**Responses to Some Statements Submitted to the USFS Following the NEPA Scoping Meeting on the Proposed Camp May Road Pipeline**

 George Lawrence, LASC Board member and former president

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**1. Richard Swenson**

Mr. Swenson incorrectly implies that 90 acre-ft of water would make only about 10 acres of machine-made snow. His estimate is wrong by about a factor 20.

Snowmaking produces snow that is about 40% water density, and the standard depth to produce a “bullet-proof” base that will last all season is about one foot. So, allowing for normal (typically wind-related) losses during snowmaking operations, one can assume that 1 acre-ft of water will provide about 2 acres of man-made snow on the slopes. So 90 acre-ft of water would provide 180 acres of snow, enough to cover 2/3 of Pajarito Ski Area’s slopes. The 90 acre-ft reflects a vision of potentially expanded snowmaking at Pajarito that could exist a number of years from now, but does not reflect the system currently in place. With the installed snowmaking infrastructure at Pajarito, only about 30 acre-ft would be used initially, which is enough to cover about 60 acres of ski slopes. This is the capacity of the existing storage pond on top of the Mountain (about 10 million gallons).

**2. Jennifer Leon**

Ms. Leon questions whether use of pumped community water for snowmaking is a good use of precious potable water resources in Los Alamos. This is a reasonable concern. But, to put things in perspective, one should understand that the snowmaking water demand (10-30 million gallons per year) would represent only a modest increase on the amount of potable water that is currently used to irrigate lawns and gardens in Los Alamos County. This usage is estimate to be several hundred million gallons per year, an order of magnitude greater than the snowmaking usage.

In addition, a large fraction of the water used for snowmaking at Pajarito will return to the local aquifer, which is not the case for landscape irrigation. Some of the snowmaking water is lost to evaporation/transpiration, and during Spring a modest fraction of the snowmelt ends up in the Los Alamos canyon stream. But it has been estimated that nearly 70 percent of the snowmaking water seeps into the ground and recharges the aquifer. This is the “return-flow” credit that the NM State Engineer typically grants to ski areas in New Mexico against their snowmaking water rights. In contrast, most of the water used on lawns and gardens goes into evaporation, and is thus lost to the aquifer.

An important point to remember is that County potable water for snowmaking using the proposed pipeline will be supplemental to that which is acquired each spring from the existing snowmelt collection system at the base of the Ski Area. In a good or average snowpack year, we can expect to fill or mostly fill the snowmaking storage pond from snowmelt runoff alone, with County water making up any shortfall as needed. In a poor snowpack year, County water will be needed to fill most or all of the pond’s capacity. First priority will always be given during March/April/May to collecting as much water as possible from the melting snow on the mountain. This is the ecologically responsible path, and also saves money in terms of pumping power costs and water delivery charges.

**3. Jody Benson, Sierra Club representative**

The Los Alamos Utilities Department may be responding to some or all of Ms. Bensons comments and concerns, so my responses here should be seen as supplemental.

The pipeline will be buried underground to a depth that permits it to function in winter as well as during the warmer part of the year. There is no possibility that it will be on the surface.

There is only one pipeline. It will installed on the east/north side of Camp May Road when it leaves the intersection with West Road, but will cross to the other side at some point as it approaches the Ski Area.

There is a 15% contingency built into the project cost estimate.

The pipeline supplying water to the storage pond on Pajarito Ski Area land already exists; it was installed in 2009.

The additional downdraw on the aquifer under the Pajarito Plateau will be very small compared with the existing annual downdraw from the annual total water usage in Los Alamos County. The maximum expected demand for the pipeline is 90 acre-ft per year, compared with about 4,000 acre-ft per year for the County and LANL; about 2% of the total.

Pumping will take place in the spring (April) to replace the water in the storage pond that was used up during the previous winter’s snowmaking. At the design flow rate of the pipeline (250 gpm, gallons per minute) it will take about 4 weeks of continuous (24/7) pumping to refill the 10 Mgal capacity of the pond. The County requires that the pond should be full by the start of fire season, nominally early May. Throughout the year, there will be intermittent short duration pumping to re-supply the drinking water tank at the Ski Area. At 250 gpm, the entire 70,000 gallon capacity of this tank can be filled in about 5 hours. The pipeline will operate again in late fall (October) for a few days to replace evaporation losses in the storage pond, and to ensure that the pond is at full capacity at the start of snowmaking (mid November). The line could operate again continuously in November and December to refill the pond as its volume is drawn down by early season snowmaking. There would likely be no continuous pumping in January through March, and again from May through September.

The energy to power the pipeline for filling the storage pond one time is approximately 70 MWh (megawatt-hours). This is compared with an average annual energy use for the County and LANL of 575,000 MWh. The additional energy increment for the pipeline operation for one pond filling per year is thus extremely small, namely about 0.01% (one part in 10,000). For two fillings per year, these numbers would double of course. Based on these considerations, it seems safe to say that the impact of the additional energy used (to operate the pipeline) on climate change will be too small to measure.

As noted above, much of the water from snowmaking returns to the local aquifer, which is Los Alamos canyon and then eventually the Pajarito Plateau. Given the Ski Area topology, there should be no significant return to other nearby canyons. The return-flow credit (aquifer recharge) number for Pajarito snowmaking operations is close to 70%, as calculated in a detailed technical study for LASC and Los Alamos County by a licensed hydrology consultant several years ago. The consultant was the same hydrologist as employed by several CO and NM ski areas in generating return-flow estimates for their snowmaking operations. The study is available upon request.

For wildland fire-fighting, the snowmaking reservoir would be available to helicopter borne water pickups. Given its elevation and geographical location, the Pajarito ridge-top pond should be at least as useful as other nearby water resources, if not more so. Helicopters would fly uphill empty and downhill with full water loads, rather than the other way round for the other nearby water sources. The pipeline itself can be used to supply water tankers driving along the road, at each of the pumping stations. During the Las Conchas fire, the pond did provide a limited number of helicopter water pickups; at that time, there was not much water in the pond because of poor snowpack in the previous winter. Most of the firefighting on the Mountain was done by pumper fire-trucks driving on the internal Ski Area roads, that were supplied from the existing County-owed 250,000 gallon tank near the Ski Area Lodge. This tank was full at the beginning of the fire, and was essentially empty at the end, likely saving the central part of the ski area from total destruction. The firefighters would have greatly benefited from having a lot more water available on the mountain, namely a full storage pond.

**4. Roger Leuthner**

Mr. Leuthner lists several objections to the pipeline project.

Although one always wants to conserve water in the Southwest, the potable water resource in Los Alamos County is not “scarce.” The aquifer under the Pajarito Plateau is known to be very large, possibly thousands of feet deep. There are no supply-shortage issues for the present or the long range future.

There are several thousand skiers in Los Alamos and surroundings, a substantial fraction of the community, not a “small minority.” Being able to ski or snowboard reliably every winter at Pajarito will be a major quality-of-life draw for a large fraction of our citizens. With the installation of the pipeline and a sizeable fraction of the slopes capable of snowmaking, we expect the use of Pajarito to grow, with a significant number of users also coming from out of town. The comparison of water use for snowmaking with diverting the much greater amounts of potable water currently used for lawns and gardens in our community has been already mentioned.

The firefighting utility of a reliable and substantial water supply to Pajarito Mountain and along Camp May Road has already been discussed. The experience of what happened during the Las Conchas fire amply demonstrated the protection advantage to the Ski Area, Camp May, and the entire community of having large water resources in these locations. The County Council and County management recognize the desirability of building the pipeline to provide a substantial fire barrier on the west side of town, and some believe it would be justifiable to cover the entire cost from County funds. With the commitment of Durango-based Pajarito Recreation LP (the new owners of the Ski Area) to pay for half the pipeline cost, the County will benefit significantly.

Since the pipeline is to be built along the existing Camp May Road right of way, on ground for the most part that has previously been disturbed, it’s hard to see how there would be significant damage to “the remaining forest.”

**6. Elaine Jacobs**

Ms. Jacobs discusses concerns about potable water use for snowmaking. I have tried to address these concerns in the responses to other people given above, and will not repeat them here.

Ms. Jacobs makes some uninformed assertions about water loss from the snowmaking pond from evaporation during the warm months, and supposes that very large amounts of water would have be supplied to replace such losses. Evaporation from the pond is significant, but not anywhere near at the level suggested by Ms. Jacobs. During the past few years, we have monitored the net pond water loss due to evaporation offset by rainfall input to the pond. From our own observations, and from extensive USDA corroborating evaporation data available for high-elevation ponds in NM, AZ, and CO, we believe average annual losses from the Pajarito pond will be around 15% of the volume, or about 4.5 acre-feet per year. This number is about 2% of the water evaporation loss supposed in Ms. Jacobs statement. Last summer, the net loss from evaporation minus rainfall input was actually close to zero, because of a relatively wet spring/summer and below normal temperatures.

The months of the year when the pipeline will be supplying water to the Pajarito storage pond have already been explained in the response to Ms. Benson above. As noted there, the pipeline will be used ensure a full pond before fire season begins. After that, there will be a need to replace the modest evaporation losses in the fall before snowmaking begins.

**Other Comments**

There are several additional written contributions that question the pipeline project on grounds that are the same as or similar to those from the above named people. To avoid repetition, I have elected not to respond further to these submissions.

A couple of the other commenters have asked why it is not possible to use County recycled or gray water for snowmaking, instead of more-valuable potable water. This is obviously something that the Los Alamos Utilities Department engineers should answer, but my understanding is as follows. The Los Alamos County water reclamation system does not treat water to the tertiary level, which requires reverse-osmosis technology or equivalent. The water quality that is provided by the County’s treatment facilities is adequate for doing things like watering the Los Alamos Golf Course, but would be unsafe (and illegal) for making snow at Pajarito Ski Area. Basically, water used for snowmaking has to be of drinking water quality, since it can easily be ingested during skier “faceplants.” The one ski area in our region that does employ recycled water for snowmaking is Arizona SnowBowl, north of Flagstaff. They use up to 60 million gallons per year of tertiary-treated wastewater through a 15-mile-long pipeline from the city of Flagstaff.