Drinking Water Treatment Process

1. **The Clackamas River** is an exceptionally clean source of surface water. The Clackamas River watershed covers almost 950 square miles, much of it undeveloped forest lands. Timothy Lake and runoff from Ollalie Butte make up the headwaters of the Clackamas River, and many tributary streams contribute to the flow of the river.

2. Raw river water is collected by **intakes** in the Clackamas River and flows by gravity through debris removal **traveling screens. Pumps** then lift the water 70 feet to the treatment plant.

3. Raw Water from the river is **metered** for flow and water conditions, and that information is used to determine the ideal mix of treatment chemicals to add to the water as it enters the plant. Like most natural waters, Clackamas River water contains suspended and dissolved substances that can be removed by physical and chemical means.

4. As the water enters the plant, chlorine is added to **disinfect** the water by inactivating potentially dangerous microorganisms. **Coagulants** are added to help settle the water and remove small particles. Coagulation and flocculation take place as very small particles combine with one another and form larger chains of particles (floc) that can settle or be filtered.

5. **Contact Basins** cause particle collisions resulting in larger floc and settling of the heaviest of the floc. After some settling has occurred, the water flows to the filters for removal of the finest particles.

6. **Filter aid** chemicals make floc particles stronger and more easily removed when the water passes through plant filters. As the water passes down through the filter layers, the particles cling to the filter media, and the filtered water is piped to the **clearwell** after it receives a final chemical adjustment.

7. **Filter layers** are composed of anthracite coal, silica sand and garnet sand. The coal on top is the lightest layer, the silica sand is heavier and the garnet is the heaviest, at over four times the weight of water. The filter media expands and mixes together when the water flow is reversed for backwash, and collected sediments and floc are washed away. After backwash, the media returns to its original layers because of the relative weights for each layer.

8. **The clearwell** collects filtered water once the **pH and chlorine** levels are adjusted to assure optimum levels when the water leaves the plant. The 1.2 million gallon clearwell contains large baffles (internal walls) to keep the water in the clearwell long enough for the chlorine to complete its disinfection process.

9. When filters are backwashed, finished water is pumped from the clearwell to the bottom of the filters to wash trapped floc to the waste **settling ponds.**

10. **Finished water is pumped from the clearwell** to residential and commercial district customers, other water providers and throughout the system for fire protection.

11. **Reservoirs** hold large water reserves for times of increased water use such as hot or cold spells, fires, varying customer needs, and to maintain consistent water pressure.