

REVIEWED
LEGAL COUNSEL

BEFORE THE BOARD OF COUNTY COMMISSIONERS OF DESCHUTES COUNTY, OREGON

An Ordinance Amending Ordinance No. PL-15, Deschutes County Zoning Ordinance of 1979, as Amended, to Provide Standards and Criteria for Geothermal Facilities, Providing Definitions, Making Geothermal Operations Conditional Uses, and Making Findings. *

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 COUNTY CLERK
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 MARY SUE PENHOLLOW
 COUNTY CLERK

ORDINANCE NO. 85-002

THE BOARD OF COUNTY COMMISSIONERS OF DESCHUTES COUNTY, OREGON, ORDAINS as follows:

Section 1. Section 1.030, Subsection (3), Definitions, Deschutes County Zoning Ordinance of 1979, Ordinance PL-15, is amended to read:

"(3) Accessory use or accessory structure. A use or structure incidental and subordinate to the main use of the property, and located on the same lot as the main use. Accessory uses include drilling for, and utilization of, low-temperature geothermal fluid in conjunction with the main use of the property."

Section 2. Section 1.030, Definitions, Deschutes County Zoning Ordinance of 1979, Ordinance PL-15, is amended by the addition of the following:

"(46a) Geothermal energy facility, small-scale. An electrical power generating plant with a nominal electric generating capacity of less than 25 MW; a pipeline that is less than 16 inches in diameter and less than 5 miles in length used to carry geothermal resources; and related or supporting equipment and facilities."

Section 3. Section 1.030, Definitions, Deschutes County Zoning Ordinance of 1979, Ordinance PL-15, is amended by the addition of the following:

"(46b) Geothermal resource, high-temperature. Any ground water, steam, or other fluid 250°F or greater which is used for its thermal characteristics."

Section 4. Section 1.030, Definitions, Deschutes County Zoning Ordinance of 1979, Ordinance PL-15, is amended by the addition of the following:

"(46c) Geothermal resource, low-temperature. Any ground water, steam, or other fluid less than 250°F which is used for its thermal characteristics."

Section 5. Section 1.030, Definitions, Deschutes County Zoning Ordinance of 1979, Ordinance PL-15, is amended by the addition of the following:

"(46d) Geothermal well, high-temperature. Any excavation, as defined by ORS 522.005(10), 522.005(12), or 522.005(15), that is constructed or used for the thermal properties of the resource contained within, or which is constructed or used for returning such resource to an underground reservoir."

Section 6. Section 1.030, Definitions, Deschutes County Zoning Ordinance of 1979, Ordinance PL-15, is amended by the addition of the following:

"(46e) Geothermal well, low-temperature. Any excavation, as defined by ORS 537.515(7), that is constructed or used for the thermal properties of the resource contained within, or which is constructed or used for returning such resource to an underground reservoir."

Section 7. Subsection (2) of Section 4.100, Surface Mining (SM) Zone, Deschutes County Zoning Ordinance of 1979, Ordinance PL-15, is amended by the deletion of Subsection (2)(I).

Section 8. Subsection (3) of Section 4.100, Surface Mining (SM) Zone, Deschutes County Ordinance of 1979, Ordinance PL-15, is amended by the addition of Subsection (3)(E) which reads as follows:

"(E) Operations for the exploration of geothermal resources."

Section 9. Section 8.050, Specific Use Standards, Deschutes County Zoning Ordinance of 1979, Ordinance PL-15, is amended by the addition of subsection (20) which reads as follows:

"(20) High-temperature geothermal wells and small-scale geothermal energy facilities:

(A) Applicants shall provide the following information:

(1) Project description. A detailed narrative which describes the applicant's plan of operations for exploration, production, utilization, and/or injection. This description shall include estimated starting and completion dates for each activity or phase of the project. It shall also include a concise but comprehensive discussion of the project's expected environmental impacts. This narrative shall also include as an exhibit a statement describing the applicability of all local, state, or federal inventories of Statewide Planning Goal 5 resources in the project vicinity.

(2) Maps. As may be required by the Planning Director, maps shall be submitted on readily reproducible transparencies as follows:

(a) A topographic map, of a scale not less than one inch to one-half mile, on which the following are shown: all pertinent property ownership and geothermal lease boundaries; the location of all proposed, existing, and abandoned geothermal wells and/or energy facilities; all existing and planned access roads; major drainage patterns of the project's operational area; and significant environmental features and natural resource locations, including but not limited to: mineral or aggregate deposits, fish and wild-

life habitats, ecologically or scientifically notable natural areas, outstanding scenic views, wetlands, surface water bodies, wilderness areas, historic and cultural sites, and recreation trails and facilities.

- (b) A map of the project site, of a scale not less than one inch to fifty feet, on which is shown a detailed layout of all drilling pads, sumps, equipment, buildings, pipelines, power lines, and related facilities.
 - (c) Other specialized maps, plans, or drawings as may be required by the Planning Director, including but not limited to: a larger-scale map to show any of the foregoing information if details cannot be satisfactorily indicated on the smaller scale map; detailed engineering drawings for any construction at a location on steep terrain, potentially unstable ground, or other geologically or environmentally sensitive areas; and engineering drawings of new road construction or existing road modification when such roads are in rugged terrain, or pass through or near environmentally sensitive areas.
- (3) Emergency contingency plan. A detailed emergency contingency plan which addresses prevention or control of fires, blow-outs, pollution incidents, accidents, injuries, and adverse weather conditions. This plan shall describe the following:
- (a) How the emergency will or might affect the applicant's operations; or endanger personnel, public health, safety, or the environment.

- (b) Measures proposed to prevent, control, mitigate, or minimize the possible negative effects of emergency incidents.
 - (c) Procedures for training and instructing personnel as to proper procedures for preventing, controlling, or minimizing the impacts of emergency incidents.
 - (d) Where and how stand-by emergency control equipment and services are to be obtained in the event of an emergency incident.
 - (e) Notification list with order of notification, including names, telephone numbers and addresses of the applicant's responsible officials, and those of applicable emergency service agencies.
 - (f) Where and how first aid, and minor and major medical aid, will be obtained if needed during work on the project.
- (4) For drilling applications, a narrative and diagrammatic description of the following:
- (a) The type and capacity of drilling equipment to be used.
 - (b) The expected drilling schedule.
 - (c) The drilling method to be used; type of circulating media to be used, e.g., water, mud, foam, air, or combination thereof; chemical additives to be used; circulating media cooling measures to be employed; and amounts of reserve circulating media and water to be kept on the drill site. If toxic materials to be used, protective measures must be explained in detail.

- (d) The number and type of workers to be employed during drilling.
 - (e) The safety provisions and emergency shut-down procedures to be used for protection of the public health and environment.
 - (f) The planned use, source, quality, and consumption rate for any outside water supply.
 - (g) The method and locations for disposal of wastes.
 - (h) A description of the intended site restoration procedures to be used after completion of drilling.
 - (i) When approved by the Planning Director, applications for prospect wells, as defined by ORS 522.005(15), may satisfy the information requirements of Section 8.050(A)(1) through 8.050(A)(4) by submission of a copy of the applicant's prospect well permit application to the Oregon Department of Geology & Mineral Industries.
- (5) For energy facility applications, a narrative and diagrammatic description of the following:
- (a) The structures, equipment, and support facilities to be used in the project, and their manner of operation.
 - (b) A description of the purpose and operational characteristics of the major components in the energy facility, including schematic flow diagrams.
 - (c) An artist's rendering which illustrates the visual appearance of the facility and its immediate environs after completion.

- (d) A time schedule for the installation and start-up of the facility.
 - (e) The number and type of construction and permanent workers to be employed at the facility.
 - (f) The safety provisions and emergency shut-down procedures to be used in the facility for protection of the public health and environment, including a schedule for testing and maintaining safety devices.
 - (g) The planned use, source, quality, and consumption rate for any outside water supply.
 - (h) The method and locations for disposal of wastes.
 - (i) A description of facility monitoring to assure continuing compliance with applicable noise, air, and water quality standards and regulations, and for other potentially significant environmental impacts.
 - (j) A description of the intended abandonment and site restoration procedures to be used if and when the facility is permanently taken out of operation.
- (B) The siting, drilling, operation, and abandonment of wells and energy facilities shall comply with the following standards:
- (1) Excluded areas. No activity shall be permitted in inventoried natural resource areas, as defined by Oregon Statewide Planning Goal 5, which the County has determined to be unsuitable for any use other than the inventoried natural resource pursuant to Geothermal Policy 4(F) of the Comprehensive Plan.

- (2) Scenic protection. Activities shall be designed and conducted so as to be as compatible as practical with surrounding scenic and visual characteristics. Energy facilities shall be designed to minimize their visual profile, and painted or prepared so as to be non-reflective, and of colors which blend with, and reduce contrast with, surrounding landscape colors.
- (3) Fish and wildlife protection. Activities shall be designed, conducted and monitored, so as to assure protection of surrounding fish and wildlife resources. Activities shall not encroach upon, nor jeopardize, habitat areas which are necessary to sustain local or migratory populations of fish and wildlife determined by the County to be significant.
- (4) Historic and cultural protection. Activities shall be designed and conducted so as to avoid disturbance to historic and cultural resources. The applicant shall cease construction or operations if such resources are encountered, and inform the County within 48 hours of such resources. Thereafter the applicant shall submit a plan for preservation and/or interpretation of such resources before recommencing construction or operations.
- (5) Access roads. Activities shall be designed and conducted in such a way as to utilize existing roads as much as practical. Any permanent roads to be constructed shall comply with applicable County road standards.
- (6) Signs. All well and facility sites shall have a sign of not less than three, nor more than six, square feet in surface area prominently erected, which displays the site's name or identification number; the operator's name, address, and phone number; and the name and phone number of the operator's representa-

tive to be contacted in the event of an emergency.

- (7) Earth work. Drill pads, pipeline routes, facility sites, and roads shall be designed and constructed as follows:
- (a) Plans for drill pads, pipelines, facility sites, and roads shall be prepared by a registered civil engineer.
 - (b) Upon commencement of site work, topsoil shall be removed and stockpiled for later re-spreading over disturbed areas prior to revegetation in accordance with Subsection 21 of Section 8.050(B). Except for large stumps, vegetation removed during initial site work shall be chipped, stockpiled, and respread with topsoil. Stumps shall be buried outside of fills. Vegetation beyond the site perimeter shall not be disturbed; the clearing limits for the site shall be specified in plans submitted to the County. Buffer zones of undisturbed soil and vegetation shall be maintained for 500 feet on either side of stream courses. Roads and pipelines crossing riparian areas shall be designed and constructed at minimum widths and in consideration of maximum erosion control.
 - (c) Fills shall be compacted to a minimum of 90% relative density (ASTM D-1557) so as to minimize erosion. If significant erosion occurs the applicant shall take prompt remedial action.
 - (d) Fill slopes shall not exceed a gradient of 2:1. The toes of all fills shall be stabilized with rock, or keyed into stable soil, and placed so as

to reduce erosion potential to an absolute minimum. Revegetation of fill slopes shall be carried out in accordance with Subsection 21. Cut slopes shall not exceed a gradient of 1-1/2:1. Modification of these slope gradients may be made upon written approval of the Deschutes County Public Works Director.

- (e) Subdrains shall be provided under all fills where natural drainage courses and seepage are evident.
- (f) No drill pads, pipelines, facility sites, or access roads shall be allowed on potentially active landslides.
- (g) Grading and filling shall be designed so as to channel storm runoff to existing natural drainages. Energy dissipaters and collection devices to reduce the erosion force of unnatural runoff shall be provided.
- (h) Sumps shall be designed so as to withstand both static loads, and dynamic loads imposed by potential seismic events. Sumps shall be constructed of material compacted to a minimum of 90% relative density (ASTM D-1557), and shall be lined with either clay or an equivalent impermeable membrane. Safety fencing may be required.
- (i) Sumps shall be operated in such a manner as to preclude overtopping. Three feet of free board shall be maintained at all times when sumps are in use. Upon completion of drilling and testing, sumps shall be purged of environmentally

harmful chemicals and precipitates, and backfilled immediately thereafter.

- (8) Pipelines. All pipelines shall be designed and constructed in accordance with applicable state standards. Pipelines shall be subsurface at road crossings, unless it is demonstrated that no significantly adverse visual impacts will result from above-ground crossings. In no case shall pipelines impede vehicular traffic. Catch basins and drainage to acceptable receptacles shall be installed and continuously maintained in order to contain condensate.
- (9) Noise. Activities shall be conducted in compliance with Oregon Department of Environmental Quality noise standards. Noise from drilling and facility operations shall be muffled, and times of operation limited so as not to constitute a public nuisance as defined by the Department's standards. The County may require noise monitoring and reporting over and above that required by the Department of Environmental Quality.
- (10) Fire protection. Activities shall be designed and conducted so as to provide fire protection measures acceptable to the County, any adjacent land management agency, and any fire district in which the project is located.
- (11) Waste disposal. All wastes generated by a project, including but not limited to refuse, drilling fluids, drill cuttings, sand, precipitates, and other solids, shall be disposed of in a manner and at a location in conformance with Oregon Department of Environmental Quality standards.
- (12) Public safety. Activities shall be designed and conducted such that un-

attended equipment and operational areas are protected from access by unauthorized persons.

- (13) Air quality. Activities shall be designed and conducted so as to comply with the air quality standards of the Oregon Department of Environmental Quality. Operational areas and access roads shall be regularly sprinkled with clean water to control dust. Except for prospect drilling, as defined by ORS 522.005(15), the County may require establishment of a meteorological station and meteorological monitoring at the site.
- (14) Water quality. Activities shall be designed and conducted so as to comply with the water quality standards of the Oregon Department of Environmental Quality. The equipment service and fuel transfer areas, and the area occupied by drilling rigs, shall drain into sumps. No fluids of any type shall be allowed to enter stream courses.
- (15) Subsidence and induced seismicity. Activities shall be designed and conducted so as to minimize the potential for land subsidence or induced seismicity which could result from the withdrawal and/or injection of geothermal fluids. Except for prospect drilling, as defined by ORS 522.005(15), the County may require submission of a geological study of such potentials. Except for prospect drilling, as defined by ORS 522.005(15), the County may also require establishment of a monitoring program to gauge such impacts during operations, and if either subsidence or induced seismicity is determined by the County to present a significant hazard, the County may require remedial action including, but not limited to, reduced production rates, increased injection of waste or other fluids, or suspension of production.

- (16) Clean-up. Upon completion of each phase of a project, the site shall be promptly cleared of all trash, refuse, and other waste material. All drilling equipment shall be removed from well pads within 60 days of the completion of a well.
- (17) Well drilling completion notice. Applicants shall notify the County in writing of completed well drilling and testing within 7 days of said completion. Applicants shall notify the County in writing of suspended drilling within 7 days of said suspension, when such suspension is expected to last longer than 180 days.
- (18) Standby wells. Wells which have encountered geothermal resources, and which are awaiting connection to a pipeline or energy facility, shall be maintained at a minimum steam bleeding rate in compliance with Oregon Department of Geology & Mineral Industry standards. The area surrounding the wellhead pads of standby wells and producing wells shall be subject to the revegetation requirements of Subsection (21).
- (19) Re-entry of wells. Applicants may redrill or otherwise reenter the same well-bore of any well for which a conditional use permit has already been issued as long as all conditions of the use permit continue to be met.
- (20) Site abandonment and restoration. When a well or facility is permanently abandoned; the applicant shall remove all equipment, structures, and other related material within 180 days from the date operations cease. Thereafter the applicant shall regrade the area of operations so as to match original land contours as closely as practical, and shall revegetate the area in accordance with Subsection 21 of 8.050(B).

(21) Revegetation. Following the completion of well drilling, or the permanent abandonment of a well or facility, the applicant shall revegetate the area of operations as follows:

- (a) Previously stockpiled topsoil and chipped vegetation shall be respread over disturbed areas prior to reseeding.
- (b) Disturbed areas shall be reseeded with native plants and grasses. This revegetation shall commence in the first fall following completion of drilling or site abandonment. Temporary fencing of reseeded areas may be required to facilitate revegetation. The revegetation shall be evaluated by the County during the first spring following initial reseeding, and if determined to have resulted in less than a 75% survival rate, additional revegetation shall be required in the immediately succeeding fall season."

Section 10. Adopting findings as set forth in Exhibit A, attached hereto and by this reference incorporated herein, in support of the amendments set forth in Sections 1 through 9 of this Ordinance.

DATED this 13th day of February, 1985.

BOARD OF COUNTY COMMISSIONERS
OF DESCHUTES COUNTY, OREGON

Laurence A. Tuttle
LAURENCE A. TUTTLE, Chairman

Lois Bristow Prante
LOIS BRISTOW PRANTE, Commissioner

ATTEST:

Susan Stoneman
Recording Secretary

Dick Mauldin
DICK MAUDLIN, Commissioner

FINDINGS FOR ADOPTION OF
DESCHUTES COUNTY GEOTHERMAL ELEMENT

(References cited are listed in Section 8 of the Element)

1. The present treatment of geothermal resources in the Comprehensive Plan predates the Oregon Land Conservation and Development Commission's adoption of procedures for complying with Statewide Planning Goal 5 (as stipulated in OAR Chapter 660, Division 16), and will therefore be a compliance requirement during periodic review. The Geothermal Element being adopted by Deschutes County is intended to comply with Division 16; recognizing, however, that the Element will require periodic amendment to incorporate new resource information as it becomes available over time.

2. Presently the County zoning ordinance does not comply with ORS 215.416 as it applies to geothermal activities. This statute stipulates that clear and objective standards must be in place for uses that are treated conditionally, which is the case for geothermal well drilling and facility siting. The Geothermal Element being adopted by Deschutes County is intended to comply with the requirements of ORS 215.416 by providing such standards.

3. The Pacific Northwest Electric Power Planning & Conservation Act of 1980 stipulates that local governments shall participate fully in the preparation and implementation of the regional power plan (reference Sections 4(g)(2)(c) and (4)(g)(3) of the Act). The subsequent April, 1983 Northwest Conservation & Electric Power Plan stipulates that local governments shall be fully involved in implementation of the Plan's measures affecting renewable resource development (reference Policies, p. 2-2, and Resource Options, p. 3-5, of the Plan). The Geothermal Element being adopted by Deschutes County represents the County's response to this regional mandate for local resource planning.

4. The adoption of the Geothermal Element is timely in view of increased interest in the County's geothermal resources during recent years. Since the early 1970's the number of geothermal well permits issued by the state inside the County has increased markedly, as shown in Tables 3.1 and 3.2 of the Element. This increased interest in local resources was interpreted by the Oregon Department of Geology & Mineral Industries in their 1983 statewide summary of geothermal activity as follows: "Drilling. . .was chiefly centered on Newberry volcano in the Central High Cascades. . .For the first time in the history of geothermal leasing in Oregon, the acreage leased by the U.S. Forest Service exceeded the acreage leased by the U.S. Bureau of Land Management. This. . .reflected continued investor

confidence in Newberry volcano and the Cascades. . .The emphasis on the Cascades and on Newberry volcano, which began in 1981, continued in the drilling activity of 1983. All of the holes drilled were in these two areas. Newberry volcano remained the most popular target, but the High Cascade Range, particularly the area just south of the silicic South Sister volcano and the area between Mt. Jefferson and Green Ridge, were also attracting drilling interest. . .The shift from BLM to USFS leases reflects a fundamental change in the emphasis of the geothermal industry in Oregon. Prior to 1980 and 1981, Basin and Range targets were predominant, but the discovery of high-temperature resources at Meager Creek in the British Columbia Cascades, and a similar discovery at Newberry volcano, demonstrated to explorationists the tremendous potential of the Cascades. It became apparent from the results at Newberry that high-temperature reservoirs could exist in youthful volcanic areas without significant hot spring activity. This conclusion implied that, even though most of the High Cascade Range lacks significant hot springs, large, undetected reservoirs could exist almost anywhere. This caused a rush to lease Cascade lands, especially lands next to silicic volcanic centers such as Crater Lake and the South Sister." (Priest, DOGAMI, 1984)

5. The U. S. Forest Service and the Oregon Energy Facility Siting Council (EFSC) are in the process of reexamining the geothermal components of their respective plans and rules.

The U.S. Forest Service has asked the County for countywide geothermal recommendations as early in 1985 as possible for consideration in updating of the Deschutes National Forest Plan; and EFSC has encouraged the County to submit its Newberry resource area recommendations as soon as possible for consideration in EFSC's review of the power plant suitability boundary surrounding the Newberry caldera. The Geothermal Element being adopted by Deschutes County represents, in total, a response to the Forest Service; and a response to EFSC in terms of Policy 10 of the Element as it relates to the Newberry resource area.

6. In accordance with OAR 660-16-020, the County has gone to extraordinary lengths to provide opportunities for public involvement in the preparation and adoption of the Element. Between December, 1983 and October, 1984 the Planning Commission conducted eight public workshops and two public hearings, with the Commission and County staff spending over 120 person-hours working with state and federal agencies, industry representatives, and individual citizens on the Element. Informational presentations were made on two occasions to industry groups, and involvement was encouraged by first-class notice to all federal geothermal leaseholders and applicants in the County. To date, a total of 13 news stories on the Element and the Newberry suitability boundary have appeared in the Bend Bulletin and Portland Oregonian. In addition, the Board of Commissioners have conducted five

public hearings over a four-month period to enable ample time for final comments on the Element. A detailed chronology of public involvement during the Element's preparation and adoption is given in Appendix C of the Element.

7. The Element has been reviewed by the following agencies without objections being raised: U.S. Forest Service; U.S. Bureau of Land Management; and the Oregon Departments of Energy, Water Resources, Environmental Quality, Land Conservation & Development, Fish & Wildlife, and Geology & Mineral Industries. The Element has also been reviewed by the Planning Department of Lake County, California, where 215 MW of geothermal power is presently on-line, and 600 MW is under development; Lake County has regulated geothermal development since 1974. This review found the Element being adopted by Deschutes County to be: "An accurate description of the state-of-the-art in . . . geothermal steam development. . . and well suited to Deschutes County's geothermal resources." (Dellinger, Lake County Planning Dept., December 7, 1984)

8. The resource inventory within the Geothermal Element concludes that there are several significant resource areas with unconfirmed potential for supporting commercial end-uses, either for purposes of power generation or direct-utilization. The inventory, as shown in Figure 2.1 of the Element, concludes that the County has notable potentials

for high-temperature power generation and low-temperature heat pump applications, with moderate-temperature direct utilization potential being uncertain without further exploration. Given these resource potentials, along with the increase in local drilling activity, and BPA's intent to solicit 10 MW of geothermal power in 1985, and the County's proximity to the California intertie transmission line, the County finds that the inventoried resources are significant enough to warrant application of the full Goal 5 process under OAR 660-16-005 through 660-16-010.

9. In examining conflicting uses pursuant to OAR 660-16-005, the County finds that the most serious potential conflicts center on the "industrialization" that accompanies high-temperature exploration and utilization (construction of wellpads, pipelines, generating equipment, support structures, transmission lines and access roads, and associated operational characteristics); and the incompatibility of this industrial-type activity in 14 areas that either possess significant natural values and/or are used intensively for recreation. The 14 areas are listed in Policy 10 of the Element, and detailed descriptions of the conflicts are given in Sections 4 and 5 of the Element. The County finds that the most serious consequences of such conflicts would be alteration and/or degradation of the natural environment from said industrial-type activities, and resulting adverse economic impacts to the recreational

sector of the local economy from the diminished tourism that would follow such environmental changes. These negative impacts outweigh the potential benefits to be derived from geothermal development in the conflicting use areas, and therefore exploration and/or production is to be prohibited in said areas per Policy 10 as a means of limiting conflicts in accordance with OAR 660-16-010(3). Exclusion of geothermal exploration and/or production from said areas will not unduly impede countywide geothermal development inasmuch as the excluded areas, comprising approximately 241,000 acres, only represent roughly 26% of the total inventoried resource of approximately 936,000 acres countywide. The exclusion of approximately 26% of the County's presently known resource base is a reasonable conflict resolution mechanism in locations where natural and recreational values are most sensitive to alterations caused by the introduction of industrial-type geothermal activities. In this way geothermal development may proceed expeditiously in areas without conflicts, while areas with unacceptable negative impacts are clearly identified and avoided.

10. With regard to the 11,000 acre interior of the Newberry volcano the County finds that exclusion of geothermal exploration and production in this small portion of the 270,000 acre Newberry resource area is an appropriate balancing mechanism to limit conflicts between recreational uses and industrial-type geothermal activities. Within the

overall Newberry resource area recreational activities are most concentrated inside the volcano's caldera; and, although there is in all likelihood a significant geothermal resource beneath the caldera, there is nonetheless a paramount need to prevent the creation of geothermal/recreational conflicts that would violate the ecological and recreational integrity of the volcano's interior. This conflict resolution mechanism leaves approximately 96% of the total Newberry resource area surrounding the caldera available for scientific research and commercial development.

11. The LaPine Pumice Company owns 157 acres of property situated in the center of the Newberry caldera between East and Paulina Lakes. This property represents approximately 1% of the 11,000 acres which lie inside the caldera. The property is currently designated as Forest in the Comprehensive Plan and is zoned Open Space. If allowed through a change to a zone that permits geothermal development, the owner has proposed to undertake an exploration program that, if successful, would culminate in the construction of a 10 megawatt (MW) geothermal power plant on the property. For purposes of the Goal 5 process the County finds that this would be an inappropriate use of the property, and that the exclusionary provision of Policy 10(a) of the Element should apply for the following reasons:

- a. Industrial-type effects of resource exploration and utilization. The introduction of geothermal industrial-type activities inside the caldera will substantially alter the existing recreational character of the area surrounding such activities. Geothermal exploration and utilization on the subject property will involve: land clearance and grading for well pads, pipelines, and buildings; generation of heavy truck traffic needed for transporting drilling equipment, facility materials, and operational supplies; temporary visual alteration during intermittent use of drilling equipment for exploration, and for well maintenance and replacement over time; permanent visual alteration from the construction of generation facilities, support structures, and new power transmission lines; generation of industrial-grade solid wastes from exploration drilling and resource production; emission of air pollutants during exploratory drilling and resource production; and emission of noise during drilling and facility operations. Although noises from power plants can be limited by enclosing plants within structures, drilling noise cannot be similarly contained. A U.S. Forest Service assessment of potential noise impacts from geothermal development in the Newberry area has concluded that "there are potential impacts resulting from increased noise levels associated with all of

the various phases of geothermal development on people, . . .recreation use, wildlife, and the opportunities for solitude on National Forest lands. An increase in noise level can result from the movement of trucks and other vehicles, drilling of wells, venting of steam, and other sources. Well drilling operations tend to be a principal source of noise. The operation of internal combustion engines, the racking of drill pipe, venting of compressed air, and steam venting can all cause excessive noise levels. This poses a health and safety hazard. . .and is objectionable to visitors to the area. There are areas adjacent to the Forest boundary, or adjacent to high-use recreation sites, where the noise levels would be a serious problem. . .Periodic noises due to well venting and drilling reach levels similar to the noise level of a jet aircraft takeoff. . .These noises may be continuous for three to six days. Well blowouts . . .if they occur, noise level may stay high for the length of time necessary to bring the well under control; this may be days, weeks, or even months. . .The engines operating compressors have a deep resonant sound that carries a considerable distance, especially at night. Drilling continues on a 24-hour a day basis during this period." (Fort Rock Ranger District, Deschutes National Forest, April, 1981)

b. Preservation of the ecological integrity of the caldera.

The subject property is an integral part of the ecosystem that exists inside the caldera, including plant and animal communities, and related natural resources that do not recognize the limits of property lines. This ecological integrity would be violated by the introduction of geothermal industrial-type activities inside the caldera, by disrupting and/or degrading the area's natural qualities with the noise, traffic, visual alterations, and potential emissions that are described above and detailed in Sections 4 and 5 of the Element. Of particular concern in this regard are the following features of the caldera: 1) protection of air quality, which would be jeopardized by pollutant emissions during drilling and resource production, such as the release of hydrogen sulfide gas which occurred at the USGS well approximately one-half mile south of the subject property; 2) protection of wildlife from noise and habitat degradation, including a nesting site for a pair of federally-protected bald eagles located approximately one-half mile north of the subject property on the shoreline of East Lake; and 3) protection of rare plants from habitat degradation, such as the Pumice Grape Fern (*Botrychium Pumicola*) which is known to occur in Oregon only at Newberry Meadow (approximately one-half mile from the subject

property), Broken Top Mountain and Crater Lake, and which has been recommended to the Forest Service for protection as an endangered plant (Garrett, December 28, 1984).

- c. Geothermal industrial-type activities are incompatible with surrounding intensive recreation. The Newberry caldera is one of the County's most heavily-used recreation areas. Within a 3 mile radius of the subject parcel there are: 8 public campgrounds with 318 campground units and associated picnic facilities; 1 picnic area outside the campgrounds; 3 boat ramps; 2 private resorts; 6 private vacation residences; approximately 100 miles of trails used for hiking, horseback riding, snowmobiling, and cross-country skiing; and 2 scenic observation points (Ft. Rock Ranger District, Deschutes National Forest, 1983). The tourist visitation in the caldera is summarized below on an average annual basis for the years 1979 through 1983 (Mohla, Deschutes National Forest, January 9, 1985):

<u>Activities Inside the Caldera</u>	<u>Average Annual Visitor Days</u>
Camping	94,700
Organization	300
Picnicking	3,400
Resorts	22,100
Recreation residence	1,400
Cross-country skiing	2,100
Nature study - education	3,300
Walking	9,400
Viewing interpretive & scenery	5,500
Auto & motorized travel	9,000
Snowmobiling	14,600
Hiking and walking	5,800
Bicycling	400
Horseback riding	3,400
Boating	41,100
Fishing	82,000
Misc. games	<u>2,500</u>
Total	300,000

The County finds that introduction of the industrial-type geothermal activities described above would constitute a serious degradation of the natural values that currently underpin these predominant recreational uses within the caldera. In reaching this conclusion the County has also taken note of the adverse circumstances that exist with geothermal power plants in Lake County, Oregon (Cannon, Lake County Planning Dept., December 14 and 28, 1984), and the experience at the California Geysers vis-a-vis recreation incompatibilities (Dellinger, Lake County Planning Dept., December 27, 1984).

- d. Subject property size is below industry norm. Aside from conflicts with surrounding recreational uses, geothermal development on a parcel as small as the

subject property would be significantly contrary to industry norms, where power generation projects are normally supplied from well fields covering several hundred, if not thousands, of acres. This is illustrated by Table 3.3 in the Element, showing the average size of approved federal geothermal leases in Deschutes County to be 6,132 acres. Because of its extremely small size, the 157 acre subject parcel would obviously require an unorthodox concentration of facilities not found in typical geothermal power projects. Moreover, despite the ability to visually screen some activities inside the parcel's pumice cone, its extremely small size would impede the establishment of natural buffers on the property's periphery to limit off-site impacts, as in the case of noise.

- e. Potential adverse economic impacts. The County finds that the potential economic benefits that may accrue from a 10 MW power plant on the subject property are too small in comparison to the existing economic benefits from tourism in the caldera, to justify jeopardizing the ecosystem that presently supports recreation in the caldera. A 10 MW facility would create no more than 5 permanent jobs (FERC, 1981) which would represent a total annual payroll of no more than \$250,000. Alternatively, the average annual recreational use of 300,000 visitor days in the caldera

can be equated to approximately \$12 million annually in the form of wages, salaries, and rental income spent by visitors on equipment, supplies, lodging and other services. The amount of work generated by this level of tourism is approximately 550 jobs in 107 of the 120 sectors of the local economy (Mohla, Deschutes National Forest, January 9, 1985). After allowing for indirect employment effects by doubling the power plant jobs and payroll, the local economy would still suffer a net loss, if caldera tourism were to fall by only 10% as a result of geothermal industrialization in the area.

- f. Protection of caldera hydrology. Within a 2-1/2 mile radius of the subject property there are 22 groundwater wells supplying over 3 million gallons annually for recreational visitors to the caldera. This groundwater system is related to the caldera's surface water resources, including two lakes, springs, and several creeks. The County finds that the potential for hydrological impacts from geothermal activities on the subject property represents an unjustified risk to current hydrological qualities in the caldera. In reaching this conclusion the County has also taken note of the adverse hydrological circumstances that may exist with the 2 MW geothermal power plant near Lakeview, Oregon (Gannett, Oregon Water Resources Dept., December 27, 1984; and Cannon, Lake County Planning Dept., December 14, 1984).

- g. Power transmission line improvement. If the subject property is to be developed for power generation it will be necessary to enlarge the existing power transmission line serving the caldera. Assuming 10MW of output, this would require line capacity on the order of 30 kilovolts, which will necessitate installation of new lines on the poles in the existing utility right-of-way. The County finds that this type of construction activity and permanent enlargement of a highly visible utility facility are contrary to the preservation of natural aesthetic values inside the caldera, and illustrative of the type of negative off-site impacts that would accrue to other portions of the caldera from geothermal development on the subject property.
- h. Year-round access. If geothermal power generation were to be developed on the subject property, such a use would create a need for year-round vehicular access inside the caldera, which is presently not available from the responsible land management or transportation agencies. Moreover, the introduction of vehicles inside the caldera during winter months would significantly alter the area's present winter recreation values.

- i. Promotion of tourism contrary to geothermal industry practice. The subject property owner has asserted that tourism will be increased by location of a geothermal power plant inside the caldera, and that such visitation will be encouraged on the subject property if geothermal development is allowed. The County finds that this is contrary to general industry practice, which discourages visitation by the general public at facility sites for purposes of safety and operating efficiency. (Dellinger, Lake County Planning Dept., December 27, 1984)
- j. Proposal contrary to Deschutes Comprehensive Plan policies. The proposal to develop geothermal resources on the subject property is contrary to the following Comprehensive Plan policies: No. 15, Rural Development, which states that "construction on open lands shall be in a manner least intrusive to the aesthetic and natural character of those lands and neighboring lands;" No. 4, Economy, which states that "consistent with policies in the Recreation and Open Space chapters, cooperation with federal and state agencies shall be sought by the County in preserving and developing, as appropriate, scenic and recreational resources;" and No. 6, Open Spaces, which states that "because management of state and federal lands affects areas under the County's jurisdiction and vice versa, better coordination of land-use planning between the

County, U.S. Forest Service, . . . and other agencies shall be sought." The County finds that the proposal is contrary to Rural Development Policy 15 because it would be extremely intrusive to the aesthetic and natural character of the caldera as detailed above; that it would be contrary to Economy Policy 4 because of the negative economic impacts resulting from scenic and recreational degradation detailed above; and that it would be contrary to Open Space Policy 6 because industrialization of a small parcel completely surrounded by federal recreation lands would be clearly inconsistent with the objectives of coordinated land-use planning.

- k. Proposal contrary to objectives of wildlife refuge agreement. The County finds that the proposed use of the subject property is contrary to the intent of the August 1, 1979 agreement between the Oregon Department of Fish & Wildlife and the Deschutes National Forest establishing a wildlife refuge in the caldera, in view of the agreement's purpose of "protecting all wildlife species for added enjoyment of the public" (Mathisen, Dept. of Fish & Wildlife). As indicated previously, the introduction of industrial-type activities in the caldera would be adverse to existing wildlife conditions, and therefore, contrary to the principles of a refuge (Mohla, Deschutes National Forest, January 9, 1985).

1. Proposal contrary to U.S. Forest Service policy. The County finds that the proposed use of the subject property is contrary to existing U.S. Forest Service policy as contained in the Deschutes National Forest Land and Resource Management Plan. Under this Plan the central interior of the caldera has been designated as Intensive Recreation and Undeveloped Recreation areas, and has been excluded from the federal geothermal leasing program. The Deschutes National Forest Supervisor has indicated that these management policies are likely to remain in the Forest's 1985 update of its Plan (Mohla, Deschutes National Forest, November 21, 1984), and that it views the proposal unfavorably in light of its adverse impacts (Mohla, January 9, 1985).

- m. Proposal contrary to U.S. Park Service policy. The County finds that the proposed use of the subject property is contrary to the U.S. Park Service's 1975 designation of Newberry volcano as a National Natural Landmark under the Historic Sites Act of 1935, in that such designation is intended to "encourage the preservation of significant areas." The National Park Service has provided this information to the County "to ensure that nationally significant features are considered in planning decisions, and not inadvertantly damaged or destroyed through lack of knowledge of their existence or significance" (Atkins, National Park

Service, December 19, 1984). The County finds that the Park Service's criteria of national significance is based largely on an area's natural integrity, making continued integrity essential to preservation of landmark values. Natural landmarks should be managed in such a way as to pose no threat to the perpetuation of the designated features, and industrial-type activities in the vicinity of these features would clearly violate the integrity of the natural values represented by the landmark.

- n. Proposal contrary to Oregon Legislative policy. The County finds that the proposed use of the subject property is contrary to House Joint Resolution 31 enacted by the 1975 Oregon Legislature, in that the subject property is within an area declared by the Resolution to be unsuitable for power plants because "preservation of the recreation, scenic and historic areas of Newberry crater. . .is of vital importance to the people of the state of Oregon." Introduction of industrial-type geothermal activities into the caldera would violate such preservation efforts.
- o. Proposal contrary to Oregon Energy Facility Siting Council Rules. The County finds that the proposed use of the subject property would be inconsistent with OAR 345-40-030 which establishes the Newberry caldera area as unsuitable for geothermal power plants. Although

EFSC's rule technically applies only to power plants greater than 25 MW in capacity, the siting of a 10 MW plant in the caldera would clearly be inconsistent with the overall purpose of EFSC's rule, which is to protect environmentally-sensitive areas from the industrialization that accompanies high-temperature geothermal development.

- p. Proposal contrary to Bonneville Power Administration environmental policies. The County finds that the proposed use of the subject property is contrary to the Bonneville Power Administration's environmental policies as follows: Section 917.4(d) of the BPA Environmental Manual, which states that "adverse effects include any action resulting in the reduction or deterioration of the environmental and cultural values for which an area has been designated. Values of such areas include but are not limited to: 1) cultural, scenic, historical, ecological, air and atmospheric, water, or archeological resources; 2) provide for fish and wildlife food and habitat, outdoor recreation, and human occupancy and use." Section 917.6 further states that "if a practicable alternative to the proposed action and any of its associated adverse effects exists, it shall be preferred" (emphasis added). Adverse effects are further defined by Section 917.7 as "any action which could alter or

destroy the values of these areas. . .which include but are not limited to. . .introduction of visual, auditory, or other intrusions which would be incompatible with the environmental or cultural values for which the area was established" (BPA, November 1, 1981). The County finds that the proposed use of the subject property would create adverse effects as defined by BPA, and more importantly per Section 917.7, that there are ample alternative locations for the proposed power plant in the 259,000 acres of the Newberry resource area that are not being excluded from exploration and production.

- q. Proposal contrary to Oregon Land Conservation & Development Commission rule. Based on the foregoing inconsistencies with federal and state policies and plans, the County finds that the proposal is contrary to Oregon Statewide Planning Goal 2, as contained in OAR 660-15-000(2), which states that "County, state, and federal agency. . .plans and actions related to land-use shall be consistent." Clearly, a County decision to permit geothermal exploration and/or production on the subject property would be inconsistent with the plans and policies of the U.S. Forest Service, U.S. Park Service, Oregon Legislature, Oregon Dept. of Fish & Wildlife, Oregon Energy Facility Siting Council, and the Bonneville Power Administration.

r. Proposal contrary to Bonneville Power Administration geothermal solicitation criteria. The only purchaser of power from the proposed plant identified to date by the property owner is BPA. However, selection of the subject property for a BPA project is not only contrary to the BPA environmental policies cited above, but also contrary to the BPA solicitation scheduled for May, 1985, in that BPA will require candidate sites to "have an initial capacity of 10 MW and be capable of expansion to at least 100 MW" (emphasis added) (Fuqua, BPA, November 16, 1984). The subject property is therefore not an eligible candidate under the BPA solicitation because EFSC will not issue a site certificate for plants larger than 25 MW in capacity inside the caldera. Moreover, given typical high-temperature well spacing requirements of 30-40 acres per well and a liberal assumption of 10 MW of steam production per well, the subject property is substantially inadequate in size to reasonably accommodate an ultimate wellhead capacity of 100 MW. In the absence of BPA eligibility, the County is unaware of any purchaser of output from a plant on the subject property.

12. The Geothermal Element being adopted complies with the applicable Statewide Planning Goals as follows:

- a. Goal 1, Citizen Involvement. Adequate opportunities for citizens to be involved in all phases of the preparation and adoption of the Geothermal Element have been provided as described above in Paragraph 6, and as detailed in Appendix C of the Element.

- b. Goal 2, Land-Use Planning. The Geothermal Element is based upon the facts and analysis contained in Sections 1 through 7 of the Element, including identification of issues and problems, an inventory of the resource, evaluation of alternative courses of action, and ultimate policy choices. Preparation and adoption of the Element has been coordinated with all affected agencies as indicated above in Paragraph 7, and as detailed in Appendix C of the Element.

- c. Goal 3, Agricultural Lands. The Element preserves and maintains agricultural lands by adherence to the permitted uses in exclusive farm use zones as stipulated by ORS 215.213.

- d. Goal 4, Forest Lands. The Element conserves forest lands for forest uses by identifying conflicting uses, and limiting such conflicts through exclusion of geothermal exploration and/or production in the specific areas listed in Policy 10 of the Element.

- e. Goal 5, Open Spaces, Scenic and Historic Areas, and Natural Resources. The Element conserves open space and protects natural and scenic resources through compliance with OAR Chapter 660, Division 16. Goal 5 compliance is discussed in detail in Paragraphs 6 through 10 above, and Sections 1 through 7 of the Element.
- f. Goal 6, Air, Water, and Land Resources Quality. The Element seeks to maintain and improve the quality of the air, water, and land resources of the County through geothermal development standards that do not permit development to violate, or threaten to violate, applicable state and federal environmental quality statutes and standards. The pertinent policies and standards are contained in Section 7 of the Element.
- g. Goal 8, Recreational Needs. The Element seeks to satisfy the recreational needs of the County's citizens and visitors by identifying those recreational areas where conflicts will occur with geothermal development, and by providing policies and standards for limiting such conflicts. The pertinent policies and standards are contained in Section 7 of the Element.

- h. Goal 9, Economy. The Element seeks to diversify and improve the local economy by generally supporting geothermal development. This support is specifically expressed in Policies 5 through 9 in Section 7 of the Element.
- i. Goal 11, Public Facilities and Services. The Element supports a timely, orderly, and efficient arrangement of public facilities and services in resource areas through Policies 13 and 14 of the Element, and conditional use standards contained in Section 7 of the Element.