Section 1230 - GEOTHERMAL ENERGY SYSTEMS

1. Geothermal energy systems shall be permitted in all zoning districts, subject to the following regulations:
   - A Accessory use. A geothermal energy system shall be permitted by right in all zoning districts as an accessory use.
   - B Design and permitting. The design and installation of geothermal systems and related boreholes for geothermal heat pump systems shall conform to all applicable industry standards, including those of the American National Standards Institute (ANSI), the International Ground Source Heat Pump Association (IGSHPA), the American Society for Testing and Materials (ASTM), the Air Conditioning and Refrigeration Institute (ARI), or other similar certifying organizations concerning such designs and installations, their successors or replacements, as the case may be, and shall comply with the Township Building Code and with all other applicable Township requirements. The manufacturer specifications shall be submitted as part of the application. A zoning permit and building permit, under the Pennsylvania Uniform Construction Code, shall be required.
   - C Permitted types. Only the following types of geothermal energy systems shall be permitted:
     - (1) Closed horizontal loop;
     - (2) Closed vertical loop;
   - D Wellhead protection areas. All geothermal energy systems, due to their potential for contaminating, via surface water, the groundwater supplies upon which the residents of the Township, Atglen Borough and Christiana Borough depend, shall be prohibited from construction and use within Zone 1 of the designated wellhead protection areas. Within Zone 2 of the designated wellhead protection area, geothermal systems are limited to closed-loop systems as defined within this section. Design and installation of a geothermal energy system within 3,000 feet of a Township, Atglen Borough or Christiana Borough well shall not be permitted except as reviewed and coordinated with the Township Engineer.
   - E Carbonate geology. Recognizing that carbonate geology exists in West Sadsbury Township and is prone to subsurface erosion, (i.e. sinkholes, soil fluting, disappearing streams), all applicants for geothermal energy systems shall acknowledge, and by virtue of an application for and installation of a geothermal energy system acknowledge and agree to, the following:
     - (1) In all situations when boreholes or trenches are (or have been) excavated, or natural conditions have otherwise been disturbed, the likelihood of subsurface erosion increases;
     - (2) The applicant (or subsequent owner) accepts all responsibility and liability for any subsurface erosion that does form in association with the applicant's geothermal energy system; and
     - (3) The applicant (or subsequent owner) agrees to repair any and all subsurface erosion that forms in association with the geothermal energy system.
   - F Appurtenances. All or any mechanical equipment (appurtenances) associated with and necessary for the operation of the geothermal energy system shall comply with all accessory setbacks for the district in which the system is installed.
   - G Setback requirements. Unless otherwise specified, geothermal systems shall be set back a minimum distance of 10 feet from any property line.

(1) Potential pollution sources. Geothermal boreholes or trenches (in the case of horizontal loop systems) shall be set back a minimum of 25 feet from on-lot sewage disposal systems or potable wells.

H Closed-loop geothermal systems. The following regulations shall apply to all closed-loop geothermal systems:

(1) Permitted fluids. Unless otherwise specified, for all closed-loop geothermal systems relying upon circulating fluids, the heat transfer fluid is potable or beneficial reuse water and may have approved nontoxic antifreeze, such as propylene glycol added, as defined within this ordinance. A permanent sign must be attached to the heat pump specifying that only approved heat-transfer fluids can be used.

(2) Geothermal heating and/or cooling system vertical heat exchange boreholes containing loop pipes shall be tremie grouted for the total depth of the borehole utilizing the IGSHPA Manual Grouting Procedure for Ground Source Heat Pumps. West Sadsbury Township shall be notified prior to grouting activities. At the discretion of the Township, the Township or its representative may perform inspections of the borehole grouting. Costs associated with the inspections will be the responsibility of the applicant.

(3) Construction standard. All materials and construction practices shall conform to all applicable industry standards for closed-loop geothermal heat pump systems, such as, but not limited to, standards for pressure testing, heat transfer fluids, etc. All materials and construction practices shall prevent contamination of groundwater.

(4) The applicant shall be required to submit complete specifications for the entire system (including well drilling and grouting procedures). For geothermal projects proposed in Zone 2, the project shall be reviewed and requires approval by the Township Engineer and the Township's Professional Geologist as part of the permit process.

(5) In Zone 2, no drilling or grouting shall be performed without inspections by the Township Engineer or the Township's Professional Geologist. A twenty-four-hour notice is required prior to starting the project, and to schedule inspections. Costs associated with the inspections will be the responsibility of the applicant.

(6) (h) Discharge of water:

(a) [1] Discharge of water from drill boreholes into sanitary sewer systems shall be prohibited.

(b) [2] Discharge of water from drilling boreholes into storm sewers, neighboring properties and onto roads, shall be prohibited.

(c) [3] Discharge of water from drilling boreholes into a watercourse shall comply with all federal, state, county and Township laws and regulations.

(i) If a horizontal or vertical closed loop system is proposed in an area of current or previous contamination as identified by state or federal agencies, the project shall be reviewed and requires approval by the Township Engineer and the Township's Professional Geologist as part of the permit process.

I Abandonment or disrepair. Before any construction can commence on any geothermal energy system, the property owner must acknowledge through a recorded agreement between the applicant and West Sadsbury Township that he/she is the responsible party for owning and maintaining the geothermal energy system. The agreement shall be written in language acceptable to the Township Solicitor and shall, at the request of the Township, include the

posting of financial security in a form and amount acceptable to the Township for estimated expenses of removal. The agreement shall include that if the geothermal energy system is abandoned or is in a state of disrepair, it shall be the responsibility of the property owner to remove, permanently seal, or properly maintain the geothermal energy system within six months from the date the system enters such a state.

J Decommissioning. Any earth disturbance as a result of the removal or permanent sealing of the geothermal energy system shall be graded and reseeded.

K Design, installation or abandonment of a geothermal energy system shall comply with all federal, state, county and Township laws and regulations.

ADD to Section 202

GEOTHERMAL TERMS

(1) BENTONITE - A highly plastic, colloidal clay composed largely of the mineral montmorillonite. Used in grout to seal geothermal or other wells or boreholes after they have been drilled, bored, or otherwise excavated.

(2) BOREHOLES - A penetration of soil and/or rock that is augured, drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed which is generally cylindrical in shape and whose diameter is generally smaller than its depth of penetration. Used in closed vertical loop geothermal systems.

(3) CLOSED HORIZONTAL LOOP GEOTHERMAL SYSTEM - A type of geothermal heating and/or cooling system that consists of the following basic elements: underground loops of piping; approved, nontoxic heat transfer fluid; a heat pump; and an air distribution system. An opening is made in the earth. A series of pipes are installed into the opening and connected to a heat exchange system in the building. The pipes form a closed loop and are filled with a heat transfer fluid. The heat transfer fluid is potable or beneficial reuse water and may have approved nontoxic antifreeze, such as propylene glycol, added. The fluid is circulated through the piping from the opening into the heat exchanger and back.

(4) CLOSED VERTICAL LOOP GEOTHERMAL SYSTEM - A type of geothermal heating and/or cooling system that utilizes a pressurized heat exchanger consisting of pipe, a circulating pump, and a water-source heat pump in which the heat transfer fluid is not exposed to the atmosphere. The heat transfer fluid is potable or beneficial reuse water and may have approved nontoxic antifreeze, such as propylene glycol, added.

(5) GEOTHERMAL ENERGY SYSTEM - An energy generating system that uses the Earth's thermal properties in conjunction with electricity to provide greater efficiency in the heating and cooling of buildings.

(6) GROUT - Neat cement, cement plus bentonite, bentonite, bentonite plus silica sand, or other low-permeability sealing material. Grout is to be mixed and applied according to manufacturer's specifications (e.g., water content and viscosity) for use in grouting (i.e., sealing) wells and/or geothermal boreholes.