bulky and costly. In response, we developed the present design (shown schematically in Figure 1) that still uses 40 Watts, but now disinfects 15 lpm, is much more compact, and has a substantially lower manufacturing cost. The unit is designed to treat water with a UV extinction coefficient of 0.3 cm^{-1}, equal to that of the average effluent from US municipal wastewater treatment plants.

LABORATORY TESTS OF UVWw UNITS

We present descriptions and a table (Table 1) summarizing 10 lab-based tests of the UVWw units conducted both within LBNL and at independent laboratories within the U.S. and abroad. As discussed above, the UVWw device has evolved through two generations of prototypes; only one test of the first generation (UVWw 1.x) unit is included in this summary.

1. In 1996, the UVWw 1.x prototype 8 gpm (30 lpm) device was tested at the Haffkine Institute, a national laboratory of pathology and infectious diseases in Bombay, India. Although the current UVWw design uses half the flow rate, the tests of the 1.x prototype are still a valuable demonstration of the UVWw technology's effectiveness against a range of pathogens. In the tests at the Haffkine Institute, each of 10 different waterborne pathogenic organisms (including *E. coli*, Salmonella typhii, Vibrio cholerae, Shigella Dysenteriae, and Pseudomonas aeruginosa) were separately suspended in chlorine-free tap water. The initial concentrations of the pathogens were approximately 1,000,000 colony-forming units (CFU) per deciliter of water. In each case, the UVWw treatment reduced pathogen concentrations to below detectable levels (per ml water, for a reduction of at least 4 logs) in the outflow water, and the Institute reported that this water met applicable bacteriological drinking water standards.

2. Later in 1996, scientists at Lawrence Berkeley National Lab (LBNL) tested a UVWw 2.x prototype 4 gpm (15 lpm) unit. They collected two water samples from a local creek (Strawberry Creek on the UC-Berkeley campus) with well-documented problems of unhealthful fecal coliform bacteria contamination. The samples varied in turbidity (10 and 80 NTU) and initial coliform bacteria content (10,000 CFU and 1,000 CFU per 100 ml, respectively). In both samples, the UV treatment reduced coliform bacterial levels by at least 4 and 3 logs, to below detection limits.

3. A subsequent test performed at LBNL in November 1996 compared two methods - one appropriate for field use (Colilert[1] MPN tubes as presence-absence tests) and the other the

[1] Colilert (a product of IDEXX Laboratories, Inc.) turns sample from clear to yellow if any coliform bacteria are present.. The Standard Methods for the Examination of Water and Wastewater refers to this test as Chromogenic Substrate.