GEOTHERMAL PROJECTS PROPOSED FOR THE OREGON INSTITUTE OF TECHNOLOGY

LOW-TEMPERATURE POWER GENERATION

Oregon Institute of Technology (OIT) proposes to install a geothermal power plant using a low-temperature resource on the campus. Technical support would be provided by the Geo-Heat Center. The power plant would be a binary or organic Rankine cycle (ORC) type in the 200 kW generating capacity range. This plant would use the existing geothermal water that is presently supplied from wells for heating the campus. The process would take approximately 15˚F (8˚C) off the top of our 192˚F (89˚C) geothermal water, and the remaining 177˚F (81˚C) is then sufficient to heat the campus by "cascading" the water after being run through the power plant for space heating. The plant would be housed in the existing heat exchange building on the south east corner of campus near the geothermal production wells. Cooling water would be supplied from the nearby cold water wells to a cooling tower. The plant would provide approximately 20% of the electricity demand on campus saving approximately $100,000 annually. This would be the first geothermal power plant in Oregon, the first on a campus, and would serve as a demonstration site and as an educational training facility.

HIGH-TEMPERATURE POWER GENERATION

OIT also proposes to install a high-temperature geothermal power plant on campus. Technical support would be provided by the Geo-Heat Center. The power plant would be approximately one megawatt (MW) in generating capacity and most likely be a flash steam type. This plant would use high-temperature geothermal water/steam from a proposed 5,000 to 6,000 foot-deep (1500 – 1800m) geothermal well to be drilled into the fault along the east side of campus. The plant would be housed adjacent to the existing heat exchange building on the south east corner of campus near the geothermal production wells. Cooling water would be supplied from the nearby cold water wells to a cooling tower. The plant would provide 100% of the electricity demand on campus saving approximately $500,000 annually, with any excess electricity sold into the grid through a net metering system. This would be the first flash steam geothermal power plant in Oregon and would serve as a demonstration site and as an educational training facility. If sufficient temperature and flows were obtained from the deep well, not only could energy be generated from a flash power plant, but the "waste" water could also be run through a low-temperature binary power plant in what is called a "bottoming cycle" to produce additional energy. And, finally this "waste" water would be used for space heating on campus or sold for a fee to adjacent land owners, as the flow would supplement our existing wells used for space heating.

GREENHOUSE FACILITY

OIT with technical support from the Geo-Heat Center proposes to construct two geothermally heated greenhouses on campus. These greenhouses would each be 100 feet long and 60 feet wide (6,000 square feet) (31m x 18m = 560m2).

Different heating and cooling systems would be provided to each greenhouse as a research and demonstration project. Benchtop heating system would also be provided for soil heating of potted plants. All heating and cooling in the greenhouses would be monitored and controlled by computer.

The greenhouses would be utilized in conjunction with the Klamath-Lake County Economic Development Association as an incubator facility for interested investors/developers to test the feasibility of growing their crop in a controlled environment utilizing geothermal energy. This could result in spin-off full size commercial development that would contribute to the employment and economy of the region, similar to the development on the New Mexico State University campus (see GHC Quarterly Bulletin, Vol. 23 No. 4 – December, 2002).

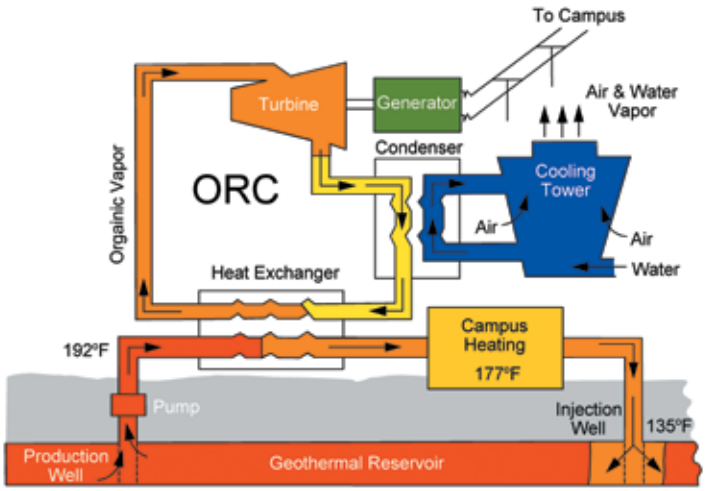
AQUACULTURE FACILITY

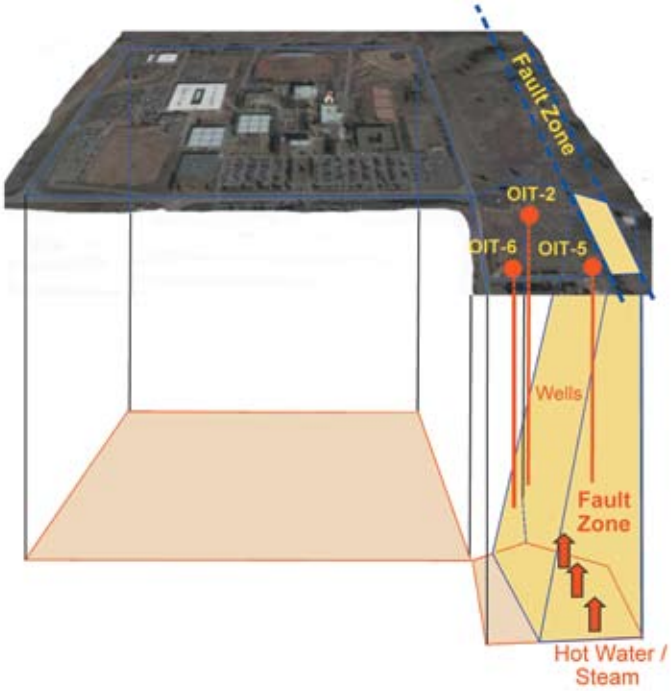
OIT with technical support from the Geo-Heat Center proposes to construct two geothermally heated outdoor aquaculture ponds and a covered grow-out tank facility on campus. The outdoor ponds would each be 100 feet long and 30 feet wide (3,000 square feet) (31m x 9m = 280m^2) and the indoor covered facility would be of greenhouse construction 100 by 60 feet (6,000 square feet) (31m x 18m = 560m^2). Different heating systems would be provided to each pond as a research and demonstration project. The covered facility would consist of a series of fiberglass tanks, heated by the geothermal water and supplement with overall space heating. All heating systems would be monitored and controlled by computer. Various fish species, hardshell aquatic species and even various algae could be grown and tested.

The aquaculture facility would be utilized in conjunction with the Klamath-Lake County Economic Development Association as an incubator facility for interested investors/developers to test the feasibility of growing their specie in a controlled environment utilizing geothermal energy. This could result in spin-off full size commercial development that would contribute to the employment and economy of the region, again similar to the New Mexico State University campus facility.

The greenhouse and aquaculture facilities would also provide research and demonstration projects for students in mechanical, electrical and computer engineering on campus. Agricultural students from the Klamath Community College could be involved in testing various crops and aquatic species for commercial production in the area. The local Oregon State University Extension office could also utilize the facility in cooperation with the local high schools. - *The Editor*

LOW-TEMPERATURE POWER PLANT





HIGH-TEMPERATURE POWER PLANT