

Water Quality Issues in Conjunctive Use Projects¹

G. Fred Lee, PhD, PE, DEE and Anne Jones-Lee, PhD

G. Fred Lee & Associates

27298 E. El Macero Drive, El Macero, CA 95618

Ph: 530-753-9630; Fx: 530-753-9956; Em: gfredlee@aol.com

www.gfredlee.com

With increased attention being given to conjunctive use of surface and groundwaters in California as part of developing future water supplies to meet increased population demands and agricultural irrigation and wildlife needs, there is increased recharge of contaminated surface waters in conjunctive use projects. Lee and Jones-Lee (1993, 1994a, 1995, 1996) have discussed the need to more appropriately consider water quality impacts of constituents in incidental and enhanced groundwater recharge. They find that often limited attention is being given to the potential impacts of the chemical constituents and pathogens present in the recharged surface waters on the quality of the groundwater recovered in a conjunctive use project.

One of the most significant errors that is being made is the assumption that if a recharged water meets drinking water MCLs, that this water will not be adverse to the use of the recovered water for domestic or other purposes. This assumption ignores the fact that there are about 75,000 chemicals used in the US today. Only about 100 to 200 of these are regulated. The recent discovery of perchlorate as a pollutant in groundwaters points to the importance of being ever mindful that the current regulatory approach can fall far short of providing for public health and environmental protection especially for those situations where the recharged waters contain constituents derived from domestic and industrial wastewaters as well as agricultural runoff. Lee and Jones-Lee (1994b) have discussed the reasons why it is inappropriate to assume that a water or soil that contains complex chemical mixtures that meets a current regulatory standard is safe for public health and the environment.

It is frequently assumed in conjunctive use projects that the aquifer system will “treat” the recharged surface waters to remove pollutants present in these waters. While aquifer systems have the ability to treat/remove some constituents in recharged surface waters, there are constituents that are not removed that can pollute recovered groundwater and/or build up within the aquifer.

Another problem area is that frequently inadequate attention is given to the potential for constituents in the recharged surface waters to effect the physical and chemical characteristics of the aquifer. Lee and Jones-Lee (1993) point out that failure to properly consider the characteristics of the recharged surface waters on groundwater and aquifer quality can cause significant problems including failure of conjunctive use projects.

¹ Derived from a presentation at the National Ground Water Association West Coast Conference session on Conjunctive Use held in San Francisco, CA, February, 2000. Published in *HydroVisions* 2(3):9-10, Fall (2000).

All conjunctive use projects should be preceded by a comprehensive monitoring/evaluation program that characterizes the physical, chemical and biological characteristics of the surface waters that are proposed to be recharged to the aquifer. This monitoring evaluation program needs to be more comprehensive than typically used in conjunctive use projects. Also, the physical and chemical characteristics of the aquifer should be evaluated. This information should be used to predict whether the characteristics of the surface waters that are proposed to be recharged in a conjunctive use project could lead to impaired groundwater quality and/or aquifer quality. Lee and Jones-Lee (1994c)

Once the conjunctive use project is operational a detailed monitoring program of the recharged and recovered groundwaters, as well as the waters within the aquifer, should be conducted. Further, information on the potential build-up of pollutants within the aquifer system should be evaluated through examination of the fate of the recharged chemical constituents. As discussed by Lee and Jones-Lee (1994a), this evaluation is essential to ensure that the build-up of hazardous chemicals within the aquifer does not ultimately lead to a "Superfund" site-type situation that will require remediation of the contaminated aquifer.

Guidance is provided in the author's publications listed below on the pre-operation and operation monitoring/evaluation programs that should be conducted in conjunctive use projects.

References and Additional Information

The following references are available from www.gfredlee.com in the Reuse of Reclaimed Wastewaters section or by request from gfredlee@aol.com.

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