



THE LEAGUE OF WOMEN VOTERS OF KLAMATH COUNTY

AIR QUALITY IN THE KLAMATH BASIN

A PRELIMINARY REPORT

APRIL 1991

CONTENTS

PAGE

FOCUS OF THE REPORT	1
EXISTING AIR PROBLEMS	2
AIR DEGRADATION HISTORY - HOW DID WE GET TO THIS POINT?	3
LOCAL METEOROLOGY	5
WIND PATTERNS IN THE KLAMATH BASIN - MAP	6
SOURCES OF AIR POLLUTION	7
HEALTH EFFECTS OF AIR POLLUTION	8
ECONOMIC IMPACTS OF AIR POLLUTION	10
TOXIC BIO-ACCUMULATION	11
TESTING AND MONITORING	13
AIR POLLUTION LAWS AND REGULATIONS	15
INCINERATION - A SPECIAL ISSUE OF VITAL CONCERN	19
ALTERNATIVES - REDUCE - REUSE - RECYCLE	21
HOW TO TAKE ACTION - MAKING YOUR VOICE HEARD - WHAT YOU CAN DO	23
DEFINITIONS AND ABBREVIATIONS	26
BIBLIOGRAPHY	31
ACKNOWLEDGEMENTS AND DISCLAIMER - COMMITTEE MEMBERS	33
LEAGUE OF WOMEN VOTERS POSITIONS ON AIR QUALITY	34

THE FOCUS OF THIS REPORT IS: H E A L T H OF ALL TYPES

HUMAN HEALTH:

Our highest priority is personal and family health. Every one has the right to expect to breathe clean air, without the presences of odor, or visible or invisible contaminants which can damage health. Everyone fully expects our government agencies to protect our health, to enforce the laws, to monitor, test and regulate conditions which might endanger our health. Without HEALTH we cannot enjoy other qualities of life.

ECONOMIC HEALTH:

To attract good, clean industry and business, clean air is one key resource. Tourism is vital to our local economy. New businesses can rejuvenate outmoded industries.

AGRICULTURAL AND FORESTRY HEALTH:

Klamath County has a \$100 million plus agricultural base, including many products which might be affected by air pollution. Long-term effects of toxic air pollution on farm animals and food crops extend beyond our Klamath basin - and our pocketbooks. The health of our forests depends on clean air; our clean air in turn depends on trees.

WILDLIFE AND ENVIRONMENTAL HEALTH:

Our area has a rich heritage of natural wildlife with the largest concentration of wintering bald eagles in the continental United States. Three large national refuges for feeding, nesting and breeding host migratory waterfowl. Polluted water can be lethal to wildlife and the environment; polluted air can carry toxics over land and water. Wild species are indicators of a healthy or unhealthy environment for humans.

THESE ASPECTS ALL OVERLAP AND INTERFACE AS INTEGRAL PARTS OF OUR AIR QUALITY. HOW SHOULD OUR FRAGILE AIRSHED BE PROTECTED? HOW CAN WE SHARE THIS FINITE RESOURCE TO INSURE GOOD AIR QUALITY IN THE FUTURE? NOW IS THE TIME TO TAKE A COMPREHENSIVE APPROACH, WITH CAREFUL FRONT-END THINKING AND PLANNING TO PREVENT AIR POLLUTION.

The National Environmental Protection Agency ranked our area as the WORST IN THE NATION, and worst particulate matter reading ever recorded, on the night of January 25, 1988. Improvement accomplished since then still falls short of EPA Air Quality Standards.

THERE ARE MANY SOURCESAND MANY KINDSof air pollution. Some are extremely toxic and intensify health reactions for asthmatics; impair breathing; or may contribute to cancer and other serious diseases.

WE DO NOT SEE THE WORST AIR POLLUTANTS We cannot escape them at high locations, by remaining indoors, or staying outside the urban growth boundary.

This Preliminary Report is presented as a public service by the League of Women Voters of Klamath County. After more than two years of study, the abundance of new research requires further work; but important considerations for the Klamath Area should be known by the Klamath Citizens NOW. Other communities in the United States and Europe have shown how to take strong action to prevent air pollution and improve health of young and old, athlete and invalid.

"CERTAINLY THOSE WITH ASTHMA AND SENSITIVE SINUSES WILL CONTINUE TO INCUR COSTS AND LOSS OF PRODUCTIVITY AS LONG AS THE POLLUTION IN KLAMATH FALLS IS BAD.....IF YOU ARE EXPOSED TO CHRONIC CONDITIONS, FOR ALL PRACTICAL PURPOSES YOU HAVE CHRONIC DISEASE." Joe Weller, State Program Director of the American Lung Association of Oregon January 1, 1991

EXISTING AIR PROBLEMS

In just a few years the visible and 'smellable' air pollution in Klamath Basin communities has become an annoyance to citizens, a hazard to sufferers of health and breathing problems, and an endangerment to children, athletes and the elderly. It also has the potential of decreasing property values, and possibly restricting economic expansion and deterring tourism.

Pollutants have proliferated from overloads imposed by heating fuels, motor vehicles, incineration of trash and biomedical waste materials, slash burning, wind-borne dirt, industrial smoke and gases, and steam-carried chemicals.

We still face "Red Alert" days when we may not burn nonessential fuel, play outdoors, or exercise as we wish. Increasingly, there are reports of medical problems directly and indirectly related to airborne pollutants. We accept watering eyes, shortness of breath, damaged surfaces, and odors as a bother beyond our control.

Some areas encounter special problems, even dangerous permanent damage to health and property values. Generally the air or fuel "smog" entrapment in the basin is more than simple "inversion".

This report presents facts and references, and attempts to put into perspective the sources and variations of air pollutants in a comprehensive manner - representing a partial review of known facts - and indicating the direction of research by responsible authorities, as well as legislation - and most important of all: HOW YOU, WE, AND EVERYONE CAN PREVENT POLLUTION AND IMPROVE OUR ENVIRONMENT to regain the SWEET SUNNY AIR OF SOUTHERN OREGON.

"TWENTY YEARS AGO WE NEVER HAD REQUESTS TO KEEP CHILDREN INDOORS BECAUSE OF AIR POLLUTION. NOW TEACHERS HAVE REGULAR REQUESTS FOR STUDENTS TO REMAIN INSIDE DURING RECESS AND P.E. TIMES DUE TO THE POOR AIR, OR BECAUSE WE CAN SEE THE AIR."

Wayne Snoozy, Principal Fairhaven Elementary School

AIR DEGRADATION HISTORY - HOW DID WE GET TO THIS POINT?

Up to and including the early 1940's Klamath Basin residents took for granted clean air with wide visibility for miles. Partially because of the good quality of air and the environment, the U.S. government selected the Old Fort Road mile high site east and above Klamath Falls as the location for a recuperation facility for recovery of World War II. Marine Corps veterans who were malaria victims.

In the late 1940's and '50's smoke and particulate emissions from lumber mill woodwaste "wigwam" burners caused serious air pollution problems, leading to legislation that finally eliminated these burners. In the 1950's and '60's Klamath County experienced changes and rapid growth in industry, commercial shopping malls, new suburban homes (both requiring more vehicular traffic), and the Kingsley Field Air Base with jet plane exhaust. Hazy days were common.

In 1970 Congress passed the first national Clean Air Act, giving the EPA broad authority to regulate certain air pollutants; but much research and documentation was lacking for adequate enforcement. In the early 1970's the Oil Producing and Exporting Countries (OPEC) Cartel limited the amount of oil pumped in order to raise prices. A major energy crisis developed throughout the world. Gasoline and fuel oil prices skyrocketed and these fuels were often difficult to acquire. Some households in the Klamath Falls urban area converted to natural gas for space heating, but a great many more turned to woodstoves and fireplaces, which operate inefficiently. A cheap, plentiful supply of wood was available in the surrounding national forests for anyone with a pick-up, a chain saw, a few dollars, and a do-it-yourself attitude.

Electrical generating costs also rose and it became evident that "cheap" power was a myth. Exorbitant costs and long construction time for nuclear power plants, along with near-catastrophic accidents (Three-Mile Island and Brown's Ferry) and the lack of safe disposal for high level radioactive waste, brought the nuclear energy industry to a standstill by the late 1970's. Thermal generation using coal has deteriorating effects on the environment, including acid rain, destruction of the ozone layer, and global warming. Alternative forms of energy (solar, wind and geothermal) were weakly encouraged, but there was never the government commitment and financial incentive required for adequate research and development of these energy forms. Wood burning continued as the only widely-used "alternative" heating method in the Klamath Basin all through the 1980's.

By the mid-'80's as the winter inversions and smog increased it became obvious that changes had to be made. On "Red Alert" warnings children's physical activities at suburban schools were restricted. Joggers were warned not to run and elderly people advised to avoid excess exertion. Scenic views were veiled or obliterated for days, and the urban air was acrid. The

HISTORY continued.....

Emergency Room at Merle West Medical Center and family doctors were seeing many more patients with respiratory and related health problems. Late in 1987 monitoring equipment was installed to measure air-borne particulates, and ON JANUARY 25, 1988 WE REGISTERED 792 on the Air pollution index - THE HIGHEST READING EVER RECORDED IN THE NATION! Klamath County was out of compliance 47 days that heating season. (1)

Grant money was obtained by Klamath County to hire an air quality program director, stationed in the County Health Department. Measures to reduce air pollution problems included information and education programs. Klamath Falls and the County urban areas received federal block grant funding to finance replacement of old wood stoves with efficient natural gas furnaces where gas was available, and certified new wood stoves elsewhere, and weatherization of older homes for low income families or sole source wood heat. (PURE)

A grant was also obtained for testing students at three schools for lung capacity and pulmonary deficiencies. On April 1, 1991 the results of this pilot health study were released, showing a link between exposure to woodsmoke air pollution and decline in lung function. The study was conducted by the Oregon Health Division and the Klamath County Department of Health Services. Standard lung functions were measured on 410 elementary school children from high and low air pollution exposure in Klamath Falls urban area at three different times. Significant decreases in average lung function measurements among children in the high exposure area during winter months coincided with elevated outdoor particulates levels. These findings are consistent with results from other published studies. Indoor woodsmoke exposure during winter months was reported to be significantly associated with declines in children's lung function levels. (2)

Monitoring continued and a voluntary woodburning curtailment program was set up to encourage stove users to burn dry wood in small hot fires, and avoid any burning on "red" days and limit burning on "yellow" days voluntarily. Airborne particulate levels were substantially reduced over a three year period. The 1988-89 heating season found us out of compliance 39 days - and the Klamath Basin remained in violation of the Federal Clean Air Standards. The 1990-91 season still had 18 days of non-compliance. (3)

What will the 1990's hold for a healthy air quality in the Klamath Basin? The U.S. Environmental Protection Agency (EPA) was empowered by passage of the readoption of the National Clean Air Act by Congress in 1990, to require much more stringent control over air pollution by the states. A law requiring mandatory curtailment of woodburning on critical days may soon be in place. Tighter regulations for other sources of air contamination will likely be imposed in the coming months also.

Sources of air pollution other than wood stoves also continue in our area. These include: slash burning as a means of disposing of timber harvest wastes, agricultural field and ditch burning, highway right of way clearing and burning, and residential "backyard" burning. Industrial and vehicle emissions, road dust, and waste incineration all share in bringing the Klamath Basin into a "Non-Attainment Area" category. RESTRICTING WOODSTOVE USE ALONE WILL NOT PUT KLAMATH COUNTY INTO TOTAL COMPLIANCE.

"AIR MONITORING INFORMATION IS INSUFFICIENT FOR DETERMINING NON-ATTAINMENT AREA BOUNDARIES.... THE TECHNICAL ANALYSIS OF SOURCE CONTRIBUTIONS IS INADEQUATE, AND EMISSION INVENTORY ESTIMATES FOR INDUSTRIAL SOURCES ARE INCORRECT." Oregon Environmental Council funded study on Air Pollution in Southern Oregon and Klamath Falls September 1990

LOCAL METEOROLOGY

Klamath Falls is located on the east slopes of the Cascade Mountains, north of the California border. It is a basin-shaped area between western mountain forests and eastern high desert, at an elevation of 4,100 feet, on the southern shore of Upper Klamath Lake. The climate is semi-arid, high desert (annual rainfall 14.3 Inches). The Klamath Basin is relatively flat, including old lake bed drained by the Klamath River. A system of elongated rolling hills surrounds it with occasional peaks or buttes, some rising 2,000 feet above the valley floor.

The Basin is prone to pollution conditions because of the basin/mountain/water relationship. It experiences both winter and summer inversions. The urban area, with its elevation, dry climate and low frequency of cloud cover, experiences strong, shallow night time winter radiation inversions. Frigid arctic air masses frequently invade and temperatures can remain well below freezing for several weeks. Winter nights are clear and cool. The lake often freezes over; 6 to 10 inches of snow may cover the ground. Nocturnal radiation inversions occur as a result, and are confined and held by the surrounding terrain. Inversions of as much as 10°F have been observed within 60 feet of the surface, holding smoke down. (See Figure 2) (4)

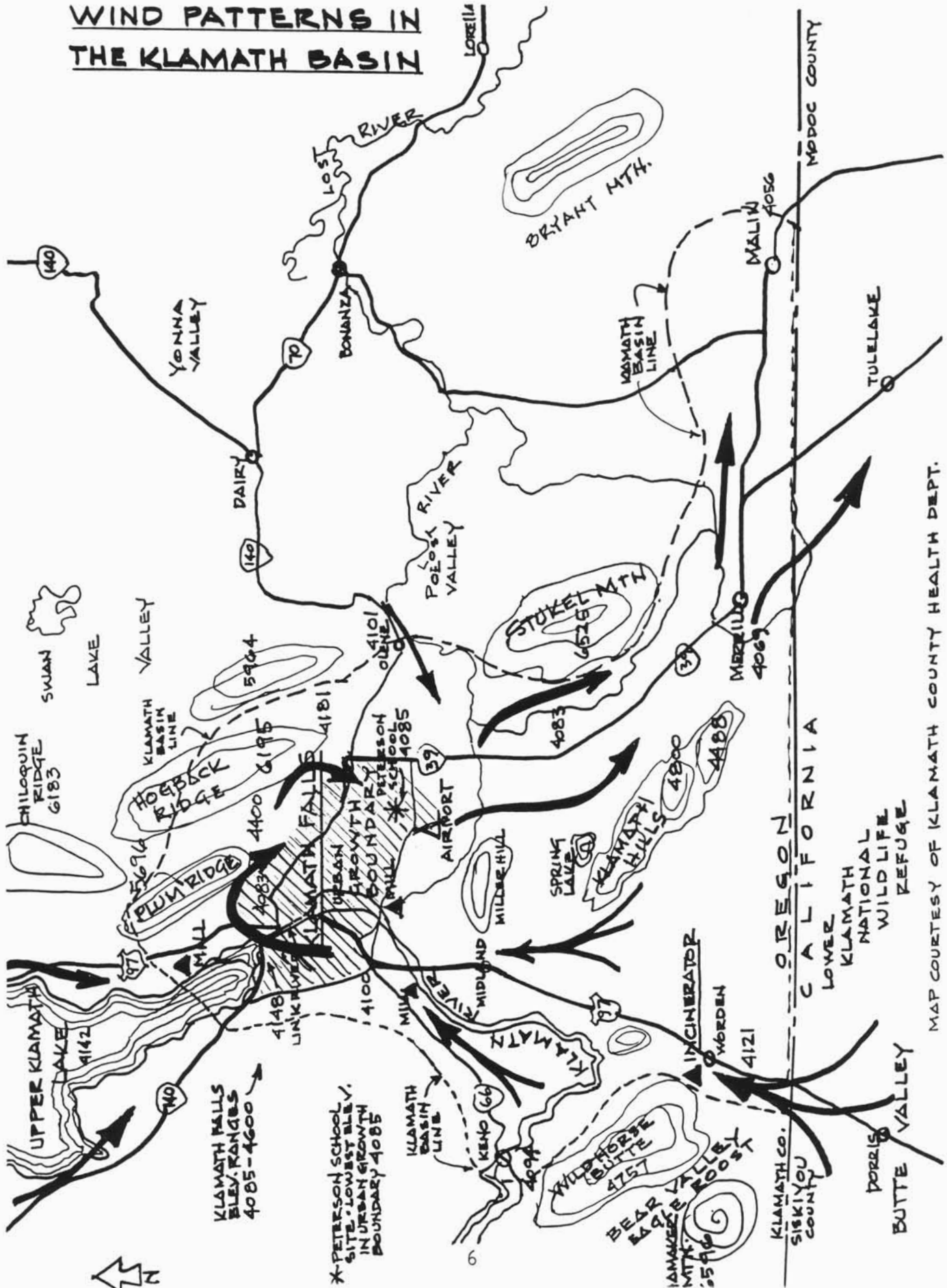
The area's unique winter inversion conditions are very low - 100 to 150 feet above the valley floor. Cold polluted air is trapped by warmer air above. This has the potential of concentrating pollution which can create a "thicker chemical soup" adding to the seriousness of the local air pollution problem. The worst inversions occur when Upper Klamath Lake is frozen, lowering the bottom of the warm air layer. Medford's inversion layer is much higher-1,500 to 2,000 feet above the ground. (5)

Air flows in the basin tend to follow the water courses. Smoke from Butte Valley in California on the south is diverted northward along the Worden-Keno hills on the west side of the basin. Smoke from Chiloquin and northeast locations flows southward down US 97 along the east shore of Klamath Lake and into the Klamath Falls urban area. Slash burning smoke from as far away as the Rogue Valley and Rocky Point on the northwest shore of Klamath Lake follow the west side of the lake down to the urban area. Overflow from Klamath Falls is forced southeast to Merrill. Field and slash smoke from the Poe Valley region tends to follow Lost River to Merrill and Malin, also. This pattern of air movement, sucked into the urban area from distant origins creates two conditions - concentrated pollutants in the built-up area, and widespread exposure from multiple polluting sources to populations throughout the basin. (See Map)

SHOULD THE AIR POLLUTION BOUNDARY PARAMETERS BE EXPANDED BEYOND THE URBAN GROWTH BOUNDARY TO INCLUDE ALL POLLUTANT SOURCES, FOR MAXIMUM EFFECTIVENESS, FAIRNESS AND HEALTH CONSIDERATIONS?

"KLAMATH FALLS IS THE VACUUM CLEANER BAG OF THE COUNTY" Louellyn Kelly
Air Quality Program Director, Klamath County Health Services

WIND PATTERNS IN THE KLAMATH BASIN



MAP COURTESY OF KLAMATH COUNTY HEALTH DEPT.

"CAUTION - THE AIR YOU BREATHE MAY BE HAZARDOUS TO YOUR HEALTH"
 Featured article in League of Women Voters of the U.S. National Voter June/July 1990

SOURCES OF AIR POLLUTANTS

INDUSTRY	TRANSPORTATION
Manufacturing processes Mills, wood products Fabricators Food Processing Electronics Refineries Incineration Garbage Waste Bio-Medical Waste Motor Oil Tire Burning Burning Contaminated Soil Thermal Power Generation (coal)	Vehicle Exhaust Automobiles Trucks Buses Trains Planes Track-out Dust (trucks) Road De-Icing Fugitive Dust (Silica) Salts Anti-freeze (Ethylene Glycol) Toxic/Hazardous Spills Highway Right-of-Way Clearing/ Burning (smoke & dust)
AGRICULTURE	FORESTRY
Field and Ditch Burning Sprays (chemicals) Fugitive Dust Animal Wastes Feed Lots Dairy Runoff	Slash Burning Controlled Burning (selective) Logging Roads (dust) Herbicide Sprays Forest Fires
COMMERCIAL / MUNICIPAL	RESIDENTIAL
Vehicle Service Stations (fumes) Dry Cleaners (fumes) Waste Incineration Land Fill Toxic Gases Sewage Treatment & Evaporation Ponds Hazardous Waste Disposal Sites	Wood Stoves and Fireplaces Burn "barrels" (open burning) Old oil stoves and furnaces Yard Waste Burning - leaves

Any source of air pollution should be evaluated but it isn't all equal - in quantity or in hazards presented to health or economic vitality. Blowing dirt or road sanding dust may indeed be an irritant, but it isn't necessarily toxic or enduring. On the other hand, toxic materials such as heavy metals and dioxins emitted by incinerators cause long term harmful effects due to their persistence and bio-accumulation.

ORIGINATORS OF POLLUTION HAVE THE RESPONSIBILITY TO EXAMINE THEIR POLLUTING ACTIVITIES AND TO TAKE ADEQUATE MEASURES OF CORRECTION.

"LUNG AND BRONCHIAL CANCER AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) ARE THE THIRD LEADING KILLER OF OREGONIANS" A Legacy of Death: Smoking and Respiratory Disease in Oregon. Oregon Dept. of Human Resources 1988

HEALTH EFFECTS OF AIR POLLUTION

An average person's lungs have a surface area the size of a tennis court. Because each of us consumes so much air (10,000 to 20,000 liters a day) our greatest source of exposure to toxic pollutants is the air we breathe. Of thousands of chemicals listed in the Environmental Protection Agency's (EPA) toxic substance data base, the National Research Council estimates that **LESS THAN TEN PERCENT HAVE EVEN BEEN TESTED** to determine if they may be health hazards. (6) Scientists have not begun to evaluate the synergistic effects of breathing combinations of pollutants.

Children and the elderly are more vulnerable to air pollution health effects than the general population. These effects often take a long time to develop and be detected (10 to 30 years). Children breathe more air for a given volume of lung tissue than do adults. Experience leads us to expect that immature growing bodies will be highly vulnerable to all sorts of environmental stresses. With mouth breathing and increased ventilation rates (as occur with play and exercise) more particles will penetrate deeper into the respiratory tract. (7)

Particle size and concentration is important in determining the effect on an exposed person. Particles from a fraction of one micrometer to several micrometers in diameter present the most risk since they are the most likely to deposit in the lungs when inhaled, and are the most reactive chemically. Most man-made pollutant particles fall within this "respirable" size range.

Policymakers consider unacceptable any cause which poses a cancer risk greater than one death per million people exposed; yet nationwide, dozens of communities may be living with significantly higher risks. EPA suggests that a resident of an average city has a lifetime risk of cancer caused by breathing toxic air emissions of greater than one in ten thousand in some urban areas. Toxic emissions can cause many other health problems including birth defects, liver and kidney damage, blindness, emphysema, and bronchitis. Little research has been done to quantify non-cancer risks. (8) A U.S. Senate committee concluded that such health problems "...are serious and pervasive; there is no choice but to breathe the air, whether it is clean or polluted." (9)

Emissions resulting from incineration of municipal or bio-medical waste are characterized by their extreme toxicity. The California Air Resources Board (CARB) reports that ALL bio-medical waste incinerators tested in California emitted dioxins and heavy metals in the air emissions and ash. (10) Donald Barnes, Director of the EPA Science Advisory Board said of dioxin: "This is the most potent carcinogen we've ever seen in the laboratory". The range of health related problems potentially caused by dioxins is extraordinary. (11) U.S. Air Force physicians linked dioxin with increases in cancer, birth defects, psychological damage, liver damage, cardiovascular deterioration, and degeneration of the endocrine system. (12) Lead, Mercury, and Beryllium are three pollutant metals for which the EPA has issued standards. Others include Cadmium, Zinc, and Arsenic. These metals are found in incinerator emissions

HEALTH EFFECTS continued.....

and ash according to EPA and CARB. Lead, in particular, has been shown to cause damage to the gastrointestinal system, the liver, kidneys, blood and central nervous system. (13)

The emission of these highly toxic materials from bio-medical waste incinerators or from other industrial burners, WHERE ANY CHLORINATED MATERIALS MAY BE BURNED, CAN BE ENTERING THE AIRSHED OF THE KLAMATH BASIN. THE ACCUMULATION OF THESE MATERIALS HAS NEVER BEEN TESTED FOR IN THE KLAMATH BASIN. No base indicators exist, yet studies show that the presence of dioxins does not occur naturally and that prior to industrialization with its accompanying use of chlorinated and other man-made chemical products, dioxins and other organic-compounds were nonexistent. This strikes down the notion that forest fires, woodstove smoke, volcanos and other naturally occurring combustion sources produce dioxin and heavy metal pollutants. (14)(15)

Dr. Rick Zwartverwer, Pediatrician and Vice President of the Klamath Medical Society, announced that group's unanimous support for mandatory controls regulating woodburning in Klamath County. He stated that there have been 6 separate studies proving an increase in chronic respiratory problems in local children including asthmas, colds (upper respiratory infections) and ear infections. (16)

KLAMATH HOSPICE WORKERS REPORT THAT THE GREATEST NUMBER OF HOSPICE PATIENTS HAVE LUNG CANCER.

Will woodsmoke pollution control do the job? Although wood smoke is harmful to breathe, it does not bio-accumulate. Even with the proposed mandatory woodsmoke controls, what are the potentials for adverse health effects from long-term accumulation of heavy metals such as cadmium and lead, and/or toxic organic compounds such as dioxins and furans from other sources? According the U.S. Health Service 25% of the people in the U.S. get cancer. Most of us have exceeded the lowest safe level of total carcinogen exposure. As new carcinogens appear, cancers they induce are typically similar to those already seen. Many cancer-causing agents or processes act through the same ultimate mechanism in the same target cells. Thus the effect of these agents is being added to the already-existing effects of other materials in the environment. What was once a dreaded rarity is now becoming commonplace. (17)

ASK YOURSELF: Have I or any of my family members or friends experienced any of the following symptoms recently: Chronic cough, eye irritation, sore throat, headache, chest discomfort? Sick days, restricted activity days, emergency-room visits, hospital stays, asthma attacks? What might be the synergistic effects from MULTIPLE CHEMICALS COMBINING? From MULTIPLE FACILITIES, or from ALL POLLUTION SOURCES? Is this "Chemical Soup" A Time Bomb?

WHAT MIGHT BE THE CUMULATIVE EFFECTS OF ALL SOURCES OF AIR POLLUTION OVER TIME IN THE KLAMATH BASIN?

"YOU CAN'T SEND OUT A LETTER TO A PROSPECT FOR A NEW INDUSTRY LOOKING INTO LOCATING IN KLAMATH FALLS AND SAY: 'WE'VE GOT A LAKE FULL OF FISH, WE'VE GOT CRATER LAKE, WE'VE GOT A WONDERFUL HOME-SPUN ATTITUDE HERE, AND BY THE WAY, WE'VE ALSO GOT THE DIRTIEST AIR IN THE COUNTRY'"
State Sen. Peter Brockman: news article, Herald & News Mar. 2, 1989

ECONOMIC IMPACTS OF AIR POLLUTION

Nobody wants air pollution, yet it seems that when a polluting source must be cleaned up it always costs too much. When cost of pollution-abatement is discussed it seldom includes "hidden" costs associated with pollution relating to poor health, lost productivity, lost opportunity or the costs incurred to clean up spills or recover land. Insurance cost increases are seldom considered when economic impacts of pollution are discussed. A great economic drawback to siting of mass-burn incinerators in a community lies with the potential liability in the event of an accidental release of toxic materials. In most cases cleanup costs from spills and toxic air emission upsets which carry over onto adjoining property (or downwind) are excluded from insurance coverage. If the facility is unable to pay cleanup costs the county or state may be left to find a remedy. This can result in insurance costs increases for local government . (18) It has even been suggested that new industry will be attracted to locate in a community which has a municipal or bio-medical waste incinerator - that jobs and a healthy economy will come from this "new industry". There is evidence that the opposite is the case. and that business and industry (and the jobs they create) leave areas having these facilities. (19) Does any community want "dirty" industry to be attracted to their area?

Common sense indicates that long-term non-attainment would lead to declining property values, decreased employment, increased health costs and lowered productivity. How does a community measure these impacts? No model is available which predicts synergistic effects of the numerous factors that are connected with air-pollution. New industry, or industrial expansion , may be severely curtailed or denied in nonattainment areas. The 1990 readopted Clean Air Act will require more stringent controls over these activities.

Klamath Basin's annual agricultural receipts exceeded \$100 million in 1990. The long-term effects of toxic air pollution on animals and its absorption into food crops is well documented. (20) (21)

Tourism is becoming increasingly important to the economy in Southern Oregon. The scenery, abundant wildlife, climate, and unique geographical features such as Crater Lake, the Lava Beds and several wilderness areas can bring tourist business into the area in greater numbers each year. If the scenery is obscured, tourism could be seriously damaged. Crater Lake and the Wilderness Areas are required to be managed, along with the adjoining National Forests, to maintain their Class 1 rated airshed by the 1977 amendments to the National Clean Air Act. This is the most restrictive class for visibility and air pollutants. These requirements are recognized by the Winema National Forest in their 1990 Final Environmental Impact Statement for their land and resource management plan. (22) But if the nearby Klamath Basin has air pollution, how can these valuable tourist attractions retain their Class 1. rating?

"Residents do not realize the economic impact poor air quality has on a community. A damaged reputation carries a community price tag" states Ken Brooks, EPA Director, Oregon

"A BIO-ACCUMULATIVE EFFECT INVOLVES CHEMICALS THAT MOVE FROM THE NON-LIVING ENVIRONMENT (AIR, WATER, SOIL) INTO LIVING THINGS WITH AN INCREASE IN CONCENTRATION. BIOACCUMULATIVE TOXINS ARE DANGEROUS BECAUSE AMOUNTS THAT SEEM HARMLESS ARE MULTIPLIED AS THEY PASS THROUGH THE FOOD CHAIN; OFTEN THE RESULT IS ENVIRONMENTAL DESTRUCTION." Environmental Research Foundation Hazardous Waste News #225 3/20/91

TOXIC BIO-ACCUMULATION RESULTING FROM AIR POLLUTION

Air pollution consists of many components. Some (dioxins, furans, phenols and heavy metals) remain in the ecosphere long after the polluting source has ceased to exist. These toxic pollutants can be reestablished into the air by farming and wind-borne dust. They can also originate in the air and then enter the water or soil to be ingested into the food chain by plants and animals. Drs. Paul Connett and Tom Webster have produced data supporting the fact of bio-accumulation of air-borne pollution. Bio-accumulation means that toxic pollutants ingested by one organism becomes concentrated and are passed on to another organism. (23)

Since the rate of air pollution is not static, a means of testing for the accumulated total is necessary and stack sample testing is not adequate. Testing must be done on biological samples such as plants, crops, animal and human tissue, to determine the total accumulation.

The DEQ testing plan for mass-burn incinerator sources fails to account for the bio-accumulative effects of air emissions. They propose simple stack sample testing which ignores these effects. An analysis of the DEQ testing plan by the Alder Hill Research Group states that the plan stops far short of DEQ's prior public commitment to require comprehensive dioxin testing. Monitoring for contamination of organism such as humans or wildlife is not required (by DEQ), yet their protection is the stated objective of the monitoring. The omitted monitoring is the minimum necessary for assessing the hazard, particularly when faced with extremely bio-accumulative pollutants like dioxins. Dioxin levels in humans and the environment can not be predicted reliably from stack samples alone. (24)

Drs. Connett and Webster assert that "Contamination of the food chain is the main route of human exposure to the PCDD and PCDF emitted by incinerators.... Some risk assessments have estimated human exposure to food contaminated by incinerator emissions, which calculate maximum individual risk and local population risk but not exported risk: exposure to food grown in one location and exported to another." (25) The same researchers conclude in another paper that "...Estimates indicate that drinking one liter of milk is equivalent to breathing the air at the same point as the grazing cow for about 8 months... ingestion of one quarter pound of butter would be equivalent to about 1.5 years of on-site inhalation." (26)

Numerous reports from the U.S. Fish and Wildlife Service also discuss the bioaccumulative process of toxins entering organisms. These reports cover the hazards to fish, wildlife and invertebrates from dioxins, chlorpyrifos, lead, arsenic, polychlorinated biphenyls, chromium and cadmium in several Synoptic Reviews. All of these toxic materials are components in air pollution. All are found in varying degrees in the air emissions from mass-burn municipal and hospital waste incinerators. ALL TEND TO BE BIO-ACCUMULATIVE AND HAVE SERIOUS EFFECTS ON THE ORGANISMS THAT INGEST THEM, INCLUDING HUMANS. (27)

TOXIC BIO-ACCUMULATION Continued

The diagram below illustrates how air borne toxins enter the food chain and become bio-accumulative. The pollution source can be any air emission toxic generator such as a mass-burn municipal or hospital-waste incinerator burning chlorinated plastic materials, or a hog fuel burner in which solvents or waste oil are burned along with the wood chips normally used. The toxins are deposited on the ground in a pathway defined by the prevailing wind patterns and other weather factors (such as thermal inversions and surface barriers). Once deposited, the toxins enter the plants eaten by foraging animals (cows, sheep and other domestic grazing animals and wildlife). Small animals ingest toxic material which is in turn passed on to predators (dogs, coyotes, eagles). The toxins are concentrated in the body fat of each organism upward in the food chain. Humans encounter the toxins in the meat, dairy products and vegetable crops they eat. Heavy metals can not be destroyed, therefore they accumulate over the lifetime of the organism consuming them.

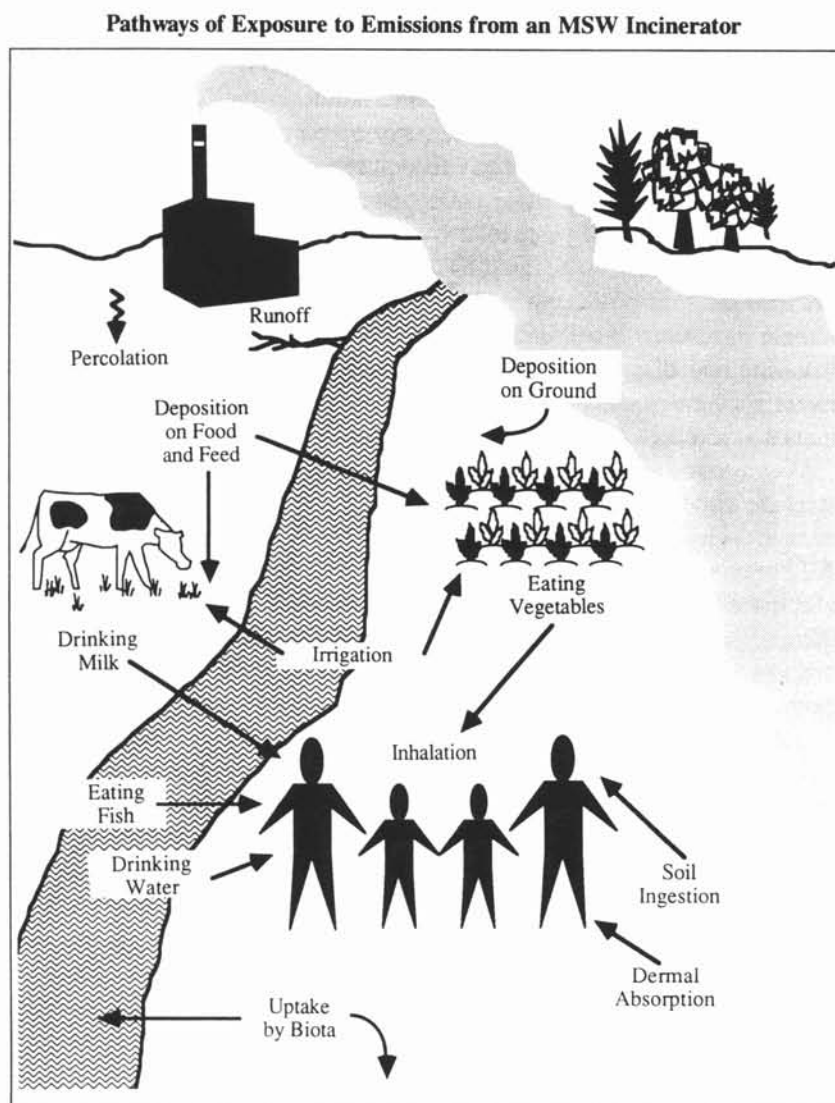


FIGURE 1.

REPRINTED BY PERMISSION
RECYCLING AND INCINERATION
Environmental Defense Fund
ED. R. DENISON AND J. RUSTON

SOURCE: EDF, based on U.S. EPA, *Methodology for the Assessment of Health Risks Associated with Multiple Pathway Exposure to Municipal Waste Combustor Emissions* (Research Triangle Park, NC: Office of Air Quality Planning and Standards, October 1986), cover illustration.

"ONLY BY REQUIRING DIRECT MONITORING OF DIOXIN LEVELS IN THE TISSUES OF HUMANS AND OTHER ORGANISMS CAN DEQ ADEQUATELY ASSESS THE CUMULATIVE HAZARD POSED BY AUTHORIZING DIOXIN DISCHARGES FROM THE BIO-WASTE INCINERATOR. INSTEAD, DEQ PROPOSES NOTHING MORE THAN OCCASIONAL STACK SAMPLES AND COMPUTER MODELING OF THE DIOXIN DOSE RECEIVED BY HUMAN BEINGS AT RISK. THAT APPROACH ENTIRELY IGNORES THE DOSE HUMANS ARE ALREADY RECEIVING, NOT ONLY FROM OTHER SOURCES, BUT ALSO FROM PREVIOUS DIOXIN EMISSIONS BY THE INCINERATOR." Alder Hill Research Group

TESTING AND MONITORING

To eliminate or reduce air pollution a knowledge of its composition and sources must be known. Any effectively functioning air pollution control program must have adequate monitoring as its focus. Prevention and control cannot occur until and unless testing and monitoring is properly done to identify the source with the pollutant.

Presently, testing done in Klamath Falls has emphasized measuring PM10 levels. Monitoring stations have been placed in the South Suburban area. The result is that we know that PM10 levels are high in that area. However, the origins have not been adequately identified outside the urban growth boundary. Testing for PM10's in the south suburbs does not mean that all the pollution originates there. Testing stations are also needed in Keno, Worden, Merrill, Malin, Olene, Pelican City and other sites that will enable mapping of pollution levels in the Basin.

Comprehensive testing is needed to characterize air pollution over a long period of time. It should establish base levels, then test for accumulation of pollutants, especially dioxins, furans and heavy metals, in addition to PM10's. Since many of the most dangerous pollutants are bio-accumulative and degrade very slowly, some means to determine accumulative build-up of total pollution levels is essential. Point-source testing will not measure accumulation of pollutants. Evaluation of bio-accumulative effects of certain air-borne contaminants requires testing of animal, human and vegetable matter for toxins. Stack testing only at industrial sites is insufficient and incomplete. Point-source stack test data can not be extrapolated to indicate emissions over long time periods. To do so would be similar to measuring the temperature in January and using the data to determine the temperature range for the year. The full story is not told.

Stack emissions testing can be manipulated to give good results; especially if testing is done after notification by the testing agency...and if the testing agency is contracted by the industry being tested. We all clean house when we know company is coming. Good results can be produced - simply don't burn anything containing high levels of contaminants or have the pollution control equipment fine-tuned for the test. Continuous monitoring is expensive and should be used only for those situations where potential exists for highly toxic emissions. It is not necessary for all sources of air pollution. Other testing methods will indicate accumulative effects of toxic build-up. One test type is the development of a base level, then taking samples of soil, air, vegetation, animal and human tissue, which can be analyzed. The difference between the last and the latest contamination levels indicates the rate of accumulation. (28)

TESTING AND MONITORING continued.....

Testing should never be replaced by simple design evaluation of the potential pollution source. This method of trying to determine toxic emission levels depends on too many variable parameters that can not be verified: the type of operation, materials being burned (and emitted), the training levels of operators, maintenance of equipment, enforcement standards, and accuracy of evaluation models. The only sure way to identify pollution sources and enforce air quality standards is by adequate testing.

Emissions are rarely measured under the full range of operating conditions that will be routinely encountered. Yet, such conditions can and do occur; at sufficient frequency and of sufficient duration to contribute significantly to overall emissions.

For example: during regulatory compliance testing at a new state-of-the-art incinerator in California, combustion upset conditions were encountered in one of several tests; during this test, dioxin emissions were found to be 5 to 50 times higher than under the more optimal conditions. (29)

Results of one of six dioxin emission tests recently conducted in Massachusetts were excluded from the reported data, on the basis that the boiler had not stabilized twelve hours after start up, dioxin emissions during this test were ten times higher than the average of the others. Such events are not uncommon; shut-downs and start-ups of boilers occur at least once or twice a month at typical incinerators. (30)

The primary emphasis of DEQ testing in the Klamath Basin has been placed on home woodstove smoke. The agency stated that 18 tons of particulates per year must be removed from that pollution source. Yet one mill alone (barely outside of the urban growth boundary) emits 631 tons of particulates each year; and according to the DEQ: "They make no significant contribution to the total air quality problem." (31) It seems reasonable by comparison that the industrial, bio-medical waste incinerator, and home woodstove smoke create a chemical mix that permeates the entire Klamath Basin. DEQ has virtually ignored sources of air pollution other than woodstove smoke. It is much more difficult to convince woodstove users that they should cease burning wood as a fuel, if a much larger source of contamination is ignored.

"THIS LAW CULMINATES TEN YEARS OF WORK AT ALL LEVELS OF THE LEAGUE ...WE'VE PASSED A MAJOR ENVIRONMENTAL MILESTONE" Susan Lederman, president of the League of Women Voters of the United States. November 1990

AIR POLLUTION LAWS AND REGULATIONS

The 1990 Reauthorization of the National Clean Air Act of 1970 by Congress addresses an array of environmental problems from the depletion of the ozone layer to airborne toxic pollutants that threaten public health, and strengthens the government's role. It includes:

SLOW CURBS ON MOTOR VEHICLES, phasing in stricter tailpipe emissions over a 4 year period. By 1998 new model cars must meet tightened standards for 10 years or 100,000 miles; double the current requirements. The EPA will determine if a second round of curbs are needed after the year 2000.

ACID RAIN CONTROLS BRIDGING REGIONAL DIFFERENCES. A delicate balance was struck between competing interests with an acid rain compromise. The act limits emissions of acid rain pollutants and establishes a system of pollution allowances to resolve clean-up costs among rivals. By the year 2000 a cap will be imposed on sulfur dioxide emissions, in two phases. The dirtiest utilities must make the largest reductions by 1995, and less polluting plants must meet new limits 5 years later. Nitrogen oxide is also reduced and limited. A "pollution allowance" system will give "credits" to dirty utilities that reduce toxic emissions to below the required limits, and clean utilities can use credits to expand their capacities.

CURBS ON AIR-BORNE TOXICS. Industry is required to cut emissions of 189 chemicals known to cause cancer, birth defects and other serious diseases. Toxic-emitting plants must install the most effective control technology, cutting emissions by 90% by 2003. If this does not cut cancer risks enough, EPA will impose a tougher standard with "ample margins of safety" or a one in 10,000 "residual risk" of cancer.

FIVE OZONE CATEGORIES, ranging from "marginal" to "extreme" will be established to control urban smog, and include cities, suburbs and rural areas. If a state fails to develop an effective strategy to achieve the new standards, in two years, the EPA must issue a federal plan to cut smog to stipulated levels. A broad range of polluters including refineries, chemical factories, dry cleaners and bakeries, must install pollution equipment.

"This legislation provides a good starting point for cleaning up our air in the 1990s," said Lederman. "Congress can be proud of enacting strong programs to cut acid rain, and cut emissions of toxic substances."

The 1970 Clean Air Act mandated that the EPA protect the public from exposure to hazardous air pollutants that "may reasonably be anticipated" to cause cancer and other debilitating and potentially fatal diseases. Through 1990 the EPA regulated only 7 of the many possibly hazardous air pollutants identified: Arsenic, asbestos, benzene, beryllium, mercury, radionuclides and vinyl chloride. There is no national uniform monitoring program to determine levels of toxic pollutants. Data is inconsistent because different collection methods are used, and each state has its own system. (32)

"WE HAVE ESTABLISHED A VERY UNFAIR BURDEN OF PROOF IN OUR SOCIETY WHERE WE ALLOW PEOPLE TO PUT OUT CHEMICALS THAT WE KNOW ARE CARCINOGENIC, NEUROTOXIC, AND CAN CAUSE BIRTH DEFECTS: AND JUST BECAUSE WE HAVEN'T HAD ANYBODY KEEL OVER IN THE STREET, EVERYTHING IS OKAY. THAT'S BALONY!" Jerry Poje, Toxicologist for the National Wildlife Federation.

AIR POLLUTION LAWS AND REGULATIONS Continued

In 1986 at the urging of the League of Women Voters and other citizen public interest groups, Congress approved a community right-to-know law, which established a nationwide annual inventory of 300 hazardous chemicals which include many known and suspected carcinogens; and which are capable of destroying atmospheric ozone and creating urban smog. Reported releases in recent years included eleven carcinogens that EPA pledged in 1985 to regulate, but never has. What the inventories have done is to expose the magnitude of the toxic threat - jolting people into awareness. (33)

The National Clean Air Act is the legal centerpiece, and provides the states with the tools and opportunity to clean up their own air within the law's framework. The EPA has set deadlines for each state to submit a State Implementation Plan (SIP) setting out the methods by which a state intends to implement the national clean air act. In Oregon the DEQ is given this responsibility. In turn, the law provides that such state agencies may pass on this authority to the local government jurisdictions. The DEQ has found several urban locations in the state to be "non-attainment areas", including Klamath Falls which is rated as a "serious" area. This means that the DEQ and Klamath County are mandated to come up with legal ways to clean up our local air. The DEQ's draft SIP for Klamath County was found by EPA to be inadequate. If the required implementation plan is not accomplished within the allotted time, the EPA has the authority to impose its own Federal Implementation Plan (FIP) on those states, and the states, in turn, on the locations labeled as "non-attainment areas". "Serious" and "moderate" non-attainment areas must be in compliance by December 31, 1994, with 5% reductions each year thereafter for "serious" areas. If this does not accomplish the goal, The EPA and DEQ may impose more stringent regulations. These could include greatly reduced allowable emissions by industry, and perhaps limiting new industry from locating in the area. (34)

The EPA can also include the possibility of withholding state highway funds. These sanctions are imposed on the state, which in turn can pass them on to the individual local government jurisdictions in the non-attainment areas.

The new act also requires EPA to issue new regulations controlling emissions from municipal waste, hospital waste and other incinerators. Although Oregon has some emission control standards, its methods of testing and monitoring leave much to be desired.

The EPA is given the authority to modify an area's non-attainment boundaries in locations which fail to reach attainment within the time frame, and it appears that they won't. Klamath Falls could be in this category. "Our designated area is geopolitical in nature - linked to the Urban Growth Boundary which exists for infrastructure and land-use management." states Louellyn Kelly, Klamath County Air Quality Coordinator. (35) The Klamath Basin's air-pollution boundaries appear to have been rather arbitrarily established and have very little relationship to the real air pollution problem and sources of pollution.

'IT IS ANTICIPATED THAT AIR QUALITY WILL REMAIN A SIGNIFICANT CONCERN.....AIR QUALITY STANDARDS WILL BECOME MORE STRINGENT IN THE FUTURE....THAT THE AIR QUALITY PROBLEM IN ...KLAMATH FALLS...WILL CONTINUE TO GENERATE PUBLIC CONCERN AND WILL REQUIRE SOME SOLUTION.'" Final Environmental Impact Statement, Land & Resources Management Plan for the Winema National Forest 1990

AIR POLLUTION LAWS AND REGULATIONS Continued

Along with the mandate to clean up our air, the new law gives us the opportunity to do it ourselves. We don't have to stand by and let the State or Federal government do it for (to?) us, imposing standards from a distance. The Klamath County Commissioners have recently given the County Health Board and Department authority to draft a local ordinance to implement the Clean Air Act requirements. An advisory committee has been appointed to work with the County Air Quality Coordinator on this project. This group includes various representatives from government agencies, businesses, professionals and industries and concerned citizens. Hearings will be held for public input.

Although the focus of the voluntary air quality guidelines and activities has been almost entirely on woodsmoke, it is hoped that the new mandatory air quality restrictions will encompass a much broader spectrum of air pollution sources and solutions.

Oregon's Land Use Law (SB100), passed in 1973 requires counties and cities to establish local land use plans and procedures using state goals and guidelines. This law specifically includes Goal #1 as the Citizen-involvement Goal which requires that local citizens be allowed to be involved in the development and implementation of the local plans. One way Klamath County's plan can affect our air quality is through the siting of industry and specifically incinerators, which are categorized in the plan as "Extensive Impact Services". The plan now allows for an incinerator to be located in any zoning designation, as a Conditional Use. In Klamath County more than 90% of all Conditional Use Permits (CUP) requests are approved. The Land Use Code would allow an incinerator to be sited anywhere in the county, once past the CUP hearing and permit process! Only adjacent property owners receive notice for a proposed CUP, and only they can testify at a CUP hearing. It is conceivable that adjacent property owner's rights to protest could be influenced by money, power, or just ignorance of the facts. Should only a select few people decide the quality of air we breathe? Are we relying too much on people and politics instead of a good land use ordinance which would, and should protect us? How can citizens who will breathe the air be involved in such decisions?

The 1989 Oregon Legislature passed H.B. 2865 which became effective July 1, 1990 and which regulates the transport, storage, handling and disposal of infectious and pathological wastes, including ash disposal. It allows for incineration of all types of hospital waste including many kinds metals, and plastics which are proven dioxin-producers when incinerated. The bill gives the DEQ broad authority to regulate these wastes and establishes fees for out-of-state waste to be incinerated in Oregon. These fees are credited to the DEQ's budget. Incineration was established as the "Method of Choice" for treatment of hospital waste, without sufficient consideration of toxic air emissions and ash, or the advantages of waste disposal alternatives. (36) In December 1989 the League of Women Voters of Oregon protested incineration as the preferred method for disposing of hospital waste, and urged the

"ONE OF THE CURRENT INITIATIVES WE ARE WORKING VERY HARD ON IS POLLUTION PREVENTION AND VOLUNTARY POLLUTION REDUCTION INSTEAD OF RELYING ON A STRICT REGULATORY APPROACH." Dana Rasmussen, Region 10. Administrator of the EPA, Seattle Nov. 1990

AIR POLLUTION LAWS AND REGULATIONS Continued

DEQ to use waste reduction, recycling and alternative methods. However to date incineration remains as the method of choice. (37)

As long as this philosophy favoring incineration prevails and persists, incinerators may proliferate in Oregon, burning much more hospital and municipal waste from out of state. To date, the DEQ has played down any likely hazards from these facilities, and has not established a comprehensive testing and monitoring system .

The 1989 Oregon Legislature also passed HB 3515: "The Toxics Use Reduction and Hazardous Waste Reduction Act". The national Toxics-Release Inventory Act of 1986 was essential to the passage and implementation of this law, which requires that companies which pollute more than a certain amount must reduce their use of toxic substances. The DEQ monitors progress and assesses fees on toxic substances. (38)

Several Air Pollution bills are presently before the Oregon Legislature. Some Field Burning proposals would require still more "study", others might provide little improvement over what already exists in law, and still others would phase out all agricultural burning by the year 2000. None have passed into law as yet.

The most significant bill affecting air quality presently before the legislature is HB 2175 submitted by the DEQ and supported by several public interest groups including the League of Women Voters of Oregon, and environmental organizations. It has undergone hearings in the House and will soon be before the Senate as SB1089, which is to recommend some improvements over the House version. (39)

This bill would impose a fee for emissions from all major sources of air pollution, including industry, transportation, forest practices and woodheating. It establishes an air quality improvement fund, allowing the fees to be used for eligible reduction projects and programs to clean the air. The bill has been called a "non-regulatory, market-based incentive program" which has the potential to reduce Oregon air pollution 40% in 5 to 10 years. The DEQ states that "People can decide for themselves whether to pay the fees or switch to less polluting activities." (40) This bill does little to PREVENT POLLUTION , but merely legalizes it. Might it encourage certain polluters to choose to just keep paying to pollute? Can money buy the right to pollute the air we all must breathe?

Allowing (and encouraging) non-polluting alternative methods, and prevention would eliminate the need for additional laws, ordinances, rules, regulations, and fees. This saves taxpayers money, saves industry the red tape, and protects future generations' environmental legacy. PREVENTION AND SUBSTITUTION PROVIDE THE ONLY SOLUTION TO THE AIR POLLUTION PROBLEM.

"SEATTLE'S PLAN TO SHIP ITS GARBAGE TO OREGON HAS PROMPTED FEARS THAT THE STATE WOULD BECOME THE DUMPING GROUND OF THE NORTHWEST...BUT IMAGINE THE OUTCRY IF LOS ANGELES, CHICAGO, OR NEW JERSEY....SENT THEIR TRASH IN OREGON'S DIRECTION" The Oregonian, February 1, 1991

INCINERATION: A SPECIAL ISSUE OF VITAL CONCERN

Incineration of hospital waste has been identified by the California Air Resources Board as the largest source of dioxin air emissions in their state.⁽⁴¹⁾ At present Oregon cannot import bio-medical waste from California because THAT STATE classifies it as hazardous! Washington State does NOT classify its bio-medical waste as hazardous, therefore Oregon imports Seattle waste to incinerate in Klamath County (Is Washington's hospital waste any less hazardous than California's?) In 1990 a bill was introduced in the California legislature to change the hazardous classification of bio-medical waste. The bill did not pass, but if it is introduced again and passes, there are NO RESTRICTIONS IN OREGON TO IMPORTING CALIFORNIA'S BIO-MEDICAL WASTE to incinerate in Klamath County. This could lead to the very real possibility of increasing dioxin and heavy metal air contamination in our overburdened airshed.

We do not, and should not, downplay other air pollution problems, but the severity, potential synergistic effects and long-term degradation problems associated with dioxins, furans and heavy metals warrant special consideration of air pollution sources that emit these dangerous pollutants. Consider the following questions regarding Oregon's present policy of using incineration as the TECHNOLOGY OF CHOICE for disposal of bio-medical and municipal waste, and siting of an incinerator in Klamath County a few miles from the Urban area:

1. Why did the DEQ not consider the possible impact of dioxin and heavy metal contamination (from the incinerator) entering the food chain and bio-accumulating?

2. Did the DEQ know that a dairy operates less than one half-mile from the incinerator site? That the largest concentration of wintering bald eagles in the 48 states is located adjacent to the incinerator? That a grain storage elevator is located less than 400 yards from the site which uses outside air to circulate through the stored grain for drying? Did the DEQ consider that the contaminants emitted from the incinerator could be deposited on the grain, then be shipped to breweries and bakeries?

3. Why was an in-house Oregon Fish and Wildlife Department memo sent from the Portland Headquarters to the Klamath Basin Regional Manager instructing the downplay of the dioxin issue relating to the incinerator? Especially since the U S. Fish and Wildlife Service has published numerous research papers on the adverse biological effects of dioxins, furans and heavy metals on fish, wildlife and invertebrates? ⁽⁴²⁾ ⁽⁴³⁾

4. Why did the DEQ imply that the bio-medical waste incinerator cannot emit dioxins and heavy metals, then a year later claim that local woodstove smoke produces "three times more dioxins than the incinerator"? Quantifiable amounts of dioxins for the Incinerator and wood - stoves were cited, yet they have **never tested** either. How is it that originally "none are produced by the incinerator", then later that dioxins are produced but that woodsmoke produces more? ⁽⁴⁴⁾

INCINERATION Continued.....

5. Why were local wind patterns not considered when the incinerator siting was approved?
6. Who would be responsible for any ECONOMIC LOSS incurred by accumulation of continued contamination from dioxins and heavy metals over the years?
7. Is the incinerator in the long-term economic best interest of Klamath County? Citizens of Sherwood, Oregon and Columbia County recently successfully defeated incinerator sitings in their areas after lengthy hearings. Is incineration as the method of choice in disposing of bio-medical and municipal waste in the economic best interest of Oregon? - no matter where in the state a facility may be located? Is the assumed benefit worth the potential risk?
8. Why did the DEQ note in an 1988 status report that no out-of-state waste would be burned at the Worden facility? Why didn't the DEQ correct this misinformation when the trucks began to bring in bio-medical waste from Seattle? (45)
9. Why was the public not informed about the recent shutdown of the Worden Bio-medical waste incinerator due to faulty emission control equipment? What is the origin and cause of the sooty black substance emitted from an air vent blower deposited on the side of the incinerator building? Why wasn't dioxin testing done on the Worden facility last January as promised by the DEQ? WHAT ARE THE PRESENT CONDITIONS AND STATUS AT THE WORDEN SITE AND WHAT WILL BE REQUIRED FOR IT TO RESUME OPERATION?
10. Why was the Worden incinerator exempted for five years from compliance with the upgraded 1990 Oregon standards, after only 18 months of operation? (46)

A study commission, made up of 3 medical doctors and 4 Ph.D. scientists, evaluated a proposed municipal waste incinerator planned for Columbia County, Oregon. This group concluded that they could not recommend construction for these reasons: (47)

1. The facility could not be guaranteed to be safe
2. There were unquantifiable health risks associated with the project.
3. There were no good reasons given why the risks involved should be accepted in Oregon
4. Once toxic chemicals are released into the atmosphere, no further control is possible; other methods of waste disposal may allow better control and management.
5. Burning trash does not eliminate the need for landfills. The resulting ash contains toxic chemicals requiring special handling and landfill treatment.

These people were able to convince the regulating authorities that an incinerator for burning waste was not a good idea for their location - as were those who live in Sherwood. How is Klamath County different from these locations?

"IF YOU THROW OUT THE VARIABLES TO REACH AN 'APPLES TO APPLES' COMPARISON FOR OPERATING COSTS ALONE, AUTOCLAVING RUNS 60% LESS THAN INCINERATION." Robert Spurgin, Vice Pres. BFI Medical Waste Systems, Waste Age May 1989

ALTERNATIVES: REDUCE - REUSE - RECYCLE

Pollution control has not worked. Laws passed in the 1970's to protect us - the Clean Air Act, Clean Water Act, Safe Water Act, etc.- have not solved the problem. After 20 years of regulation, our environment and communities have never been at greater risk.

The reasons are clear: the focus of the EPA and Congress for 20 years has been to "control" pollution after it is created, instead of preventing it. There are some successes, which provide valuable lessons. Levels of a few chemicals: DDT, PCB's, mercury, strontium-90, asbestos, and phosphate in some rivers - have been reduced substantially. Levels of airborne lead have declined considerably. Asbestos is gradually being contained or removed.

These successes explain what works and what doesn't. Every success on this short list of significant improvements reflects the same action: PRODUCTION OF THE POLLUTANT HAS STOPPED. DDT and PCBs and asbestos levels dropped because their production and use have been banned. Mercury is much less prevalent because it is no longer used to manufacture chlorine. Lead has been removed from gasoline. The United States and the Soviet Union have stopped above-ground nuclear testing to avoid the hazards of nuclear fallout.

POLLUTION MUST BE ELIMINATED AT THE SOURCE . AFTER IT IS PRODUCED, IT IS TOO LATE. EVEN THE ENVIRONMENTAL PROTECTION AGENCY HAS COME TO RECOGNIZE THIS!

PREVENTION IS THE ANSWER. Toxics-based technologies must be replaced by clean ones. When non-polluting technologies are available for any industry, their use must be mandated. THE TRUE TOTAL COST OF POLLUTING MUST BE RECOGNIZED!

SOME METHODS OF USING ALTERNATIVES FOR MORE HEALTHFUL AIR:

1. Industry and mills can use dual fueling for red alert days, using natural gas instead of waste wood products. Maintaining and updating pollution control equipment is essential.
2. Street and highway de-icing alternatives include clean washed hard rock sand, that does not contain dust and Ethylene Glycol antifreeze which is applied in a spray and dilutes in runoff and evaporates. What is the ecological impact of this method? Its application would only be in Urban Growth areas in conjunction with sand. Considering the damage potential of salting (the City still uses salt) to concrete surfaces , other alternatives to salt, although initial cost is more, may not be as expensive as they appear.
3. Field burning alternatives call for gradual change from highly-polluting open burning to less polluting propane burning. Growers burn to prevent diseases that attack crops, and to dispose of straw garbage left after harvest, which is burned.

ALTERNATIVES continued....

4. Alternatives to woodstove-use: Certified wood stoves, pellet stoves, highly efficient natural gas or oil furnaces, solar, and geothermal. Weatherization of homes and business.

5. To reduce automobile emissions: keep vehicles tuned-up, use mass transport (buses, trains), and bicycles when possible. Plant trees to absorb emissions and add oxygen.

6. Alternatives to slash burning include chipping, hauling, burying, mulching and composting.

7. Municipal and hospital mass-burn incinerators have successfully been replaced by other non-polluting technologies:

A. Source reduction and source separation: By reducing the amount of waste, especially separating out plastics and heavy metals from the waste stream, these materials won't be burned and produce toxics. Pathological and biological waste can be burned without toxic emissions or ash. Non-plastic alternatives are available for most of the throw-away plastics used in hospitals. Glass and metal can be sterilized and are re-usable. (48)

B. Non-combustion treatment of waste: Separation of recyclables saves raw materials, reduces volume, and allows alternative treatment of the remainder. Vegetable material can be composted. Separation of solvents, oils, plastics and other chemically toxic materials is necessary so the whole waste stream is not contaminated. (49)

C. Render hospital waste non-infectious by microwaving: Shredding the waste-stream and microwaving it renders the material non-infectious without combusting; the result can be landfilled. Combustion Engineering, Inc. of Stamford, Connecticut and Sanitec Medical Waste Disinfection and Treatment System produce medical waste systems now used in hospitals in Europe and the United States that do not burn wastes. (50)

D. Autoclave: The California Department of Health Services has determined that steam sterilization is as effective as incineration in disinfecting medical waste. Some 80% of California hospitals use methods other than incineration. Shredding Systems, Inc. of Wilsonville, Oregon makes shredding equipment for autoclaved waste. (51)

8. Bioremediation is a new term used to describe the process of removal of certain petro-chemical toxics by micro-organisms. The bacterial culture is specially developed to attack certain chemical compounds. One culture "eats" phenol and then dies off when its food supply is depleted. Other specific bacteria decompose other toxic agents. The cultures are naturally occurring, not developed from gene alteration. The idea of using bacteria to fight toxic pollutants has been known for decades. Sewage treatment plants rely on these techniques. The EPA calls bioremediation "one of our promising technologies" in hazardous waste cleanup and oil spills. Environmental regulations are forcing business and industry to use alternative cleanup methods. Microbes are relatively cheap workers: it costs about \$30 - \$100 per ton to clean up soil by bioremediation, compared to \$300 - \$400 a ton for incinerating it on site, or about \$1,000 a ton for removal to a remote incinerator and hazardous waste landfill. It has environmental advantages over air-polluting incineration. (52)

"FROM THE RIGHT-TO-KNOW WILL FLOW THE RIGHT TO DEMAND, AND TO GET, TOUGHER LAWS AND SAFER PRACTICES." Governor Jim Florio, New Jersey 1988 N.Y. Times Editorial

HOW TO TAKE ACTION MAKING YOUR VOICE HEARD WHAT YOU CAN DO

Never undervalue or underestimate your importance in addressing issues that may affect your life and the community around you. **YOUR VOICE AND YOUR VOTE COUNT** There are many ways in which you can make a difference as one person.

REGISTER TO VOTE AND VOTE The Oregon Constitution requires that a voter be registered. The County Elections Office (Clerk) must receive a registration no later than 5:00 PM on the 21st day prior to an election in which a person intends to vote. You must re-register if you change your name, address or political party affiliation. Registration forms are available at the Courthouse, Post Office, and County Library. The telephone directory also has voter information and a registration form in front of the yellow pages. You can register by mail.

ATTEND PUBLIC HEARINGS AND TESTIFY Watch the newspapers and other media for announcements of dates, times, and subject matter. Research your subject, know your issue, be prepared. Be concise and to the point, Have typewritten copy to hand in. Speak in person if possible. You need not be an "expert". Express in your own words how the issue affects you, your family or community. If you cannot attend, send written comment.

MAKE A TELEPHONE CALL Brief calls at reasonable hours are most effective. If you dial direct to Washington, D.C. before 8:00 AM Pacific Time it will cost very little. Many government offices have a toll-free number. When you call, state the name and number of the bill. Give your name and address and state your message. You may also ask for information. See listings below for phone numbers.

WRITE A LETTER TO AN OFFICIAL Elected officials pay a great deal of attention to personal letters from constituents. In order to be most effective there are a few simple guidelines to use:
Address the letter correctly, and send when it is timely. Refer to the bill number and name or subject matter. Concentrate on your own or your state's elected delegation. Refer to one subject or issue per letter. Write your concerns, reasons, views, and how you may be affected. Ask for help if appropriate. Be brief, stick to the issue. Be constructive - offer alternatives. Be polite and appreciative. Say "Well-done" when deserved, say "Thank-you" for help or a positive response.

"IT'S IMPORTANT FOR PEOPLE TO UNDERSTAND JUST HOW MUCH OF THESE TOXIC CHEMICALS ARE GOING INTO THEIR AIR...SO THAT THEY CAN GET INVOLVED IN ENVIRONMENTAL DECISION MAKING AT THE LOCAL LEVEL. Susan Hazen, Director of EPA's Community Right to Know Program Washington, D.C.

HOW TO TAKE ACTION Continued

WRITE A LETTER TO A NEWSPAPER EDITOR

Letters to the Editor of a local newspaper offer opportunity to reach many readers with your message and stir them to action. Keep it short and to the point; 250 words or less. Ask readers to phone or write letters on the subject matter to decisionmakers. Suggest what to emphasize. Elected official often read letters to the editor. Mention of their name can get their attention and perhaps some action. Sign your name and give your address.

SOME "DON'TS"

Don't make threats or promises. Don't berate public officials, agency heads or anyone! Don't pretend to wield great political influence or power. Don't try to instruct elected officials on every minor issue.

Attend gatherings where you can personally meet and talk to an elected official or agency director, or any person who represents you or can be influential in making the changes you want to happen. Be friendly, courteous and brief. Don't monopolize time. Follow through .

SOME PERSONS AND AGENCIES TO CONTACT ABOUT AIR QUALITY:

President George Bush
The White House
1600 Pennsylvania Ave.
Washington, D.C. 20500
Phone 202-4516-1414

Senator Mark O. Hatfield (US Senator)
711 Hart Senate Office Building
Washington, D.C. 20510
Phone 202-224-3753 (D.C. Number)
Salem: 399-5731 Portland 326-3386

Representative Bob Smith (US Congress)
118 Cannon Office Building
Washington, D.C. 20515
phone 202-225-6730 (D.C. Number)
Medford: 259 Barnett Rd. 97501 ph. 776-4646
Toll-free number: 1-800-533-3303

Senator Bob Packwood (US Senator)
259 Russell Senate Office Building
Washington, D.C. 20510
phone 202-224-5244 (D.C. Number)
Portland: Suite 240 101 SW Main St.
Portland, OR 97204-3210 ph. 326-3370

Governor Barbara Roberts
254 State Capitol Building
Salem, OR 97310 ph. 378-3100
Toll-free number: 1-800-322-6345
Martha Pagel: Gov. Natural Resources Coord.

Peter Brockman (State Senator Dist.27)
Room S 316 State Capitol Bldg.
Salem, OR 97310 ph.378-8851
Home: 70825 Indian Ford Road
Sisters, OR 97759 ph. 549-8522

PERSONS AND AGENCIES TO CONTACT Continued

Del Parks (State Rep. Dist. 53) KF Urban
Room H 387 State Capitol Bldg.
Salem, OR 97310 ph. 378-8878
K.Falls Office: 228 N. 7th St.
Klamath Falls, OR 97601 Ph. 882-6331
Toll-free number: 1-800-332-2313

Klamath County Commissioners
Harry Fredricks, Chairman
Wes Sine, Commissioner
Ed Kentner, Commissioner
Courthouse Annex 305 Main St.
Klamath Falls, OR 97601
503-883-5100

Klamath Falls City Council
Bill Adams, Chair., David Maxwell,
Clara Moore, Bud Hart, Chuck Rhoads
500 Klamath Avenue
Klamath Falls, OR 97601
James Keller: City Manager
883-5318

Environmental Protection Agency (EPA)
Dana Rasmussen, Adm. Region 10
Air Programs Elizabeth Waddell
1200 Sixth Ave.
Seattle, WA 98101
1-206-442-1200 or 1-206-553-0180

U.S. EPA Oregon Operation Office
811 S W. 6th Ave.
Portland, OR 97204
Ken Brooks, Director ph. 1-326-3250
Paul Koprowsky, Air Coordinator

California Air Resource Board (CARB)
ARB Stationary Source Division
Chief, Toxic Pollutants Branch
1102 Q St P.O. Box 2815
Sacramento, CA 95812
1-916-322-6023

Bob Pickard (rural Kl. County Dist. 54)
Room H 278 State Capitol Bldg.
Salem, OR 97310
phone: 378-8058
Home: 19190 Pinehurst Rd,
Bend, OR 97701 ph. 1-389-6067

Klamath County Air Quality Program
Coordinator/ Director - Louellyn Kelly
403 Pine St.
County Health Department
Klamath Falls, OR 97601
883-4270 or 882-8846
Woodburning announcer 883-7449

Klamath County Library
126 S. 3rd St.
Klamath Falls, OR 97601
882-8894

Oregon Dept. of Environmental Quality
Fred Hansen, Director
Steve Greenwood, Adm. Air Quality Div.
811 SW 6th Ave.
Portland, OR 97204-1390
Toll Free: 1-800-452-4011
Wendy Sims - Air Quality Operations
John Core -Program Visibility Coord.
1-229-5380

DEQ Central Oregon Region Office
John Hector, Manager ph. 1-338-6146
2146 N.E. 4th St.
Bend, OR 97701
503-338-6146

For information on the National Library of Medicine's
TOXNET computer database write:
National Technical Information Service
5285 Port Royal Park.
Springfield, Virginia 22165
ph. 1-703-487-4650

The EPA has provided 4,000 U.S. libraries with microfiche copies of the 1987 Toxic-Release Inventories and fact sheets describing health effects of air pollutants. It is also available by calling EPA Hotline Toll Free in D.C 1-800-535-0202 or by toll charge: 202-479-2449

"YOU CAN'T GO DOWN TO THE LOCAL SUPERMARKET AND BUY A BOTTLE OF CLEAN AIR" comment by a member of the LWV Klamath County Air Quality Study Committee

DEFINITIONS AND ABBREVIATIONS

AIR: The odorless, tasteless, invisible mixture of gases which surround the earth. 99% of dry air is nitrogen (79%), oxygen (19%), argon (.5%) and carbon dioxide (.5%). Remaining gases include hydrogen, neon, helium, krypton, radon, xenon, and ozone in trace amounts. Air has a continuous turbulent motion.

AIR INDEX: (API - Air Pollution Index). EPA designation to give the public a means of assessing air quality on a given day at a given site, depending on the amount of particulates measured by a nephelometer. Categories are: good (0-50) moderate (51-100), Unhealthful (101-200), very unhealthful (201-300), and hazardous (over 300). (53)

AIR POLLUTION: Increased atmospheric haze from air pollutants, including industry, vehicles, agriculture, aircraft condensation trails and other emissions which act as a sunshade, reflecting light back into space. It may contain toxic and/or irritant suspended particles.

AIRSHED: Not a scientific term. Identification of an area in which pollution build-up can occur. Something of a myth due to prevailing winds, meteorology and topography and because areas can be interconnected by drift zones. Several airsheds can be interconnected.

ATMOSPHERE: The earth's envelope of air containing several layers bound to the earth by gravitational attraction. Nearest the earth is the troposphere, 6 - 10 miles high, containing almost all suspended solids and water vapor and 75% of the air. The middle layer or stratosphere, reaches a height of about 32 miles and contains the maximum regions of ozone concentration. Above that lies the mesosphere and thermosphere (or ionosphere) reaching about 75 miles above the earth.

BIO-ACCUMULATION: Metals and stable organic compounds are taken into the body and remain for a significant length of time. If a person is exposed to additional amounts of the chemical, large amounts can concentrate. Usually this chemical concentration occurs in fatty tissues. Chemicals which tend to accumulate in humans are not water-soluble. Bio-accumulation can occur in any form of life, but especially in animals; reaching very high level in food chains when animals consume other organisms that have accumulated toxic materials.

CADMIUM: (Cd) A metal, naturally occurring found in zinc, lead and copper ores. In cadmium poisoning the initial sign is protein in the urine; continued exposure can lead to kidney impairment. Ingestion of large quantities can lead to disorders of the bone marrow and abortions in laboratory animals, and has been shown to be a highly potent cause of lung cancer in these animals. Most cadmium intake is from smoking, food sources and contaminated drinking water.

CARBON DIOXIDE (CO₂): A necessary constituent of daily life, it is exhaled by humans and animals and taken up by plants. Carbon Dioxide is a major product of all types of combustion; especially vehicle exhaust, and incineration. Contributes to "global warming".

DEFINITIONS continued.....

CARBON MONOXIDE (CO): A criteria pollutant, readily absorbed from the lungs into the blood where it competes with oxygen for sites in blood cells where oxygen is carried, decreasing delivery of oxygen to tissues. Symptoms include headaches, light-headedness, ringing in the ears, weakness and difficulty in thinking. The effects are temporary and decrease over time following removal from exposure. Common man-made sources include exhaust from vehicles, slash burning and agricultural burning. It is produced by forest fires, and is also created from methane oxidation and biological activity.

CARCINOGEN : Any substance that causes cancer in humans or animals.

CARB: California Air Resources Board (see How to Take Action for address)

CLIMATE: Characteristic weather conditions for any place or region, measured over long periods of time. (See weather)

CLOUD :A visible mass of water vapor droplets suspended in the air, which may include other suspended particles such as dust and gases which may act as condensation nuclei .

COPD: Chronic Obstructive Pulmonary Disease. A group of breathing disorders, including bronchitis, emphysema, asthma and other allied diseases.

DEQ: Oregon Department of Environmental Quality. DEQ is responsible for enforcing regulations to protect air quality, as well as water quality and solid waste.

DIOXINS (CHLORINATED DIOXINS/FURANS): Generic term for a family of chemicals of 75 chlorinated dioxins and 135 chlorinated dibenzofurans, each differing by the number and position of chlorine atoms on the molecule. Grouped together as toxic contaminants because of their similarities in chemical, physical and toxic properties. Of these, 12 are extremely toxic. 2,3,7,8-Tetra-Chloro-Dibenzo-P Dioxin (2,3,7,8-TCDD) is the most toxic man-made chemical ever tested. Research indicates that long-term exposure effects to sub-lethal doses of dioxins causes cancer, damage to the immune system, reproductive irregularities, liver disease and skin lesions. (54) Agent Orange, an oily defoliant laced with dioxins used extensively in the Vietnam War, is probably the most commonly known form of dioxin.

The process by which dioxins are created is not exactly known. According to CARB they occur as unwanted by-products of certain chemical manufacturing and combustion processes. Emission rates appear to be related to the chemical composition of the fuel burned and of combustion efficiency. An EPA report (55) states that chemical precursors containing chlorine (polyvinyl chloride plastics or PVC's) are necessary to produce dioxins. Waste incineration produces dioxins. A waste incinerator in Hempstead, N.Y. was tested in 1977 and found to emit dioxins. Since that date every waste incinerator tested has been found to emit dioxins. (56)

EMISSIONS: Substances that are discharged into the air from the stacks of industrial operations, incinerators, or from vehicle exhaust openings.

DEFINITIONS continued.....

EPA: The National Environmental Protection Agency. Responsible for regulating and overseeing state implementation of environmental laws, including the Clean Air Act, Clean Water Act and other environmental measures.

EQC: The Oregon Environmental Quality Commission. A five member board appointed by the governor which oversees and directs the DEQ.

FOG: A cloud at or near the earth's surface, containing water droplets which are not easily distinguished by the naked eye. Mist is fog with small, discernable droplets of water.

HAZE: Fine Dust (or sea Salt) particles in the air, limiting visibility.

INVERSION: (see drawing at end of this section) A layer of warm air lying above and trapping a layer of cold air, preventing upward movement (venting or cleaning) of air. Frequent in valleys and basins, causing pollution to accumulate. The top of the layer reflects solar radiation by day, retarding surface heating which dispel the inversion. Smog increases as more fuel is burned for heat. Topographical features such as mountains, valleys and large bodies of water contribute by the gravitational flow of cold air into low regions of stable pollution-prone air. Day/night reversal rhythms of mountain and valley winds can encourage air pollution cycles. Air pollution problems are caused as much by ventilation as by pollutants. (Figure 2.) (57)

LEAD: (Pb) A toxic heavy metal and criteria pollutant. Ingestion of paint chips containing lead in combination with urban air pollution has produced brain damage, especially in children. Lead is known to impair the blood-forming system, the central nervous system and many internal organs. A former common source was leaded gasoline, but is also found in many paints and batteries. Burning material containing lead releases it into the atmosphere because lead melts and vaporizes relatively easily. Lead can accumulate in soil and biological systems.

MASS BURN: An incineration system in which nothing is sorted. Everything goes into the same fire, regardless of the composition of the materials.

NON ATTAINMENT: (area) Out of attainment: A geographical area with a describable boundary that is in violation of the National Ambient Air Quality Standards.

OZONE: A criteria pollutant and an extremely reactive form of oxygen having a characteristic pungent odor. It has immediate irritant effects on the nose, mouth, airways to the lungs, and eyes. Over time ozone can cause oxidation of fatty materials in body cells and reduction in plant growth. It can also cause paint to fade and help crack various synthetic materials. Not to be confused with the ozone layer in the stratosphere.

PARTICULATE MATTER: A criteria pollutant. Small solid particles or liquid droplets of matter that are light enough and small enough to remain suspended in the air. Made up of most of the non-gaseous products of the combustion process, and when burner temperatures are too low,

DEFINITIONS continued.....

may contain unburned and partially burned fuel components. Particulates mostly produce irritation, typically of the eyes, nose and air passages in the lungs. Larger particles can cause eye irritation, sneezing and coughing, but the body generally can rid itself of them within a day without causing prolonged or severe health effects. Fine particles (less than ten microns) are of greater health concern, and can lodge permanently in the lungs. Coarse particulate includes airborne dust, smoke soot, salt sea spray, and pollen.

POLLUTANT: A contaminant that adversely alters the physical, chemical or biological properties of the environment.

PESTICIDE: Chemicals used to destroy or control insects, weeds or unwanted growth

POLYCHLORINATED BIPHENYLS (PCBs): A class of colorless compounds with varying toxicity. Mostly inert and insoluble in water, tending to bio-accumulate. The more chlorine, the greater the health risk from PCBs. The skin and liver are most susceptible to damage from PCBs, but the central nervous system can also be affected. PCBs have accumulated in mother's milk, placing nursing infants at risk. Some PCBs are suspected carcinogens. This family of chemicals is used in electrical transformers, as plasticizers, in hydraulic fluids, printing inks and carbonless copy paper. Manufacture of PCBs was stopped in the U.S. in 1977, but they are still found in the environment and in electrical transformers.

RECYCLABLE: Waste material which can be separated out of the waste stream and can be collected and sold to be reprocessed or re-used.

SLASH: The refuse remaining on the ground after logging operations

SMOG: A combination of smoke and fog, usually in populated industrial and manufacturing areas. Most smog is a result of high temperature combustion of coal, oil or gasoline in power plants, factories and motor vehicles. Smog is formed whenever large amounts of nitrogen oxides and hydrocarbons (released from vehicles and industrial sources) combine with sunshine for photochemical reactions. Topography and weather patterns can affect the smog conditions. Ozone, sulfur, fluorine radioactive radon gas and soot are possible smog gases which can be eye and respiratory irritants, kill plants and corrode building materials.

SOURCE SEPARATION: Removing and sorting component materials in a waste stream prior to treatment, allowing different treatments appropriate to each type.

STEAM: The visible mist formed by the condensation of water vapor. What appears to be only steam rising from industrial stacks, may be a composite of water vapor, particulates and many chemical elements with the potential of being harmful air contaminants.

SYNERGISM: The interaction of two or more chemicals, in which the result is a toxic reaction or disease more intense than the simple sum of the effect of each agent acting individually.

DEFINITIONS continued.....

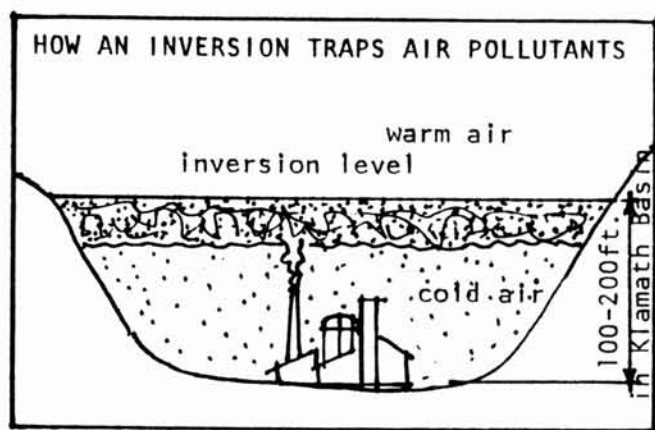
TOXIC: A toxic substance is a chemical, physical or biological agent that interferes with life processes. Exposure to toxic substances may endanger health with adverse effects including cancer, birth defects, neurological damage, damage to the body's natural immune system and other fatal diseases. Toxic exposure can cause both immediate and long-term health effects.

TRACK-OUT (Dust): The deposit of mud and other materials onto pavement from dirt roads by trucks, such as logging vehicles.

WEATHER: Short term variations of temperature, air pressure, wind, moisture, cloudiness, precipitation and visibility of the earth's atmosphere.

WIND: Air naturally in motion created by air pressure differences. Air of high pressure flows to areas of low pressure, caused by temperature differences. When heated, air expands, rising above cold air; more air flows in to replace it. The process is reversed if air is cooled. Over time air changes force and direction many times. Seasonal wind patterns are established, may remain stable over years, and develop a pollution pattern downwind from a polluting source, extending several miles. Topographical features may influence wind directions.

(58)



Cold air drains into the valley, with a layer of warm air above. Inversion air is stable, preventing upward dispersion of pollutants in cold air near ground.

FIGURE 2.

REFERENCES

1. Klamath Falls Wood Stove Voluntary Curtailment Program Evaluation, by Klamath County Department of Health and State of Oregon Department of Environmental Quality, Air Quality Division, April, 1989, page 2.
2. Oregon Department of Human Resources, Health Division Report of "Woodsmoke Air Pollution and Changes in Pulmonary Function Among Elementary School Children", Office of Epidemiology, Environmental, Occupational and Injury Section, 1400 SW 5th Avenue, Portland, Oregon.
3. News Release from Klamath County Health Department, Air Quality Director, April 1, 1991.
4. Draft State Implementation Plan for Particulate Matter, Klamath Falls, Oregon, Non-Attainment Area, State of Oregon, Department of Environmental Quality, Air Quality Division, June 1990, page 13.
5. Interview with Klamath County Air Quality Coordinator, W. LouEllyn Kelly, March 12, 1991, by LWV Air Study Committee Members.
6. "Caution: The Air You Breathe May Be Hazardous To Your Health", The National Voter, June-July, 1990, page 9.
7. "Health Effects of Ambient Air Pollution," American Lung Association, 1740 Broadway, New York, N. Y. 10019-4374, July 1989, page 76.
8. The National Voter, Supra at, page 7.
9. U. S Senate Committee on Environment, page 3.
10. California Air Resources Board, CARB 1984 Report, page 182.
11. War on Waste: Can America Win its Battle With Garbage?, by Louis Blumberg and Robert Gottlieb, Published by Island Press, 1989, page 98.
12. United States Air Force Personnel and Exposure to Herbicide Orange: Interim Report for Period March 1984 to February 1988, Richard A. Albanese, United States Air Force, Brooks, Air Force Base, Texas, February 1988.
13. CARB, 1984, Supra at, page 182.
14. "Sources of Dioxins in the Environment: A Study of PCDDs and PCDFs in Ancient Frozen Eskimo Tissue", by W. V. Ligon Jr., et al, General Electric Company, Corporate Research and Development, April 4, 1989.
15. "Chlorodibenzofuran and Chlorodibenzo-P-dioxin Levels in Chilean Mummies Dated to About 2800 Years Before the Present", by W. V. Logon, Jr., Steven Dorn, Ralph May and M. Allsion, General Electric Company, Corporate Research and Development and Instituto de Antropologia y Arqueologia, Universidad de Tarapaca, Arica, Chile, 1989.
16. Interview with Dr. Zwartverwer, March 11, 1991, with member of LWV Air Quality Study Committee.
17. Health Impact Review Panel: Report on the Trash Incinerator Facility Proposed for Columbia County, Oregon; Project Coordinator, Margery Post Abbott, Submitted to the Metropolitan Service District February 10, 1988, page iv.
18. Hazardous Waste News Report # 33, Environmental Research Foundation, P. O. Box 73700, Washington, D. C., 20056-3700.
19. Hazardous Waste News Report # 143
20. "An Estimation of Relative Human Exposure to 2,3,7,8-TCDD Emissions Via Inhalation and Ingestion of Cow's Milk", By P. Connett and T. Webster, Center of the Biology of Natural Systems, Queens College, Flushing, N. Y.
21. "Critical Factors in the Assessment of Food Chain, Contamination of PCDD/PCDF From Incinerators," P. Connett and T. Webster, Center of the Biology of Natural Systems, Queens College, Flushing, N. Y.
22. Final Environmental Impact Statement: Land & Resource Management Plan, Winema National Forest, 1990, pages 3-5.
23. "Critical Factors in the Assessment of Food Chain, Contamination of PCDD/PCDF from Incinerators," P. Connett and T. Webster. Center of the Biology of Natural Systems, Queens College, Flushing, N. Y.
24. Report on Oregon DEQ's Dioxin Testing Plan by Alder Hill Research Group, Tidewater, Oregon, 1990.

References Continued....

25. Connett and Webster, "An Estimation of Relative Human Exposure...", Supra at.
26. Connett and Webster, "Critical Factors...." Supra at.
27. United States Fish and Wildlife Department Synoptic Reviews of the Impacts of Dioxin and Heavy Metals on Fish Wildlife and Invertebrates.
28. Incinerator Monitoring: The Critical Link Between Source and Receptor, By R. A. Denison, Senior Scientist, Environmental Defense Fund.
29. Ibid
30. Ibid
31. Draft State Implementation Plan for Particulate Matter, Klamath Falls, Oregon Non-Attainment Area, State of Oregon, Department of Environmental Quality, Air Quality Division, June 1990. Page 21.
32. The National Voter, Supra at, page 6.
33. The National Voter, Supra at, pages 5 & 9.
34. Memo to Air Quality Committee and Interested Parties from W. LouEllyn Kelly, Air Quality Coordinator, Subject: Federal Clean Air Act Preliminary Analysis, dated December 7, 1990.
35. Ibid.
36. Oregon State House Bill 2865, 1989.
37. League of Women Voters of Oregon, Letter Dated December 1989, Sent to Brian Finneran, DEQ, RE: Testimony on Proposed Incinerator Rules.
38. Oregon State House Bill 3515. Toxics Use Reduction and Hazardous Waste Reduction ACT.
39. Oregon State House Bill 2175.
40. Ibid.
41. "Proposed Dioxin Control Measure for Medical Waste Incinerators", California Air Resources Board, Stationary Source Division. Staff Report, May 25, 1990.
42. Memo: From, Greg Robart, Oregon Department of Fish and Wildlife, HCD, Portland, Oregon; To, Ralph Opp, Klamath Falls, Oregon: Subject, Bio-Waste Incinerator. April 30, 1990.
43. "Dioxin Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review", U. S. Department of the Interior, Fish and Wildlife Service, May 1986.
44. Letter, September, 13, 1990. From: Department of Environmental Quality, John F. Kowalczyk, Manager, Planning and Development, Air Quality Division; To: Harry Fredricks, Klamath County Commissioner.
45. Oregon Department of Environmental Quality Status Report, August, 1988, Bio-Waste Management.
46. State of Oregon, Environmental Quality Commission, Bulletin, March 2, 1990, Subject: Adoption of Incinerator Rules: Amendments to Better Address Municipal, Hospital, and Crematory Units. Pages 2 and A-1.
47. Health Impact Review Panel, Report on the Trash Incinerator Facility Proposed for Columbia County, Oregon, February 1988, Project Coordinator Margery Post Abbott. Submitted to the Metropolitan Service District.
48. "Waste Management: As If The Future Mattered. by Paul Connett, 1988 Frank P. Piskor Faculty Lecture, May 5, 1988, St. Lawrence University.
49. Ibid.
50. "Progress with Microwave Process", Vetco, Sanitec, Microwave Disinfection Unit, Vetco, Santitc, GMBH, P. O Box Elwerathstr, 2, D-3101 Nienhagen/Celle, West Germany.
51. "Proposed Dioxin Control Measure for Medical Waste Incinerators" CARB, Supra at, page 8.
52. Portland Oregonian, March 26, 1991
53. For Your Information, Herald and News, Klamath Falls, Oregon, March 17, 1991.
54. Chemosphere, 1986, 15, N1-2.
55. Environmental Protection Agency, #EPA/600-/8-84/104F.
56. "A Data Base of Dioxin and Furan Emissions from Municipal Refuse Incinerators," Milton Beychoc, Atmospheric Environment, Vol. 21, #1, 1987, pp 6-8.
57. "Weather in the West," by Bette Roda Anderson, 1975 American West Publishing Co., Palo Alto, California.
58. Ibid,

RECOMMENDATION AND PERSPECTIVES

The scope of this report is on going. New data is continually being made available for the better understanding of pollution prevention.

WE CAN MAKE A DIFFERENCE

- | | |
|--------------------------|--|
| 1. ACCOUNTABILITY | Government and its agencies are only as effective as the accountability it maintains with the people. |
| 2. CARING | Caring for others' total well-being |
| 3. COMMITMENT | We expect our government officials to have a commitment to the entire community, not a fragmented portion. |
| 4. FAIRNESS | Equal treatment for all: individuals, industry and business. |
| 5. FLEXIBILITY | To recognize we can not continue to pollute, produce voluminous waste; and to look for new and innovative ways for pollution prevention. |
| 6. PLANNING | A comprehensive evaluation of the total effects of pollution. We need to look at the total picture. |
| 7. PREVENTION | Prevention is less expensive than control. |
| 8. RESPONSIVENESS | Listening, providing information, and including citizens in decision-making at all levels. |

We wish to thank the following organizations and individuals for their assistance in producing this document: The League of Women Voters of Oregon and LWV-OR Education Fund; The League of Women Voters of the U.S.; LouEllyn Kelly, Klamath County Air Quality Director; American Lung Assoc. of Oregon; Dr. Paul Connett, Prof of Chem., St. Lawrence Univ. N.Y.; EPA Region 10; DEQ; CARB; Southern Oregon Coalition to Improve Air Quality; Lazerquick; Cell Tech, Inc.

LWV Klamath County Air Quality Study Committee Members:
Janet MacKrell, President 1989-91;
Chris Fay; Juanita Hodges; Doris Argile Johnson; Genna Lemman;
Judy Matthews; Mavis McCormic; Nina Pence; Trish Seiler;
Diane Shockey; Terry Wagstaff; Anita Ward; Carol Yarbrough

"WE WILL SPEAK OUT STRONGLY AND FORCEFULLY FOR WHAT WE BELIEVE IS RIGHT. THE LEAGUE IS BEHOLDEN TO NO PARTY AND NO SPECIAL INTEREST. WE HAVE FREEDOM TO TELL THE TRUTH AND WE WILL." Nancy Neuman, President, League of Women Voters of the United States 1986-1990

THE LEAGUE OF WOMEN VOTERS POSITION ON AIR QUALITY

THE LEAGUE OF WOMEN VOTERS OF THE UNITED STATES

supports preservation of the physical, chemical and biological integrity of earth's ecosystem, and maximum protection of the public health and the environment. The interrelationship of air, water and land resources should be recognized in designing environmental safeguards aimed to prevent ecological degradation, and to prevent, reduce, and control pollutants.

Environmental protection is the responsibility of all levels of government, but the federal government must provide leadership, technical and financial assistance, and should set and enforce standards in a timely, consistent and equitable manner for all violators, including governmental units, industry, business, and individuals.

Environmental protection and pollution control, including waste management, should be considered a cost of providing a product or service. Consumers, taxpayers and ratepayers must share some of these costs. League supports policies that accelerate pollution control, including federal financial assistance for state and local programs.

THE LEAGUE SUPPORTS:

- * Prevention of air pollution where possible
- * Regulation of pollution sources by control and penalties
- * Inspection, testing and monitoring of pollution sources
- * Full disclosure of pollution data, available to the public
- * Incentives to accelerate pollution control
- * Vigorous enforcement mechanisms, including sanctions, and fines for noncompliance

The League of Women Voters of the United States believes in promoting public understanding and participation in decision making as essential elements of responsible and responsive management of our natural resources, and public involvement in all phases of this activity.

THE LEAGUE BELIEVES WE NEED:

- * Measures to reduce vehicular pollution, including inspection and maintenance of emission controls and changes in vehicle design
- * To develop more energy-efficient transportation systems
- * Regulation and reduction of pollution from stationery sources
- * Regulation and reduction of ambient toxic air pollutants
- * Measures to reduce transboundary air pollutants: ozone and causes of acid deposition.

"WE KNOW ELECTED OFFICIALS AT ALL LEVELS OF GOVERNMENT STILL RESPOND TO OPINIONS OF CITIZENS. LET'S SHOW OUR STRENGTH WITH OUR ACTION... WE CAN MAKE A DIFFERENCE." Colleen Bennett, President, League of Women Voters of Oregon. February 1991

LEAGUE OF WOMEN VOTERS POSITION ON AIR QUALITY Continued

THE LEAGUE OF WOMEN VOTERS OF OREGON:

has had positions supporting a strong national Clean Air Act since 1968, and believes that all segments of society - including government, industry, business, and individual citizens, share responsibility for improved air pollution abatement practices.

THE OREGON LEAGUE SUPPORTS:

- * Adequate financing for air pollution prevention and abatement programs
- * Adequate standards for control of all sources of pollution
- * Strict enforcement of established rules and regulations
- * A comprehensive, coordinated program for management of air as a natural resource
- * More research to find causes and effects of air pollution and methods of control and prevention
- * Coordination of research programs and sharing of information among all parties
- * Reinforcing state laws concerned with industrial air contaminant sampling programs
- * Emphasis on public well-being, rather than economic effects of pollution control measures
- * The state requirement that counties establish comprehensive plans for air quality

THE OREGON LEAGUE AGREES that effective public education programs are necessary and that industry must be prepared to pay the cost of abatement for its own pollution. The League of Women voters of Oregon and the United States worked hard for and opposed any weakening of, the National Clean Air Act Reauthorization passed by Congress in 1990.

THE LEAGUE OF WOMEN VOTERS OF KLAMATH COUNTY:

supports all of the above positions of the National and State League organizations and supports their application in Klamath County to minimize local air pollution.

In order to recover the quality of air we once took for granted in our area the League recognizes the immediate need for changes in local attitudes and habits that contribute to the pollution problem. None of us who live and work and play in the Klamath Basin can escape the consequences of continued polluted air in the area. We must all work together to change these conditions. This preliminary report on Air Quality in the Klamath Basin is presented in hopes of making a positive contribution towards that end.

THE LEAGUE OF WOMEN VOTERS OF KLAMATH COUNTY

P.O. BOX 1226, KLAMATH FALLS, OREGON 97601

