APPENDIX E

Ingestion of Antimycin A

A review of toxicity studies relating to antimycin indicates that vertebrate animals must ingest high dosages before any adverse effect is apparent (Schnick 1974) In laboratory tests, oral LD_{50} values for mammals ranged from 1.0 mg antimycin/kg body weight for lambs to 55 mg antimycin/kg body weight for mice (Herr et al. 1967). Oral LD_{50} is defined as the amount of antimycin administered orally over a specified period of time that causes the death of 50 percent of the group of test animals. For example, if a person weighing 70 kg (154 lbs) consumed 1.5 liters (0.4 gallons) from a stream during treatment, that person would ingest 300 μg of antimycin, or 0.0042 mg antimycin/kg of body weight. A 70 kg person would have to ingest 630 liters (167 gallons) of treated water during the period that antimycin is active in the project area to ingest the amount required to achieve the LD_{50} for the most sensitive mammal tested (Guinea pig, LD_{50} = 1.8 mg antimycin/kg body weight). This translates to a water consumption rate of about 105 liters (28 gallons) per hour during an active treatment period lasting six hours. Similarly, a 363 kg (800 lb) horse would have to ingest about 3,265 liters (863 gallons) of treated water to reach the oral LD_{50} value of 1.8 mg antimycin/kg body weight for Guinea pigs. Again, consumption would have to occur before antimycin degrades (i.e. about a 6-hour period), which translates to a constant consumption rate of 542 liters (144 gallons) of treated water per hour for six hours.

Consumption of antimycin in water was alleged to have caused organ abnormalities and still-birth of two lambs in northern New Mexico in 1998 (Begel 2001). However, no evidence implicating antimycin in the still-birth of the two lambs was produced, and no adverse effects on animals in the surrounding area were reported (AFSFMCS et al. 2001). In addition, Grant and Catron counties in New Mexico contracted with an independent medical microbiologist to review the potential public health hazards of antimycin, and it was determined that antimycin was an effective and safe fish control agent for removal of fishes from streams with no potential for public health issues when applied at recommended concentrations (Brooks and Propst 2001). Vezina (1967) also concluded that antimycin is not hazardous to humans, livestock, and wildlife.

The potential effects of consuming dead fish produced by stream renovation are poorly studied, but there have never been any reports of negative effects to humans or wildlife from ingestion of antimycin-killed fish that resulted from stream renovation (Berger et al. 1967, Gilderhus et al. 1969). Vezina (1967) reported that consumption of 2,900 mg (0.1 oz) undiluted antimycin/kg (2.2 lb) body weight was required to cause mortality of 50 percent of test mallard ducks in the laboratory. Similar tests on 4.5 kg (10 lb) domestic dogs required consumption of 5000 mg (0.18 oz) undiluted antimycin/kg (2.2 lb) body weight to cause mortality of 50 percent of the test population. In another laboratory study, trout killed with 10 ppb antimycin contained 76 to 388 ug/kg antimycin in their tissues (Ritter and Strong 1966). Using 20 times the high residual concentration of 388 ug/kg in trout reported by Ritter and Strong (1966) to account for targeted concentrations of 200 ppb antimycin in the proposed project, it would be necessary to ingest 374 kg (824 lbs) and 2,900 kg (6,390 lbs) of dead trout to be lethal to ducks or dogs, respectively. It is doubtful that any treated reach along Fossil Creek would produce

in total these amounts of dead fish. Because of limited available information, however, human consumption of fish killed by antimycin will be discouraged, and signs will be posted along the stream noting this prohibition.

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