3 of B(a)P[14] (as well as other cancer causing agents) experience higher lung cancer rates than non-smokers. People exposed to annual average B(a)P levels of 3.9 ng/m^3 would be exposed to the same amount of B(a)P as individuals smoking 6 cigarettes per day. This raises the concern that a carcinogenic effect might occur from the residential coal burning; however, because other POM's and their interactions may be different for cigarette smoking and residential coal burning, and because the POM levels actually reaching lung tissue may be different, it is probable that equivalent dosages of B(a)P from cigarette smoking and residential coal burning would not result in a cancer-causing effect to the same degree.

The Committee, recognizing that no national exposure standard has been established for B(a)P and POMs despite their known cancer causing capabilities, therefore recommends that B(a)P in the ambient air not be permitted to increase above current levels.

(13) Maclure, K.M. and MacMahan, G: An epidemiologic perspective of environmental carcinogenisis. In: Epidemiologic Reviews. Sartwell, P.E. and Nathanson, N. (ed.) 2:12-48 Johns Hopkins Univ. Press. Baltimore, MD. 1980.

(14) Bridbord, K. et al., Human Exposure to Polynuclear Aromatic Hydrocarbons. In: Carcinogenisis, Vol. 1. R. I. Freudenthal and P. W. Jones (ed.), Raven Press, New York, 1976.

*The 260,000 people in the densest 50 square miles of the region would be exposed to average additional levels of 2.5 ng/m^3 of B(a)P from this amount of coal burning.

II. Recommendations for Action Regarding Coal Burning

1. DEQ should restrict coal use in Oregon to the lowest sulfur content coals on a B.T.U. basis. Low ash coal is also desirable.

2. DEQ should prohibit coal burning in individual dwellings in all urban areas of Oregon and additionally in those areas where stagnant air is common. The preferred use of coal is in large industrial boilers and relatively clean burning, coal-fired plants which generate electrical power and can be located outside of areas that are subject to serious air pollution e.g., Boardman. Such energy sources can be equipped with adequate pollution controls and when combined with use of existing fuels, heat pumps, solar power and wind power should obviate most, if not all, need to use coal in home stoves and fireplaces.

GENERAL AIR POLLUTION SUGGESTIONS

1. DEQ should encourage increased energy conservation efforts by the general public and industry in order to lessen future reliance for energy upon fuels which pollute the air.

2. DEQ should recognize that the long-term health effects of cigarette smoking are of far greater significance than home stove and fireplace coal burning under most foreseeable scenarios. Consequently, in its public pronouncements on air quality, DEQ would be well advised to encourage people to stop smoking whenever the opportunity presents itself.

3. The DEQ should undertake additional measurements of indoor and outdoor B(a)P levels. These recommendations should not be interpreted as a statement by the Committee that no action on residential coal burning is justifiable until such additional information has been gathered. Rather the Committee urges that DEQ attempt to improve its information base on likely and potential future B(a)P levels such that health effects from such compounds may be better understood in the future.

   a. DEQ should undertake emission factor studies to determine whether the mid-range B(a)P emission factors it has provided to the Committee are realistic.

   b. DEQ should undertake representative periodic ambient air B(a)P monitoring to help determine whether potential coal-related increase in B(a)P emissions would raise ambient levels to concentrations of concern.

   c. DEQ should attempt to verify whether its estimates of B(a)P concentrations from down wash situations or internal smoke leaks are realistic in order to help determine whether these situations pose a risk to health. This can be done by either DEQ source testing or by reviewing monitoring work being done by other researchers.

APPENDIX 1

Membership of
COAL HEALTH EFFECTS REVIEW COMMITTEE

Dr. John Aitchison
Chief, Toxicology Section
Department of Clinical Pathology
University of Oregon Health Sciences Center

Dr. Max Bader (Chairman: Coal Health Effects Review Committee)
Oregon State Health Officer
Oregon State Health Division

Ms. Frances Costikyan
Executive Director
Oregon Lung Association

Dr. Miles Edwards
Head, Division of Chest Diseases
Department of Medicine
University of Oregon Health Sciences Center

Dr. Larry Foster
Communicable Disease Control Officer
and Assistant State Epidemiologist
Oregon State Health Division

Dr. James F. Morris
Chief, Pulmonary Disease Section
Portland Veterans Administration Medical Center

Dr. William Morton
Head, Division of Environmental Medicine
University of Oregon Health Sciences Center

Dr. Edward Press (Retired Oregon State Health Officer)
Chairman, Public Health Committee
Oregon Medical Association

Dr. Charles P. Schade
Multnomah County Health Officer
Multnomah County

Mr. William Shafer
American Cancer Society

Prof. Trygve P. Steen, M.P.H., Ph.D
Department of Biology
Portland State University

The Coal Health Effects Review Committee was initially formed by DEQ. Members with specific expertise were added upon suggestion. Members representing specific interest groups gave their personal opinions which are reflected in the policy recommendations. Although the report did not receive formal clearance or approval to date by the governing bodies of the organizations represented, the individuals involved did attempt to forward the position of the organization they represented to the best of their ability.

RANGE OF CONCENTRATIONS TO BE ANALYZED AS PART OF THE ASSESSMENT OF HEALTH IMPACTS DUE TO RESIDENTIAL COAL BURNING**

The low, intermediate, and high estimates of concentrations were derived via different emission factors and assumptions about residential coal usages rates. The basis for these calculations are presented in explanatory footnotes on pages 9 through 11.

I. 24-Hour Impacts Summary

	Highest Grid* 24-Hour Ambient Concentrations+ ug/m^3	24-Hour Concentrations Due to Downwash+ ug/m^3	24-Hour Concentrations Due to Indoor+ Smoke Leaks ug/m^3
TSP			
Low	.08	3.1	.4
Intermediate	2.0	26.4	3.0
High	73.6	85.8	9.7
SO_2			
Low	.6	40.	6.4
Intermediate	5.9	126.	20.2
High	110.	251.	40.4
SO_4			
Low	.04	N.E. ***	N.E. ***
Intermediate	.72	N.E.	N.E.
High	33.	N.E.	N.E.
B(a)P	ng/m^3	ng/m^3	ng/m^3
Low	-.06	-3.8	.55
Intermediate	22.2	467	55
High	2158.	4957	1034

* These values represent concentrations in the highest 2 x 2 kilometer grid in the DEQ's Portland area modelling network.

**Values have been adjusted to account for reduced wood impacts when coal replaces wood.

***Not estimable because it is not known how much sulfur dioxide converts to sulfates in very short time periods.

+Concentrations are additive and do not include background or other impacts from sources other than residential coal burning. Downwash and smoke leak impacts are attributable to an individual unit. Ambient impacts represent the impact of dispersed emissions from multiple sources.

NOTE: For Comparison, Oregon and Federal Ambient Air Quality Standards and Portland Area Levels are Shown in Appendix A.

Oregon Department of Environmental Quality
William T. Greene
April, 1981

II. Annual Impacts Summary

	Highest Grid* Annual Ambient Concentrations+ ug/m³	Annual Concentrations Due to Downwash+ ug/m³	Annual Concentrations Due to Indoor+ Smoke Leaks ug/m³
TSP			
Low	.01	.27	.13
Intermediate	.34	2.2	1.0
High	12.9	7.2	3.2
SO_2			
Low	.1	3.3	2.1
Intermediate	1.0	10.5	6.7
High	19.2	20.9	13.3
SO_4			
Low	.006	N.E. ***	N.E. ***
Intermediate	.13	N.E.	N.E.
High	5.8	N.E.	N.E.
B(a)P	ng/m³	ng/m³	ng/m³
Low	-.01	~~-.3~~	.18
Intermediate	3.9	38.9	18
High	376	413	345

---

* These values represent concentrations in the highest 2 x 2 kilometer grid in the DEQ's Portland area modelling network.

**Values have been adjusted to account for reduced wood impacts when coal replaces wood.

***Not estimable because it is not known how much sulfur dioxide converts to sulfates in very short time periods.

+Concentrations are additive and do not include background or other impacts from sources other than residential coal burning. Downwash and smoke leak impacts are attributable to an individual unit. Ambient impacts represent the impact of dispersed emissions from multiple sources.

NOTE: For Comparison, Oregon and Federal Ambient Air Quality Standards and Portland Area Levels are Shown in Appendix A.

III. AMBIENT IMPACTS	Low	Medium	High	Footnote
TSP				
Coal Usage	4,000 T/yr	40,000 T/yr	740,000 T/yr	1.
Emission Factors	5.3 lb/ton	12.6 lb/ton	25.4 lb/ton	2.
Annual Tons Emissions	45 T/yr	592 T/yr	15,320 T/yr	
24-Hour Maximum TSP Impacts	Impacts in Micrograms/Cubic Meter			
- Highest grid	.08	2.0	73.6	3.
- Densest 50 sq. mi.	.05	1.1	42.9	3.
- Region	.01	.3	12.9	3.
Annual TSP Impacts				
- Highest grid	.01	.34	12.9	3.
- Densest 50 sq. mi.	.01	.22	8.3	3.
- Region	.005	.09	3.4	3
SO_2 Impacts				
Coal Usage	4,000 T/yr	40,000 T/yr	740,000 T/yr	1
Emission Factors	38 lb/ton	38 lb/ton	38 lb/ton	4.
Annual Tons Emissions	76 T/yr	760 T/yr	14,060 T/yr	
24-Hour Maximum Impacts	Impacts in Micrograms/Cubic Meter			
- Highest grid	.59	5.9	110.	3.
- Densest 50 sq. mi.	.35	3.5	64.	3.
- Region	.1	1.0	19.2	3.
Annual Impacts				
Highest grid	.1	1.0	19.2	3.
- Densest 50 sq. mi.	.07	.7	12.4	3.
- Region	.03	.3	5.1	3.

	Low	Medium	High	Footnote
SO_4 Impacts				
Coal Usage	4,000 T/yr	40,000 T/yr	740,000 T/yr	
Emission Factors	2.3	4.6	11.4	4., 5.
Annual Tons Emissions	4.6	92	4218	
24-Hour Maximum Impacts	Impacts in Micrograms/Cubic Meter			
- Highest grid	.04	.72	33	3.
- Densest 50 sq. mi.	.02	.42	19	3.
- Region	.006	.13	5.8	3.
Annual Impacts				
- Highest Grid	.006	.13	5.8	3.
- Densest 50 sq. mi.	.004	.08	3.7	3.
- Region	.002	.03	1.5	3.
B(a)P Impacts				
Coal Usage	4,000 T/yr	40,000 T/yr	740,000 T/yr	
Emission Factors	-.061 g/10^6 BTU	2.365 g/10^6BTU	12.56 g/10^6 BTU	6.
Annual Tons Emissions	.009 T/yr	3.0 T/yr	279 T/yr	7.
24-Hour Maximum Impacts	Impacts in Nanograms/Cubic Meter *			
- Highest grid	-.06	22.2	2158	3.
- Densest 50 sq. mi.	-.03	12.9	1255	3.
- Region	-.01	3.9	376	3.
Annual Impacts				
- Highest grid	-.008	3.9	376	3.
- Densest 50 sq. mi.	-.007	2.5	243	3.
- Region	-.002	1.0	100	3.

* A nanogram is one billionth of a gram.

IV. IMPACTS ON HOUSEHOLDS DUE TO DOWNWASH

This analysis calculates plume impacts on adjacent houses due to downwash conditions, and assumes that the indoor concentrations equal one-half of the concentrations on the outside wall of a house.

	Low	Medium	High	Footnote
TSP Downwash Impacts				
Coal Usage	7 lb/day	22 lb/day	44 lb/day	
TSP Emission Factor	3 lb/ton	8 lb/ton	13 lb/ton	6.
Twelve-Hour Emission Rate	1.1×10^{-4} g/sec	9.22×10^{-4} g/sec	3.0×10^{-3} g/sec	7.
24-Hour Impact on Adjacent House 10 meters Downwind Due to Downwash	3.1 ug/m^3	26.4 ug/m^3	85.8 ug/m^3	8.
Annual Impact on Adjacent House 10 meters Downwind Due to Downwash	.27 ug/m^3	2.2 ug/m^3	7.2 ug/m^3	9.
SO_2 Downwash Impacts				
Coal Usage	7 lb/day	22 lb/day	44 lb/day	
SO_2 Emission Factor	38 lb/ton	38 lb/ton	38/lb ton	10.
Twelve-Hour Emission Rate	1.4×10^{-3} g/sec	4.39×10^{-3} g/sec	8.78×10^{-3} g/sec	7.
24-Hour Impact on Adjacent House 10 Meters Downwind Due to Downwash	40 ug/m^3	126 ug/m^3	251 ug/m^3	8.
Annual Impact on Adjacent House 10 Meters Downwind Due to Downwash	3.3 ug/m^3	10.5 ug/m^3	20.9 ug/m^3	9.

	Low	Medium	High	Footnote
Benzo(a)Pyrene Downwash Impacts				
Daily Coal Usage	7 lb	22 lb	44 lb	
B(a)P Emission Factor	-.061 g/10^6 BTU	2.365 g/10^6 BTU	12.56 g/10^6 BTU	11.
Twelve-Hour Emission Rate	-1.33×10^{-7} g/sec	1.63×10^{-5} g/sec	1.73×10^{-4} g/sec	7.
24-Hour Impact on adjacent House 20 meters downwind due to downwash	-3.8 ng/m^3	467 ng/m^3	4957 ng/m^3	8.
Indoor = 50% outside Wall Impacts				
Annual Impact on Adjacent House 20 Meters Downwind Due to Downwash	-.3 ng/m^3	38.9 ng/m^3	413 ng/m^3	9.

V. Impacts on Households Due to Internal Smoke Leaks

Benzo(a)Pyrene Indoor Smoke Leak Impacts

	Low	Medium	High	Footnote
Known B(a)P Concentrations due to Wood-burning Fireplaces	1 ng/m^3	3 ng/m^3	11 ng/m^3	12.
Assumed 24-Hour Concentration due to Fireplaces	.33 ng/m^3	1 ng/m^3	3.67 ng/m^3	13.
Multiplier by Which Coal B(a)P Emission Rate Exceeds Fireplace B(a)P Emission Rate from Wood	1.67	55	282	14.
Assumed 24-Hour Indoor B(a)P Concentrations Due to Smoke Leaks from Residential Coal Burning.	.55 ng/m^3	55 ng/m^3	1034 ng/m^3	15.
24-Hour Indoor B(a)P Concentrations from Smoke Leaks Less Reduced Wood Impacts	.22 ng/m^3	54 ng/m^3	1030 ng/m^3	16.
Assumed Annual Average B(a)P Levels From Smoke Leaks	.09 ng/m^3	14 ng/m^3	257 ng/m^3	

	Low	Medium	High	Footnote
TSP Indoor Smoke Leak Impacts				
Coal Usage	7 lb/day	22 lb/day	44 lb/day	6.
TSP Emission Factor	3 lb/ton	8 lb/ton	13 lb/ton	6.
Emission Rate in Grams/10^6 BTU	50.4 g/10^6BTU	134.5 g/10^6 BTU	218.6 g/10^6 BTU	7.
Multiplier by Which Coal TSP Emission Rate Exceeds Fireplace B(a)P Emission Rate from Wood	1120	2990	4860	6.,18.
Assumed 24-Hour Indoor TSP Concentrations due to Smoke Leaks From Burning Coal	.36 ug/m^3	3.0 ug/m^3	9.7 ug/m^3	19.
Assumed Annual Indoor TSP Concentrations due to Smoke Leaks From Coal Burning	.12 ug/m^3	1.0 ug/m^3	3.2 ug/m^3	20.
SO_2 Indoor Smoke Leak Impacts				
Coal Usage	7 lb/day	22 lb/day	44 lb/day	
SO_2	38 lb/ton	38 lb/ton	38 lb/ton	10.
Multiplier by Which Coal SO_2 Emission Rate Exceeds Fireplace B(a)P Emission Rate from Wood	20180	20180	20180	6.,11.
Assumed 24-Hour Indoor SO_2 Concentrations Due to Smoke Leaks from Burning Coal	6.4 ug/m^3	20.2 ug/m^3	40.4 ug/m^3	21.
Assumed Annual Indoor SO_2 Concentrations Due to Smoke Leaks from Coal Burning	2.1 ug/m^3	6.7 ug/m^3	13.5 ug/m^3	20.

FOOTNOTES:

1. If 1% of households burn 1 ton/year, annual tons of coal are 4000. With 5% burning 2 T/yr, the rate is 40,000. As an upper limit value, if all households projected to burn wood in 1987 burned the equivalent amount of coal, 740,000 tons/year would be burned.

2. EPA's emission factor (Compilation of Air Pollutant Emission Factors, U.S.E.P.A., 1975) is 20 lb/ton direct TSP for hand-fired stoves and 30 lb/ton for fireplaces. Thus 3 values of 20, 25 and 30 were assumed for direct particulate. Secondary sulfates must be added. Since the SO_2 emission factor is 38 lb/ton for 1% sulfur coal, the sulfate would range from 2.3 lb/ton to 4.6 lb/ton to 11.4 lb/ton if it is assumed that either 4%, 8%, or 20% is converted in the atmosphere to sulfates. The 8% conversion factor is the mean value derived from the PACS study, and observed sulfate concentrations.

Example:

$$\frac{38 \text{ lb } SO_2}{\text{ton}} \times .08 \text{ Conversion of } SO_2 \text{ to } SO_4 \times \frac{1.5 \text{ wt } SO_4}{\text{wt } SO_2} = 4.6 \text{ lb } SO_4/\text{ton coal}$$

Low	Medium	High
20	25	30
2.3	4.6	11.4
22.3	29.6	41.4

These values must be discounted by 17 lb/ton (AP-42) to account for wood burning TSP emissions reduced by wood replacement with coal.

3. The DEQ's 1980 computer modelling work on particulates provides information on what the daily and annual impacts of 11,000 tons of wood burning emissions would be for different areas. This data is shown below. The impact on other emission sources that have a geographical distribution similar to population or households can be calculated by scaling.

	Daily Maximum Impact of 11,000 annual Tons of Residential Wood Burning Emissions in 1987	Annual Average Impact of 11,000 tons of Residential Wood Burning Emissions in 1987
Highest grid (9,000 people)	86 ug/m^3	15 ug/m^3
Worst 50 sq. mi. (260,000 people)	50	9.7
Region (800,000 people)	15	4.

4. A 1% sulfur coal has been assumed for all cases. Wood SO_2 emissions are only 1% of the coal SO_2 emissions and have therefore been neglected.

5. As discussed in Footnote 2, this assumes either 4% or 8% or 20% of SO_2 converts to SO_4 within the region. The 8% value is the best estimate.

6. The three coal emission factors cited in Footnote 2. of 20, 25, and 30 lb/ton were reduced by the wood emission factor of 17 lb/ton to account for reduced wood burning impacts if wood replaces coal. Sulfate impacts not included since the amount of sulfur dioxide to sulfate conversion is unknown for short time periods.

7. Coal BTU content of 27×10^6 BTU/ton assumed.

8. Calculations based on Workbook of Atmospheric Dispersion Estimates, D. Bruce Turner, U.S.D.H.E.W., 1969, pp. 5-9. Assumptions used include a) a 12-hour burn period b) Class C stability c) impact on an adjacent house 10 meters distant and d) indoor concentrations of impacted house assumed to be 50% of outdoor concentrations. Thus the 12-hour impact on the outside structure of the impacted house would be four times as great as the value shown.

9. Based on 24-hour calculations as explained in Footnote 7 above, it was assumed that the heating season is 4 months long and that downwash conditions occur on one quarter of the heating season days.

10. Compilation of Air Pollutant Emission Factors, U.S.E.P.A., 1975.

11. Sources include those listed below. Emission factors for B(a)P from coal (.074, 2.5, and 12.7 g/10^6 BTU) were reduced by the available B(a)P emission factor for wood in wood stoves (.135 g/10^6 BTU)

    a. Beine, Dr. Helmut, Level of 3,4 - Benzopyrene in the Waste Gasses of Domestic Stoves Using Solid Fuels. Staub-Reinhalt. Luft 30,8:23-26, August 1970.

    b. Hangebrauck, R.P., et al, Sources of Polynuclear Hydrocarbons in the Atmosphere, U.S.D.H.E.W., Public Health Service, AP-33, PB 174-706, Washington, DC, 1967. In: Particulate Polycyclic Organic Matter, National Research Council, National Academy of Sciences, Washington, DC, 1972..

12. Gecmet's Dr. Demetrios Moschandreas, cited in the September 1980 Environmental Science and Technology article entitled "Indoor Air Pollution", has recorded B(a)P levels in rooms with wood-burning fireplaces of over 11 ng/m^3. In an 11/13/80 phone conversation, he estimated average B(a)P levels in such locations at 2 to 4 ng/m^3.

13. An 8-hour burn period was assumed.

14. The range in B(a)P levels discussed in Footnote 11 were divided by a wood fireplace B(a)P emission rate of .045 g/10^6 BTU's which data is from Table 3 in DEQ's draft research paper.

15. This row of values is the product of the two above rows.

16. Values were reduced by .33/.55, 1/55 and 3.67/1034 to account for the B(a)P indoor concentrations from wood which were assumed to have been replaced by coal.

17. Values based on burning 4 of 12 months per year.

18. The range in TSP levels discussed in Footnote 6 were divided by a wood fireplace B(a)P emission rate of .045 g/10^6 BTU which data is from sources cited in Footnote 11.

19. If burning wood with a .045 g B(a)P 10^6 BTU emission factor results in 24-hour B(a)P concentrations of 1 ng/m^3 (.001 ug/m^3), and if a 35 pound charge of wood was assumed, then an equivalent amount of coal (22 pounds) which has a TSP emission factor which is 2990 times as great is estimated to produce TSP concentrations of 2.99 ug/m^3.

    The low value is derived from assuming a lesser charge of 7 pounds coal and a lesser net TSP emission factor of 3 lb/ton (2.99 x 7/22 x 3/8 = .36 ug/m^3). The high value is derived from assuming a greater day's charge of 44 pounds coal and a higher net TSP emission factor of 13 lb/ton (3.0 x 44/22 x 13/8 = 9.7 ug/m^3).

20. A 4-month heating was assumed

21. A methodology similar to that cited in Footnote 19 was used.

APPENDIX A

Summary of Oregon and Federal Air Quality Standards for Various Pollutants and Recent Portland Area Concentrations

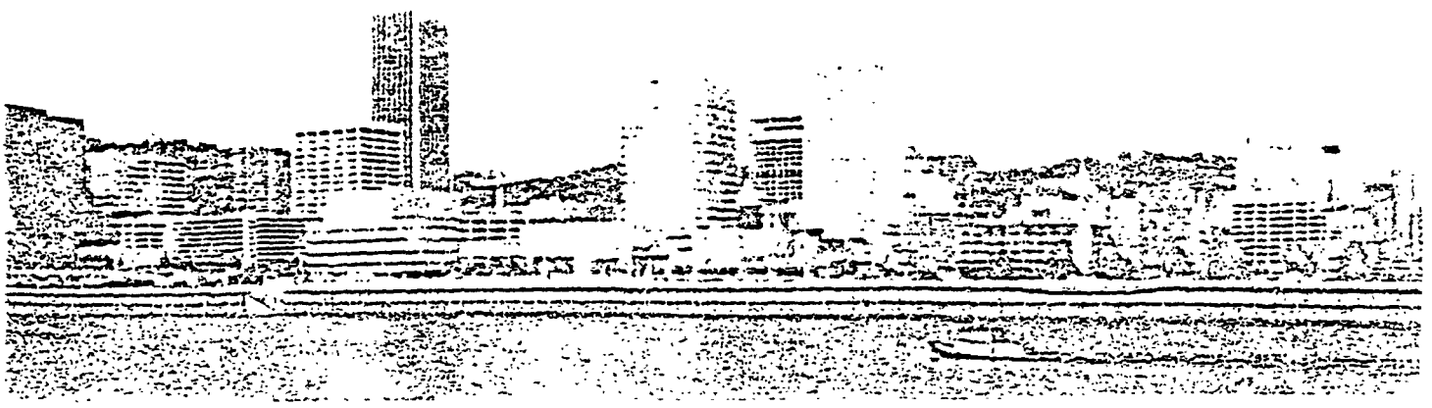
	ug/m^3 Annual	ug/m^3 24-Hour Maximum	ug/m^3 3-Hour
TSP			
- Primary Standard	75	260	N.A.
- Secondary Standard	60	150	N.A.
- Oregon Standard	60	150	N.A.
- Portland Area 1987 Max.	84	254	N.A.
SO_2			
- Primary Standard	80	365	N.A.
- Secondary Standard	N.A.	N.A.	1300
- Oregon Standard	60	260	1300
- Portland Area Current Max.	32	217	N.A.
SO_4			
- California Standard	N.A.	25	N.A.
- Portland Area Recent Max.	3-6	12	N.A.
B(a)P	Nanograms/cubic meter		
- Portland Area (1969 single site values	2.6	N.A.	N.A.
- Average U.S. 1966 levels	3.2	N.A.	N.A.
- Averate U.S. 1975 levels	.5	N.A.	N.A.

WTG:g
AG963 (1)

Portland Air Quality Advisory Committee
P.O. Box 1760
Portland, Oregon 97207
(503) 229-6092

1. The DEQ should adopt a strategy to ban the sale of residential coal in the Portland AQMA to users, with the exception of current home users, who use it as a primary source of heat. Existing residential users shall be allowed to burn coal in residences for five years, after which they should not be allowed to burn coal unless they obtain a hardship variance.

AQ0099.A



Attachment 3

Statement of Need for Rulemaking

Pursuant to ORS 183.335(2), this statement provides information on intended action to amend a rule.

Legal Authority

ORS Chapter 468, including 468.020 and OAR 340-22-020

Need For The Rule

To prevent increased difficulty in meeting ambient air standard, protect the public against potential adverse health affects and avoid severe nusiance conditions including soiling, odors, and visibility loss.

Principal Documents Relied Upon

Coal Health Effects Review Committee Summary Report to the DEQ
April 21, 1981

Fiscal Impact Statement

Potentially $400,000 in annual lost business to present coal suppliers which may be offset by increased business for cleaner energy sources. Investments up to approximately $500 for those households of the approximately 2,000 that heat with coal and will need to provide a new heating system by no later than July 1, 1983.

AAD135.2A (1)

PROPOSED RULES TO LIMIT THE SULFUR AND VOLATILE MATTER OF COAL SOLD FOR DIRECT SPACE HEATING

COAL

340-22-020 (1) After July 1, 1972, no person shall sell, distribute use, or make available for use, any coal containing greater than 1.0 percent sulfur by weight.

(2) After July 1, 1983, no person shall sell, distribute, use or make available for use, any coal containing greater than 0.3% sulfur and 5% volatile matter as defined in ASTM Method D3175 for direct space heating within the Portland, Salem, Eugene-Springfield, and Medford-Ashland Air Quality Maintenance Areas.

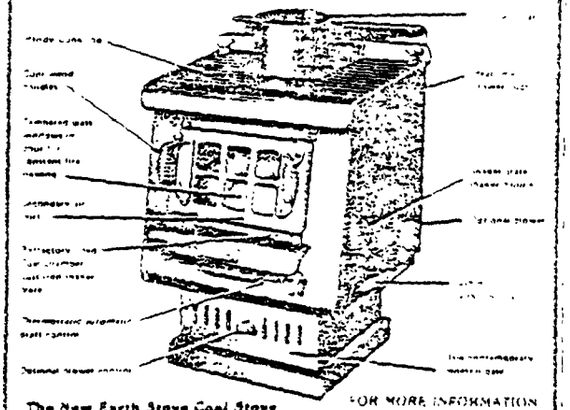
Attachmmnt 5

TYPICAL JOURNAL ADVERTISEMENTS/ARTICLES

ON COAL HEATING

The Earth Stove

NEW COAL STOVE for 1981



The New Earth Stove Coal Stove for 1981 is just what you would expect from the Earth Stove professionals. The special Convertible Draft ducting system allows the stove to adjust for either anthracite or bituminous coal. Our automatic draft control, fan option and good looks make it a welcome addition to the exciting product line of Earth Stoves and accessories.

Join us in the winner's circle in 1981 with the Earth Stove! !!

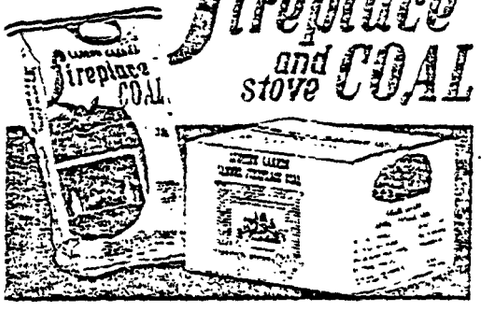
FOR MORE INFORMATION CLIP AND MAIL TO:

AMERICAN ALTERNATIVES INC.

Circle Reader Service No. 038

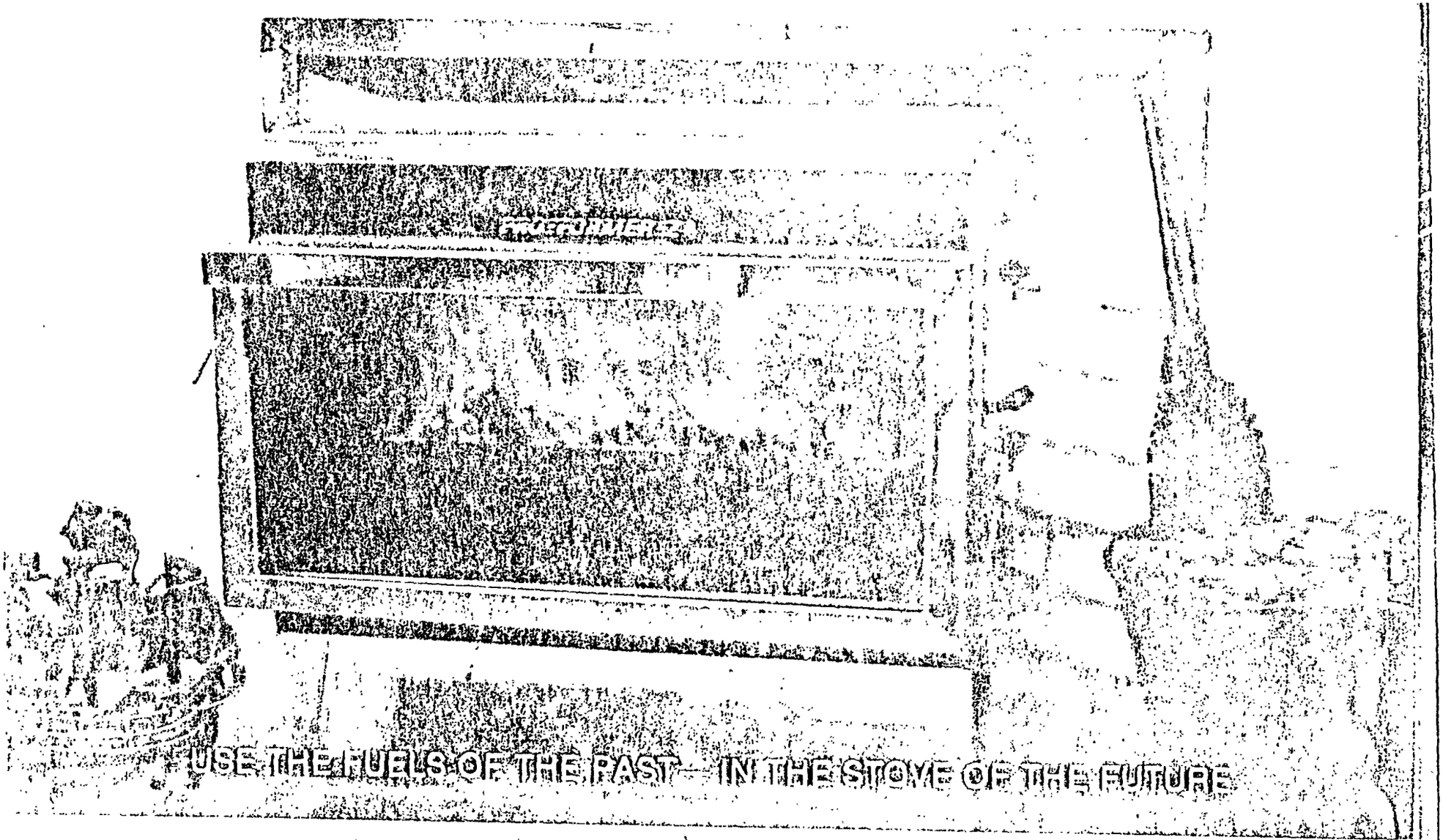
For The Warmth In Your Hearth

Introducing LAREDO CANNEL Fireplace and stove COAL



- BURNS HOTTER than wood, has greater than 12,500 BTU per pound.
- BURNS SAFER than wood, has no creosote build-up in chimneys and woodstoves.
- CLEANER TO HANDLE than wood, has no bugs or bark to bring into the home. Fewer ashes to remove.
- EASY TO LIGHT, use kindling, paper or gasoline. Can also be used to start wood fires.
- COSTS LESS Per million BTU's to use than fuel oil, natural gas, wax logs and wood.
- HAS BEEN TESTED by Commercial Testing and Engineering.

Circle Reader Service No. 050



U.S. Patent #4263885F
UL Standards 1482 and 737

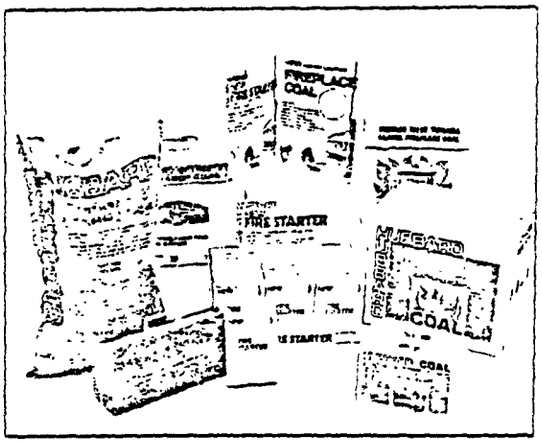
featuring

Circle Reader Service No. 316

Pro-Former Engineering Corp.
Mear Road
Holbrook, MA 02343
(617) 767-3311

Coal is America's Number 1 Resource for the Future.

Packaging plants in Wilkes-Barre, Pennsylvania and eastern Kentucky with truck or rail shipment.



Hubbard Coal pioneered the prepackage concept in coal distribution. We offer anthracite packaged in heavy poly bags or corrugated boxes. Cannel coal, bituminous lump coal and lignite briquettes are available in clean prepackaged units. Two fire-starters are available to ignite the coals: One is a convenient kerosene base product; the other, a hand split natural pitch pine.

Hubbard Coals have been picked because of their low ash and sulphur content. Don't be fooled in buying anything but clean burning, freshly mined coals produced by the energy people at Hubbard Coal.

HUBBARD Coal and Mining Companies Produce the Finest Fresh Mined Anthracite and Bituminous Coals Available.

Don't be left out in the cold. Last year's production of anthracite coals for heating units in stove, nut, pea, buckwheat and barley hardly met the requirements for the coal dealers in the Northeast New England marketplace. This season's sales of stoves in this marketplace alone will reach 270,000. With three tons average usage per season the market needs over 700,000 tons of stove, nut and pea alone. The present production facilities in the anthracite fields cannot meet this demand. If you wish to join a growing field with a growth company contact Hubbard Coal and Mining Companies.

Educational pamphlets, photos, ad slicks, vendors liability insurance, national advertising, point of purchase displays, four color posters, trade advertising included in Dealer/Distributor program.

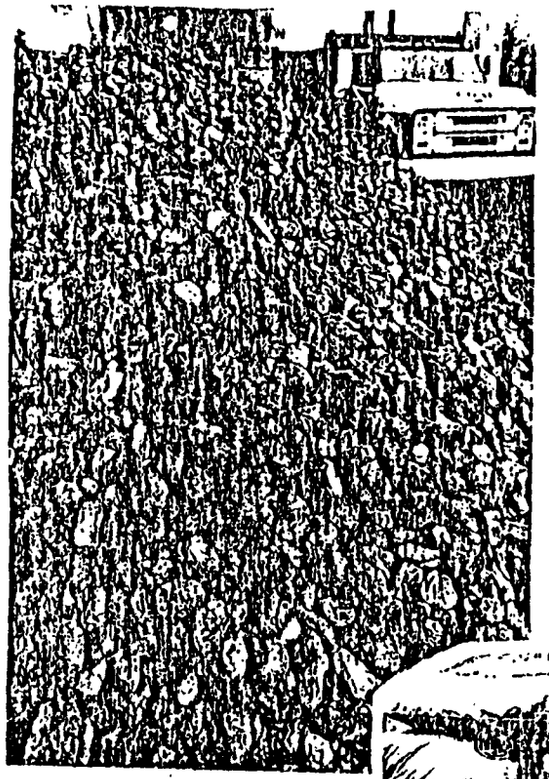
Hubbard Coal is looking for purchasers of additional tonnage in anthracite and bituminous production.* Mines are located in Kentucky, Virginia, West Virginia, Pennsylvania and Utah.

*FOR INFORMATION on becoming a Hubbard Coal Dealer/Distributor please write to us at P.O. Box 1216, Birmingham, Michigan 48012. Call 717/ 824-7505 for Barbara Bowen or 313/ 845-1937 for Red Phillips.

HUBBARD COAL

Presently we have 20 Dealer/Distributors serving the West/Mid-West/Northeast and New England Markets.

Circle Reader Service No. 004



15 bags (1 pickup load) could heat an Oregon home

Coal dealers—and consumers—who lack yard space for bulk tons (above), have the option of bagged coal (right). Photos by John Florian.

The Rush Continues...

By Jack Goldberg
Associate Editor

Using coal is the American way to heat a home.

That appears to be the thinking of millions of Americans seeking to keep warm this winter while trying to make oil-rich OPEC go hungry.

Coal, which has been receiving a bum rap ever since Tiny Tim found a lump of it in his Christmas stocking, continues its modern day rush as a home heating fuel. And industry experts predict the best years for coal are still ahead.

"We see a continuing increase in the use of coal," says Paul Merritt, managing editor of Coal Age, a respected trade publication. "The rise will not be as fast or as dramatic as has been the case five years ago but it will be more steady, consistent and long lasting."

One big snag — distribution — is starting to smooth out.

"The retail distribution market pretty much gave in 1968," says Tony Anthony, associate director of public and media affairs for the National Coal Association. "It is starting to turn around and build up quickly."

It has to. Coal use in Connecticut alone this winter is expected to soar more than 300 percent from the '79-'80 season, predicts Connecticut's energy office director, Joseph A. Belanger.

And where are we going to get this coal? From Pennsylvania, answers that state's Lt. Gov. William Scranton III, who recently toured Connecticut, Massachusetts and Rhode Island, promising that no one who uses coal there as primary heat this winter will go cold.

Tight, not critical

Scranton, of course, is speaking about anthracite, the hard coal that heats homes in the northeast — the nation's major coal burning region.

"It will be a tight market," Scranton says of this season, but it will "not be a critical situation."

He blames the 30 day anthracite coal strike earlier this year and environmental factors for spot shortages which may appear this season in New England, New York and New Jersey. He urges consumers to buy coal now to avoid dealer's empty bins later.

Last year, coal shortages put a damper on coal stove sales and raised consumer and industry skepticism over the realistic potential of coal's deliverance of America from the OPEC age.

Blaming distribution problems for last season's woes, Scranton warns that while shortages won't be as dramatic this winter, they will occur in certain areas.

"I think what you've seen is an industry that was lively for a number of years, then died, and now we've come to the problem of resurrecting it," he said. "The demand has been greater than had been expected."

More severe

However, the New England Congressional Caucus is predicting a more severe shortage of anthracite than Scranton's estimate.

"If we have even a moderately cold winter, we'll have a shortage this winter," said Robert Pratt, executive director of the caucus.

After surveying the energy offices in Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire and Maine, the caucus concluded there will be a 54 percent increase in anthracite coal consumption this winter.

Pratt said the difference between an expected increase in production of about 20 percent and of more than 50 percent in demand means a shortage is inevitable.

"I don't see significant progress since last year because the producers are so conservative," he said.

Pratt said it's understandable that the producers do not want to increase production when they are not receiving large orders now and it's equally understandable that the dealers do not want to place large orders when it's off season for their customers.

Most of the dealers are 'Mom and Pop' operations and do not have well established sources of capitol. They say, 'Why should we trust that the orders will be there?'" he said.

The energy offices in New England have projected that homeowners will need more coal in every

NATURAL GAS

Deregulation could spark a boom for solid fuel sales

by Steve Maviglio

IF THE regulatory reform dreams of the Reagan Administration come true, the average American family's annual gas heating bill will jump a whopping 86 percent next year, according to the Energy Action Foundation. Such an increase, many industry experts believe, will spark record levels of solid fuel equipment sales.

According to the American Gas Association, natural gas accounts for 26 percent of all energy consumed in the United States and about 30 percent of the energy produced in the nation. Gas also keeps about half of America's households warm.

In the next few months, these residential users may be in for an unpleasant shock. Under the National Gas Policy Act (NGPA) of 1978, prices of old gas (previously discovered) will climb gradually until Jan. 1, 1985, softening the impact of a sudden price boost on the fragile economy. (Newly discovered gas is already decontrolled.) For example, next year's schedule calls for a 14 percent price hike.

However, President Reagan has hinted that controls may be lifted as early as December. This action would boost the gas heating bill of the average family from $505 in 1981 to $940 in 1982, according to the Energy Action Foundation.

"Consumers will face price increases that make OPEC hikes look small," says Energy Action Director Edwin Rothschild. "These kinds of increases," he notes, "will make it even harder for middle-income American families to stay even with inflation."

The industry's powerful trade group, the American Gas Association (AGA), also warns of the effects of a swift end to controls. In a recent report, AGA warns that "immediate total decontrol of natural gas wellhead pricing would increase both inflation and oil imports."

The report goes on to say that gas prices paid by users in all sectors would nearly double, resulting in a first-year

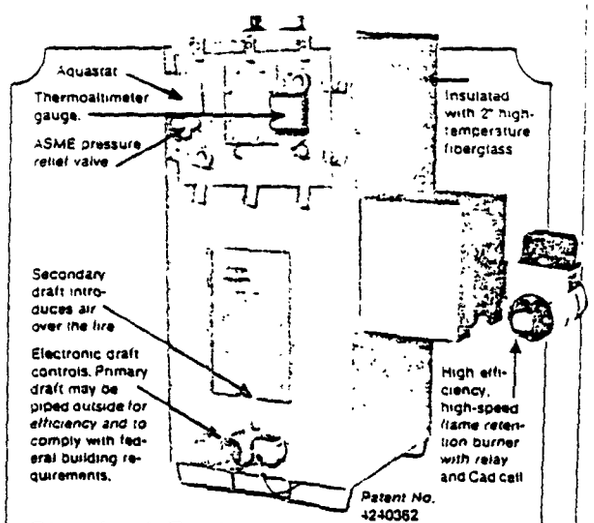
NORTHWIND BOILER

MULTI-FUEL

OR

ADD-ON

Patented (H) ASME coded removable boiler pressure vessel. Patented fire tube boilers designed after the principle of steamships, steam locomotives and nuclear reactor heat exchanges. Quick recovery and dynamic forces are possible only in tube boiler design. Northwind POWER DRAWER offers this commercially proven technique to fit your home.



Standard Features on Northwind Series "B" Multi-Fuel POWER DRAWER™ Heating Systems

Also available as an ADD-ON to your present heating system

It's easy to convert your present heating system to Multi-Fuel because Northwind's Hot Water Boiler POWER DRAWER can be used as an ADD-ON heating unit.

Also, Northwind's POWER DRAWER System lets you upgrade the ADD-ON unit to fully integrated Multi-Fuel Heating at any time simply by adding the Oil Gun Package . . . and at a fraction of normal replacement costs.

DEALERS AND DISTRIBUTORS WELCOME

ORC INDUSTRIES

2700 Commerce Street
La Crosse, WI 54601
Phone 608/781-7727

WOOD HEATING ALLIANCE

ORC INDUSTRIES, INC. COPYRIGHT © 1981

Circle Reader Service No. 036

AVERAGE ANNUAL GAS UTILITY BILLS FOR HOUSE HEATING CUSTOMERS

	1981 Cost	1982 with NGPA Plan	1982 with Reagan Plan	1982 Difference between Reagan Acceleration and NGPA Plan	Pct. Increase over 1981 Cost with Reagan Acceleration
UNITED STATES	$505	$575	$ 940	$365	86%
NORTHEAST					
Connecticut	$740	$835	$1180	$345	59%
Delaware	580	770	1145	375	68
Dist. of Columbia	670	760	1145	385	71
Maine	500	560	740	180	48
Maryland	580	660	1000	340	72
Massachusetts	665	750	1075	325	62
New Hampshire	530	600	895	295	69
New Jersey	680	765	1115	350	64
New York	770	870	1280	410	66
Pennsylvania	680	775	1230	455	81
Rhode Island	580	660	1005	345	73
Vermont	610	690	1045	355	71
NORTH CENTRAL					
Illinois	$750	$855	$1385	$530	85%
Indiana	585	670	1135	465	94
Iowa	540	620	1045	425	94
Kansas	420	485	920	435	119
Michigan	640	735	1245	510	95
Minnesota	620	710	1170	460	89
Missouri	545	620	1040	420	91
Nebraska	470	545	970	425	106
North Dakota	625	715	1185	470	90
Ohio	555	635	1055	420	90
South Dakota	475	545	925	380	95
Wisconsin	595	680	1095	415	84
SOUTH					
Alabama	$400	$455	$ 710	$255	78%
Arkansas	315	365	685	320	117
Florida	215	245	370	125	72
Georgia	390	450	740	290	90
Kentucky	440	505	890	385	102
Louisiana	345	395	660	265	91
Mississippi	335	385	635	250	90
North Carolina	450	515	790	275	76
Oklahoma	370	425	775	350	109
South Carolina	335	380	585	205	75
Tennessee	345	400	705	305	104
Texas	360	410	650	240	81
Virginia	620	700	1060	360	71
West Virginia	520	595	975	380	88
WEST					
Alaska	$495	$580	$1160	$580	134%
Arizona	260	295	450	155	73
California	300	345	595	250	98
Colorado	440	505	875	370	99
Idaho	495	560	845	285	71
Montana	420	485	880	395	110
Nevada	355	405	660	255	86
New Mexico	370	425	710	285	92
Oregon	500	565	830	265	66
Utah	510	585	1060	475	108
Washington	520	590	875	285	68
Wyoming	500	575	995	420	99

Courtesy of Energy Action Foundation, Washington, D.C.

direct cost to U S consumers of more than $60 billion. Besides that, the group fears that a windfall profits tax on gas could arise.

Economists at the Natural Gas Supply Association (NGSA) believe otherwise. In a contrasting study, NGSA predicts that immediate decontrol would "stimulate exploration and production of natural gas, which in turn would cut imports of foreign oil."

Even if the administration holds off on the immediate lifting of controls, gas prices are expected to climb 15 percent next year anyway But the cost of gas still will remain at nearly half that of oil. All told, natural gas prices have risen 42 percent since 1977, compared to oil's 105 percent increase.

That may be the prime reason behind the nearly 910,000 oil-to-gas-heat conversions recorded over the past three years. Similar rates of fuel switching are expected to continue, since nearly a third of the 16 million oil-heated homes in the United States already have gas hookups for cooking or water heating.

BUT THE oil industry is not taking this rapid loss of business sitting down. Several metropolitan areas have been flooded with ads warning about the pitfalls of rising gas prices. One commercial, funded by the New England Fuel Institute (an oil dealers trade group), lectures: "The more you know about gas, the more comfortable you'll feel about oil heat."

"Natural gas is the most ridiculous bargain on the market," a leading gas industry analyst recently told *The Wall Street Journal*. "The average price of gas is about $2 per 1,000 cubic feet. That equals $12-a-barrel oil. John Q. Public waits until he can't pay the bills. Apparently the price isn't high enough to hurt yet."

Current consumption figures prove him wrong. Despite the addition of some 400,000 households to the gas list this year, consumption remained flat. Average consumption is down too, from 107,000 cubic feet in 1974 to 90,000 today.

But today's conservation will bring tomorrow's good times to the gas industry. Many analysts are wary of obtaining future supplies. They warn that this year's gas shortage in Massachusetts may be a grim sign of things to come.

Just 25 years ago, oil companies flared gas because it was so cheap and available. One gas company executive believes that several trillion tons were burned indiscriminately.

After World War II, pipeline construction picked up, linking the gas-rich Southwest with the energy-starved Midwest and Northeast. The Southwest continues to dominate gas production, though Alaska should provide the bulk of natural gas output through the year 2020.

Canada holds significant gas reserves as well. Currently meeting five percent of U.S. demand, that nation's exports are limited to what the government feels is "excess" to their needs. According to the Canadian Petroleum Association, Canada holds gas reserves of 89 trillion cubic feet—not to mention untapped deposits in the far north and offshore.

South of the border, Mexico already has begun to meet U.S. shortfalls. Today it sends us several million cubic feet By 2000, that figure should rise to two trillion cubic feet annually

Other exploration possibilities include coal, peat and oil shale gasification, methane, biomass conversion, and development of western tight sands and Devonian shale.

Questions about future natural gas availability and an immediate price shock can only mean good news for the solid fuel industry. As with the oil price hike in 1978, sales of wood and coal-heating equipment may shoot upward

Several industry sources say that deregulation of natural gas will have a "booming" effect on the industry, "opening new markets for stoves that never existed or were latent before."

Some manufacturers believe that fireplace inserts will be especially big sellers. Urban and suburban homes heated by gas in the Northeast and Midwest are likely to turn to wood and coal for auxiliary heat, resulting in insert sales. Smaller stoves also should become sales leaders.

The White House has not set a time frame for ending controls, so it is still too early to predict any effect on this season's sales. Senate Energy Committee Chairman Jim McClure (R-Idaho) forecasts a vote by the end of the year. Others predict quicker action. *SM*

For a state-by-state analysis of the projected price increases under complete deregulation if approved this June, see the accompanying table

For The Warmth In Your Hearth

Introducing LAREDO CANNEL Fireplace and Stove COAL

- BURNS HOTTER than wood, has greater than 12,500 BTU per pound.
- BURNS SAFER than wood, has no creasote build-up in chimneys and woodstoves.
- CLEANER TO HANDLE than wood, has no bugs or bark to bring into the home. Fewer ashes to remove.
- EASY TO LIGHT, use kindling, paper or gaspipe. Can also be used to start wood fires.
- COSTS LESS Per million BTU's to use than fuel oil, natural gas, wax logs and wood.
- HAS BEEN TESTED by Commercial Testing and Engineering.

Fuel Distributors
Farrel Cooper Mining Co's Inc.
P.O. Box 1975 Fort Smith, Arkansas 72902 (501) 646-4761

See us at the National Hardware Show
Booth 1567-A Circle Reader Service No. 037

VICTOR ATIYEH
GOVERNOR

Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207
522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. J , January 22, 1982, EQC Meeting

Adoption of Amendments to Sulfur Content of Fuels, Coal, Rule, OAR 340-22-020, to Limit Sulfur and Volatile Content of Coal Used for Direct Residential Space Heating

Background

The potential air quality impact from increased use of coal as a residential heating fuel has been evaluated by the Department. A committee of prominent health officials (including the State Health Officer and Multnomah County Health Officer) and the Portland Air Quality Advisory Committee, aided in this review. The general concensus of these groups was that preventative action to restrict coal as a residential heating fuel in problem airsheds was warranted in order to:

1) Avoid increased difficulty in attaining air quality standards,

2) Protect the public health against adverse health effects,

3) Avoid severe nuisance conditions including soiling, odors and visibility loss; and

4) Avoid substantial economic and social impacts that would occur if regulations were enacted after a significant problem and market had developed.

The Department opted to propose a clean coal rule in lieu of an outright ban on residential coal burning in order to provide an opportunity for the coal industry to manufacture a residential heating fuel which would not cause significant air quality problems in Oregon. At the October 9, 1981 Environmental Quality Commission meeting, a hearing was authorized for a proposed rule which would limit coal sold as a residential heating fuel in

the Portland, Salem, Eugene and Medford airsheds to a sulfur content of no more than 0.3% and to a volatile matter content of no more than 5%.

The hearings authorization report for the October 9, 1981 Environmental Quality Commission meeting (Attachment 1) discussed in detail the potential for increased use of coal in Oregon, the potential health effects and possible control alternatives. Notably mentioned in this report was the rapid increase of solid fuel heating appliances in the last few years in Oregon and the trend toward more restricted availability of firewood and the potential for greater availability of domestic coal. Also notably mentioned were air quality impact projections which indicated potential new violations of the state sulfur dioxide standard and increases in ambient sulfates and polycyclic organic matter (carcinogens) to levels considered unhealthy by members of the medical community.

Hearings Results and Evaluation

On November 17, 1981 a hearing was conducted in Portland on the proposed residential coal rule. The hearings officer report is contained in Attachment 2. In summary, 51 pieces of testimony have been received on the subject. A total of 28 pieces of testimony were in favor of the proposed rule. Of the 28, 14 were from organizations and 14 from individuals. A total of 23 pieces of testimony were opposed to the proposed rule. Of the 23, 7 were from organizations, 9 were from individuals who burned coal, and 7 were from individuals who apparently do not burn coal.

Organizations Favoring The Rule

Prominent among the 14 organizations who testified in favor of the rule were the Oregon State Health Division, Medford City Council, Associated Oregon Industries, Lane Council of Governments, League of Women Voters and numerous environmental oriented organizations. Generally, these organizations:

1) Praised DEQ for its foresight,

2) Characterized coal as a notoriously dirty residential heating fuel,

3) Felt health and asthetics would be severely effected by increased residential coal burning,

4) Concluded industrial growth would have to be further limited to compensate for increased emissions from residential coal burning, and

5) Felt now is the time to regulate residential coal burning before major investments and life style changes occur which would be nearly impossible to reverse.

The Associated Oregon Industries believed it would be preferable to regulate the heating devices in lieu of the fuel but recognizing DEQ had no legislative authority to do so at this time felt that the proposed rule was the only way to deal with this potential problem at this time.

Individual Testimony Favoring Rule

The 14 individuals who spoke in favor of the proposed rule generally cited:

1) Previous personal bad experiences with air pollution from residential coal burning in other parts of the country, and

2) Present adverse impacts from neighbors burning wood and coal.

Many supported the allowance under the proposed rules for suppliers to produce an environmentally acceptable residential coal. One chimney sweep supported the rule as a means of preventing serious fire hazards from people burning coal in woodstoves which are not designed to withstand the extreme heat generated by coal burning.

Organization Testimony Against Rule

The 7 organizations testifying against the proposed rule generally were not in favor of regulation until a significant problem had occurred. The Federal Department of Energy expressed concern that the proposed rule:

1) May encourage more wood heat which could cause greater polycyclic organic matter (POM) (which are known carcinogens) than from burning coal, and

2) Would prevent use of anthracite coal which they consider a relatively clean burning fuel.

The Department and Health Advisory Committee did consider the POM impact of wood versus coal heating. The analysis showed that using the lowest values of POM emission factors, coal had a slightly less POM emission than wood. Using most probable and high range factors for hand fired devices, however, showed substantially more POM's from coal than from wood. Also a recent study by Harvard University has indicated greater health effects from bituminous coal burning than from wood. Finally, the substantially greater sulfur dioxide emissions and impact from coal versus wood were judged to far outweigh the concerns over slight differences in POM emissions.

In regard to anthracite coal, the Department recognizes that there are some varieties that have low volatile content (less than 10%) which can burn relatively smoke-free. Sulfur content of these coals is still relatively high (greater than .8 % sulfur); and using projections in the Health Committee report (contained in Attachment 1), burning such coal would be projected to threaten compliance with SO_2 air quality standards in Portland. There is a small amount of relatively low sulfur (less than .3%) western anthracite and bituminous coal which, if processed using available

technology, could meet the proposed 5% volatile content limit. The process would slightly increase the sulfur content (up to .5%). In order not to impose costly coal washing or other sulfur reducing techniques on this naturally occurring low sulfur coal to meet a strict .3% limit, the proposed rule could be modified to allow the limit to be measued on a preprocessed coal basis.

Individuals Testimony Against The Rule

The 9 individuals who burn coal and were opposed to the rule generally cited lower costs and convenience of burning coal and their belief they were not causing an air quality problem compared to those people burning wood. A few individuals cited a potential hardship in switching to another fuel and/or installing an alternative heating system.

The present use of coal (estimated at less than 1% of households) is admittedly not presently contributing to general airshed problems, although surprisingly DEQ has received some complaints about coal smoke. Imposing what at this point would be a ban on residential coal burning may be considered unjustifiably burdensome to some local residences. Individuals would, of course, have the right to apply for a variance under Oregon Administrative Rules. Another approach might be a blanket exemption for all existing coal burners. This would appear to have severe enforcement difficulties since coal is generally sold on a cash and carry basis and no receipts would be available to document who really qualified. Another approach would be an exemption upon application to those people who would certify that they have historically burned a specified minimum amount of coal in devices designed to burn this fuel. This would appear to be the most practical approach.

The 7 individuals who apparently don't burn coal but were opposed to the proposed rule, generally were opposed to any more government regulation and felt the analysis of the future air quality impacts of coal burning was inadequate.

Mr. K.J. Johnson raised several specific questions, including:

1) Why does DEQ feel new transshipment coal terminals will increase residential coal burning when the Port of Portland has stated several reasons why it wouldn't, and

2) What validity is there to portrayal of large pulp mill conversions to coal and if, in fact, there was validity, wouldn't the air quality impacts from them far outweigh those from residential coal burning?

While the Port of Portland indicated their contractual arrangements would generally make export coal unavailable to local markets, it is clear that major new export markets are going to substantially increase mining of coal in the west and perhaps even in Oregon and Washington. Some of this coal will be destined for domestic use including major industrial operations.

In Oregon, PGE's Boardman plant now burns coal as does Oregon Portland Cement plants at Lake Oswego and Durkee and Amalgamated Sugar at Nyssa and Kingsley Air Force Base in Klamath Falls. A permit has been issued for a wood/coal boiler to Harney County Electric at Burns and a permit application has been received from the Boise Cascade pulp and paper mill at St. Helens for a very large coal boiler. The Crown Zellerbach pulp and paper mill at Wauna also indicates intentions of pursuing a permit for a large coal conversion. DEQ believes it is reasonable to expect as the coal market, mining and general supply expand, there will be greater incentives for independent distributors to expand and penetrate the residential market. A very similar situation has been demonstrated in gasoline marketing where independent service stations proliferate as supply and demand increases.

Actual air emissions from major pulp mill coal conversions will be reviewed by the Department under DEQ's permit program to ensure no adverse impact will occur. Generally, with the available control technology and the fact that industrial coal conversions will likely replace 1.75% sulfur oil burning with 1% sulfur coal, there will be a net air quality benefit. Such was the case for particulate and sulfur dioxide emissions from a recently proposed Weyerhaeuser project at Longview, Washington.

Mr. G.R. Stroshane felt that Oregon had no potential of ever reaching severe air pollution conditions reached in the London smog of the '50s (when 4,000 excess deaths were attributed to residential coal burning). He also felt that sulfur in wood was something to be concerned about. Comparing the air pollution potential of Oregon communities with London is difficult because of lack of comparable and complete air quality monitoring information from the episodes in London. It is clear that western Oregon, notably the Medford area, has the highest meteorological potential for air pollution of anyplace in the U.S., being much higher than areas in the east. It is also recognized that severe air pollution episodes with associated mortality and morbidity have occurred in eastern U.S. areas like Donora, Pennsylvania in 1948. Therefore, the potential for severe air quality conditions in certain areas of Oregon from residential coal burning must be considered high. Sulfur dioxide emissions from coal are about 10 times those from wood on an equivalent heat basis, therefore, wood should not be considered significant in terms of sulfur dioxide impacts.

General Alternatives

The basic alternatives to consider in taking action on the proposed rule are as follows:

1) Adopt or not adopt a rule at this time. The Department believes the potential for significant increases in residential coal burning is real and that preventative action is warranted based on air quality impact projections and medical community projections of adverse effects. With some moderate resistence to the rule shown by existing coal burners, massive resistence and economic hardship would be expected if a large constituancy of coal users was allowed to develop.

2) Exempt or not exempt existing coal users. The current variance process could be used to exempt existing coal users, however, this would take separate EQC action each time. A more simplified administrative process could be followed by providing a blanket exception in the rule which would require applicants to apply and certify they have burned a significant amount of coal in a stove designed to burn coal. Such a process would avoid exempting those individuals who may have or would burn a few supermarket packages of coal in their woodstove and expect to be exempted.

3) Adopt the proposed 0.3% sulfur and 5% volatile limit or modify it so naturally occurring low sulfur anthracite and bituminous coal could be easily processed to meet the regulation. Keeping the maximum amount of options open for using clean coal as any energy source is a well justified policy considering environment, economic and energy needs. Therefore, the proposed 0.3% sulfur limit should be applied to preprocessed coal to avoid additional sulfur removing costs.

4) Applying the regulation strictly to coal or applying the regulation to fuels blended with coal. There are some indications that fuel blends are being developed which contain coal. It seems justified to apply the same environmental restrictions to this fuel as to pure coal as the same air quality impacts would be expected.

Summation

1. Oregonians have demonstrated a significant shift towards solid fuel heating as exemplified by massive increases in wood space heating.

2. The potential exists for major increases in use of coal as a residential heating fuel considering:

   1) Wood is becoming more expensive and more difficult to obtain,

   2) Coal is becoming more attractive as a residential solid heating fuel considering its cost, availability, handling and burning characteristics,

   3) Coal shipments to Oregon will substantially increase in the near future as coal export terminals and industrial coal conversions are constructed,

   4) Manufacturers are rapidly tooling up to increase marketing of residential coal burning devices, and

   5) Present and future energy prices will continue to accelerate pressures towards increased residential solid fuel use.

3. Projected air quality impacts from residential coal burning indicate:

   1) Achieving and maintaining compliance with air quality standards would be difficult,

   2) Sulfur dioxide, sulfates and carcinogens would be increased in areas like Portland to a point considered unacceptable by local health experts,

   3) Nuisance conditions, such as smoke, odors, soiling and visibility loss would be greatly accentuated.

4. The Health Effects Review Committee and Portland Air Quality Advisory Committee recommend banning of residential coal use in urban areas. Waiting to regulate after a serious problem occurred was considered unwise by the committees on the grounds that adverse health effects should not be allowed to occur and significant economic hardship would result by regulating after a major market had developed.

5. The Department believes the most prudent approach to the residential coal burning issue is to take preventative control measures and develop a clean coal regulation based on a .3% sulfur, 5% volatile limit. While such coal is presently not available in this country, technology exists to meet these requirements.

6. A hearing was held on the proposed residential coal rule at which considerable support for the rule was shown and some objections stated.

7. Some of the stated objections to the proposed coal rule could be alleviated by:

   a. Providing an exemption for existing coal burners, and

   b. Making it easier for low sulfur western anthracite and bituminous coal to meet the rule by eliminating the desulfurization part of the coal cleaning process.

8. The proposed rule should apply to fuels made with coal additives since these fuels could also create similar environmental problems to the burning of pure coal.

Director's Recommendation

Based on the Summation, it is the Director's Recommendation that the proposed residential coal rule OAR 340-22-020 (Attachment A) be adopted with amendments as shown which would:

1) Provide a means for existing coal users to apply for an exemption,

2) Provide that the sulfur limit for devolatized coal could be measured prior to devolatilization, and

3) Provide for application of the rule to fuels manufactured with coal as an additive.

William H. Young

Attachments: A. Proposed Amendments to OAR 340-22-020
1. October 29, 1981 EQC Report
2. November 17, 1981 Hearings Officer Report
3. Testimony for the November 17, 1981 EQC Meeting (Copies Provided to EQC Only)

John Kowalczyk:a
AAD164.6 (1)
229-6459
December 17, 1981

Attachment A

PROPOSED RULES TO LIMIT THE SULFUR AND VOLATILE MATTER

OF COAL SOLD FOR DIRECT SPACE HEATING

340-22-020 (1) After July 1, 1972, no person shall sell, distribute, use, or make available for use, any coal containing greater than 1.0 percent sulfur by weight.

(2) Except as provided for in subsections (4) & (5) below, no person shall sell, distribute, use or make available for use, after July 1, 1983, any coal or coal containing fuel with greater than 0.3% sulfur and 5% volatile matter as defined in ASTM Method D3175 for direct space heating within the Portland, Salem, Eugene-Springfield, and Medford-Ashland Air Quality Maintenance Areas. For coals subjected to a devolatilization process, compliance with the sulfur limit may be demonstrated on the sulfur content of coal prior to the devolatilization process.

(3) Distributors of coal or coal containing fuel destined for direct residential space heating use shall keep records for a five year period which shall be available for DEQ inspection and which:

(a) specify quantities of coal or coal containing fuels sold,

(b) contain name and address of customers who are sold coal or coal containing fuels,

(c) specify the sulfur and volatile content of coal or the coal containing fuel sold to residences in the Portland, Salem, Eugene-Springfield, and Medford-Ashland Air Quality Maintenance Areas.

(4) Users of coal for direct residential space heating in 1980 who apply in writing by July 1, 1983 and receive written approval from the Department shall be exempted from the requirement of (2) above provided they certify that they:

(a) used more than one-half (1/2) ton of coal in 1980,

(b) used a heating device in 1980 specifically designed to burn coal.

(5) Distributors may sell coal not meeting specification in (2) above to those users who have applied for and received the exemption provided for in (4) above.

APPENDIX V

New Jersey State Air Laws
Subchapter 10. Sulfur in Coal

7:27-9.3 Exemptions

(a) The provisions of this subchapter shall not apply to fuel used by ocean-going vessels or in motor vehicles.

(b) The provisions of N.J.A.C. 7:27-9.2(a), (b) and (c) shall not apply to persons storing, offering for sale, and delivering or exchanging in trade, fuels that are being used in compliance with the provisions of Table 2 and/or N.J.A.C. 7:27-9.2(d).

(c) The Department will set such standards for the sulfur contents of fuel as may be necessary to prevent violation of air quality standards where it is determined than an aerodynamic downwash problem exists as the result of emissions from a source or sources of air pollution.

7:27-9.4 (Reserved)

7:27-9.5 (Reserved)

SUBCHAPTER 10. SULFUR IN COAL

7:27 – 10.1 Definitions

The following words and terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise.

"Anthracite coal" means a hard, black lustrous coal containing 85-95 per cent carbon, characterized by its small percentage of volatile matter, high specific gravity, hardness, nearly metallic luster rich black color, and semiconchoidal fracture. Volatile matter is usually less than seven per cent.

"Approved stack-gas cleaning process" means a process which removes sulfur dioxide from the product of combustion of coal and which has been approved by the Department.

"Bituminous coal" means a coal containing 70-85 per cent carbon having usually more than seven per cent volatile matter.

"Cannel coal" means a free burning variety of high volatile content bituminous or subbituminous composed almost entirely of attritus, of uniform and compact fine-grained texture with a general absence of banded structure, dark gray to black in color with a greasy luster, noticeably of conchoidal or shell-like fracture and which ignites easily, is non-caking and does not swell on heating.

"Coal" means anthracite coal, bituminous coal and coke.

"Coal merchant" means any person who stores, offers for sale or sells coal in retail or wholesale trade, excluding agents, brokers, wholesalers, distributors or producers who sell coal for use in single steam and/or electric power generating facilities having rated hourly capacities that equal or exceed two hundred (200) million British Thermal Units (BTU) gross heat input, or in a group of steam and/or electric power generating facilities at one location having a combined rated capacity which equals or exceeds four hundred and fifty (450) million BTU gross heat input.

"Coke" means a fused, cellular, porous structure that remains after free moisture and the major portion of the volatile materials have been distilled from bituminous coal and other carbonaceous material by the application of heat in the absence of air or in the presence of a limited supply of air.

"Stack or chimney" means a flue, conduit or opening designed, constructed, and/or molecular composition of one sulfur atom and two oxygen atoms.

"Sulfur dioxide (SO_2)" means a colorless gas at standard conditions which has the molecular formula SO_2.

"Zone one" means Atlantic, Cape May, Cumberland, and Ocean Counties.

"Zone two" means Hunterdon, Sussex, and Warren Counties.

"Zone three" means Burlington, Camden, Gloucester, Mercer, and Salem Counties.

"Zone four" means Bergen, Essex, Hudson, Middlesex, Monmouth, Morris, Passaic, Somerset, and Union Counties.

7:27 – 10.2 Sulfur content standards

(a) No coal merchant shall store, offer for sale, sell, deliver or exchange in trade, for use in New Jersey, bituminous or anthracite coal which contain sulfur in excess of the percentages by weight set forth in table 1

(b) No person shall use in New Jersey bituminous or anthracite coal which contains sulfur in excess of the percentages by weight set forth in table 1.

TABLE 1
Existing Coal Burning Facilities

Type Coal	Maximum Allowable Percent Sulfur by Weight (Dry Basis)			
	Zone One	Zone Two	Zone Three	Zone Four
Bituminous	1.0%	1.0%	0.2%	0.2%
Anthracite	0.7%	0.7%	0.2%	0.2%

(c) The provisions of subsections (a) and (b) of this section shall not apply:

1. To bituminous or anthracite coal whose combustion causes sulfur dioxide emissions from any stack or chimney into the outdoor atmosphere which are demonstrated to the Department as not exceeding, at any time, those quantities of sulfur dioxide expressed in pounds per 1,000,000 British Thermal Units (BTU) gross heat input, set forth in table 2.

TABLE 2
Existing Coal Burning Facilities

Type Coal	Maximum Allowable SO_2 Emissions (lbs./10^6 BTU)			
	Zone One	Zone Two	Zone Three	Zone Four
Bituminous	1.5	1.5	0.3	0.3
Anthracite	1.0	1.0	0.3	0.3

2. To any coal-fired steam or electric power generating facility which is located in Zone Three or Zone Four, having a rated hourly capacity of greater than 200,000,000 British Thermal Units (BTU) gross heat input or group of facilities located in Zone Three or Zone Four having a rated hourly capacity of greater than 450,000,000 British Thermal Units (BTU) and which was in operation prior to May 6, 1968. Such facility shall be subject to the standards specified in table 1 for Zone One.

3. In any case in which the person responsible for the use of bituminous coal believes that bituminous coal containing one percent sulfur or less by weight cannot be

used in a specific steam and/or electric power generating facility, he may submit data to the Department setting forth justification for a less restrictive percent of sulfur content by weight in bituminous coal. If a change is approved by the Department, the Department shall authorize the use of a less restrictive percentage of sulfur by weight in bituminous coal. Any less restrictive percent of sulfur content by weight in bituminous coal authorized by the Department shall not exceed 1.5 percent at any time.

(d) The Department may authorize the use of bituminous coal not exceeding a maximum sulfur content of 3.5 percent by weight (dry basis) at existing facilities in Zone One if:

1. The person responsible for the use of bituminous coal demonstrates that bituminous coal, containing one percent sulfur or less by weight and suitable for use in the specific stream or electric power generating facility, is not reasonably available in sufficient quantities; and

2. Sulfur dioxide levels in the ambient atmosphere will at no time exceed or jeopardize the ambient air quality standards set forth in subchapter 13 of this chapter; and

3. The sulfur content of the coal burned by the facility represents the minimum sulfur content coal which can be used by the facility and is reasonably available in sufficient quantity; and

4. The person responsible for the use of bituminous coal submits to the Department for such authorization an application which considers and addresses as a minimum, in addition to the above, the following criteria:

i. Physical surroundings of the coal-fired steam or electric power generating facility;

ii. Population density of the surrounding area;

iii. Dispersion characteristics of the source;

iv. Topography of the immediate vicinity;

v. Aesthetic or nuisance effects.

(e) Authorizations granted pursuant to subsection (d) shall be valid for a period not to exceed five years from the date of issuance and may be renewed upon application to the Department, setting forth reasons and justifications for such renewal, including a demonstration of continued conformance with subsection (d) of this section.

(f) No person shall store, offer for sale, sell, deliver or exchange in trade, for use in New Jersey, or use coke which contains sulfur in excess of 0.75 percent by weight.

7:27-10.3 Expansion, reconstruction or construction of coal-fired fuel burning facilities.

(a) No person shall expand or reconstruct existing coal-fired steam and/or electric power generating facilities or build new coal-fired steam and/or electric power generating facilities having rated hourly capacities that equal or exceed, or would equal or exceed as a result of expansion and/or reconstruction, one million BTU gross heat input unless it is demonstrated to the Department.

1. That sulfur dioxide emissions, caused by the combustion of bituminous and/or anthracite coal, from any stack or chimney into the outdoor atmosphere can be controlled to levels that do not exceed at any time 0.30 pounds of sulfur dioxide per one million BTU gross heat input, or

2. That the bituminous or anthracite coal used to fire such a facility will at no time contain more than 0.20 per cent sulfur by weight.

7:27-10.4 Exemptions

(a) The provisions of this subchapter shall not apply to coal used by ocean-going vessels.

(b) In any case in which it is demonstrated to the Department that a bona fide pilot plant installation of a stack-gas cleaning process is to be made, the use of non-conforming coal to the extent necessary, in the judgment of the Department, to evaluate the effectiveness of the process will not be prohibited by this subchapter.

(c) Anthracite coal containing not more than 0.7 percent sulfur by weight or cannel coal containing not more than 1.0 percent sulfur by weight, may be burned solely for heating purposes in one or two family residences only in combustion equipment in use for such purpose prior to October 1, 1971.

APPENDIX VI

Maine Air Pollution Laws
Section 603. Low Sulfur Fuel

TABLE I

Process Weight Rate (lbs./hr.)	Emission Rate (lbs./hr.)
0.36	50
0.55	100
1.53	500
2.25	1,000
6.34	5,000
9.73	10,000
14.99	20,000
29.60	60,000
31.19	80,000
33.28	120,000
34.85	160,000
36.11	200,000
40.35	400,000
46.72	1,000,000

Interpolation of Table I for process weight rates up to 60,000 lbs./hr shall be computed by use of the following equation:

$$E = 3.59\ P^{0.62} \qquad P \leq 30\ tons/hr.$$

and interpolation and extrapolation of Table I for rates in excess of 60,000 lbs./hr. shall be computed by use of the equation:

$$E = 17.31\ P^{0.16} \qquad P > 30\ tons/hr.$$

Where E = emissions in pounds per hour and P = process weight rate in tons per hour

All emissions from all general process sources operated by the same person in the same general location shall be combined in computing the process weight rate.

4. Test methods and procedures. Test methods 1 and 5 as promulgated by the Administrator of the United States Environmental Protection Agency in Regulation 60.85 published in the Federal Register, volume 36, number 247, December 23, 1971, or such other methods as are deemed equivalent by the Board shall be used to determine compliance with this regulation.

§603. Low sulfur fuel

1. Prohibitions.

A. In the Central Maine, Downeast, Aroostook County and Northwest Maine Air Quality Regions, no person shall sell, distribute, buy or use any fuel with a sulfur content greater than 2.5% by weight anytime after November 1, 1973. In the Metropolitan Portland Air Quality Region outside the Portland Peninsula Air Quality Region, no person shall sell, distribute, buy or use any fuel with a sulfur content greater than 2.5% by weight anytime after June 1, 1975.

B. In the Portland Peninsula Air Quality Region, no person shall use any fuel with a sulfur content greater than 1.5% by weight anytime after November 1, 1975.

C. In the Portland Peninsula Air Quality Region, no person shall use any fuel with a sulfur content greater than 1.0% by weight anytime after November 1, 1985.

2. Records. Any person importing residual oil or coal into the State of Maine shall submit to the Department of Environmental Protection a record of the sulfur content of each shipment of such fuel. Any person blending oil for use within the Portland Peninsula Air Quality Region shall submit to the Department of Environmental Protection on a monthly basis a report indicating the total volume and average sulfur content actually supplied.

3. Exemptions.

A. A source that installs one or more sulfur collecting devices that reduce sulfur dioxide emissions to the equivalent level allowed in that air quality region shall be exempt from this regulation.

B. If, during periods of energy crisis or equipment outage, an oil supplier is unable to supply conforming fuel, that supplier may apply for a temporary variance to the Commissioner of Environmental Protection. The Commissioner may without hearing issue that variance for a period not to exceed 60 days if the application in his judgment meets the criteria of the applicable statutory variance requirements. Such temporary variance cannot be renewed.

§604. Sulfur dioxide emission standard for sulfite pulping processes

1. Scope. The emission standard shall apply to all emissions of sulfur dioxide from sulfite pulping processes except sulfur dioxide produced from the burning of coal or petroleum fuels. This emission standard shall become effective in all regions as follows:

a. Immediately for any sulfite pulping process, the construction or operation of which begins after January 31, 1972.

b. June 1, 1975, for all existing sources.

2. Emission standard. No person shall emit or cause to be emitted any sulfur dioxide emissions from any emission source within the scope of this emission standard in excess of 40 pounds per air dried ton of sulfite pulp produced.

3. Test methods and procedures. Test methods 1 and 6 as promulgated by the Administrator of the United States Environmental Protection Agency in Regulation 60.85 as published in the Federal Register, volume 36, number 247, December 23, 1971, or such other methods as are deemed equivalent by the Board shall be used to determine compliance with this regulation.

§605. Malfunctions

Any person owning or operating any emission source that suffers a malfunction or breakdown in any component part which malfunction or breakdown causes a violation of sections 598 to 604 shall notify the Board in writing within 48 hours.

§606. Nonpoint sources or indirect sources; review of public ways

1. Prohibition. No person, firm, corporation, municipality, state agency or other entity shall commence construction of any highway project of 4 or more lanes in the State unless the Board of Environmental Protection has first determined that the project will not violate the State of Maine Ambient Air Quality Standards. The person or agency proposing to construct a highway resulting in 4 or more lanes shall submit to the Department of Environmental Protection an air quality impact analysis. This analysis shall be conducted in accordance with such mathematic modeling techniques as are mutually acceptable to the department, the Federal Environmental Protection Agency and the Federal Highway Administration.

2. Exemptions. The foregoing shall not apply, however, to highway projects that will have no significant effect on air quality, such as lights, signs, landscaping and resurfacing.

3. Scope. The requirements of this section shall apply in all the air quality regions of the State.

4. Effective date. Section 606 of this Act shall be retroactive to April 10, 1974.

§607. Municipal alternative

1. Cone Burners. The Department of Environmental Protection shall have the authority to assist municipalities and set the emission standards for the use of cone burners incineration for the disposal of municipal solid waste.

2. Notification. Any municipality, group of municipalities, quasi-municipal corporations or district shall notify the Department of Environmental Protection of its intent to construct and operate a cone burner and may request technical assistance be provided by the department.

§608. Stationary source performance standards [Repealed]

§609. Petroleum liquid storage vapor control

1. Scope.

A. This section shall be applicable in the Metropolitan Portland, Portland Peninsula and Central Maine Air Quality Control Regions of the State.

B. This section shall apply to all fixed-roof storage vessels with capacities greater than 150,000 liters containing volatile petroleum liquids whose true vapor pressure is greater than 10.5 kilo pascals, 1.52 pounds per square inch absolute.

2. Prohibition. No owner or operator of a fixed-roof storage vessel shall permit the use of those vessels unless:

APPENDIX VII

Telephone Contacts

- APPENDIX VII -

Telephone Contacts

Region I

a. EPA - Cynthia Green, Massachusetts Air Program Coordinator 10/13/82

b. EPA - Sara Simons 10/18/82

c. Vermont Agency of Environmental Conservation - Harold Garabedian, Chief, Air Quality Division 10/21/82

d. NESCAUM, Michael Bradley, Director 10/13/82

e. Connecticut Department of Environmental Protection - Goodman Lovell, Acting Director 11/09/82

Region II

a. EPA - Robert Redell 10/14/82

b. New York Department of Environmental Conservation - Tim Ross 11/09/82

Region III

a. EPA - Bernie Turlinskey, Regional Energy Coordinator 10/14/82

b. Philadelphia Department of Public Health - Bob Astrowski, Director of Staff Services 10/14/82

c. Alleghany County Bureau of Air Pollution Control, Joe Chirico 11/09/82

Region IV

a. EPA - Walter Bishop, Assistant Chief Air Planning Section 10/14/82

b. Georgia Department of Natural Resources, Marvin Lowry, Chief, Air Quality Section 10/14/82

Region V

a. EPA - Bob Miller, Regulatory Specialist, Indiana 10/14/82

b. Wisconsion Department of Natural Resources, Doug Evans, Assistant to Director 10/14/82

Region VI

a. EPA - Donna Ascenzi, Texas SIP Coordinator 10/21/82

b. EPA - Randy Brown, New Mexico SIP Coordinator 10/21/82

Region VII

a. EPA - Gale Wright, Chief, Air Planning Section 10/13/82

Region VIII

a. EPA - Dave Joseph 10/14/82

b. EPA - Tom Harris, Montana Air Programs Coordinator 10/14/82

c. Colorado Department of Health, Jim King 10/18/82

d. City of Aspen, Lee Cassin, Environmental Health Officer 10/21/82

e. Missoula County Health Department, Greg Oliver 10/21/82

f. City of Telluride, Peggy Howlitt, Town Clerk 10/19/82

g. City of Crested Butte, Miles Radeamin, Director of Planning and Community Development 10/26/82

h. City of Vail, Ruth Cogan 10/26/82

Region IX

a. EPA - Wally Woo, Planning Section Chief 10/21/82

b. Washoe County (Nevada), Bryan Wright, Air Pollution Coordinator 10/21/82

c. Bay Area Air Quality Management District (San Francisco), Paul Brand, Public Information Officer 10/21/82

d. California Air Resources Board, Gary Yee, Air Pollution Specialist 10/21/82

e. Fresno County (California), Stu Wilson, Air Pollution Planner 10/21/82

Region X

a. EPA - Wayne Grotheer

b. Alaska Department of Environmental Conservation, Tom Chapel, Environmental Engineer 10/19/82

c. Alaska Department of Environmental Conservation, Dave Estes 10/21/82

d. Puget Sound Air Pollution Control Agency, John Roberts 10/19/82

e. Washington Department of Ecology, Tom Harris 10/21/82

f. Northwest Air Pollution Authority (Washington) 10/21/82

g. Southwest Air Pollution Control Agency 10/21/82