with applicable NRC, Environmental Protection Agency (EPA), and State regulations, and are incorporated into the renewed license. These action levels specify radionuclide concentrations at which investigations would be initiated and operations would be shut down.

The effluent monitoring program will cover the expanded dry conversion process, including monitoring of new process off-gas and building ventilation systems.

Environmental Monitoring

SPC also performs monitoring to detect accumulation of radioactive materials in the environment. Off-site soils are sampled from two stations quarterly and are analyzed for uranium. Off-site vegetation is sampled from two stations monthly during the growing season and is analyzed for fluoride as an indicator of plant emissions. Ambient air is sampled continuously at two stations and analyzed for fluoride.

The lagoon liner systems are inspected monthly for the presence of liquids. If liquids are present, a sample is taken and analyzed for constituents present in the lagoon. If the liquids are identified as lagoon contents, the lagoon would be emptied and the liner repaired.

Ground water near the lagoons is sampled on a quarterly basis, and the samples analyzed for gross alpha and beta and for chlorides, nitrate nitrogen, ammonia nitrogen, and pH. If the ground water data indicate a lagoon leak, then the lagoon would be emptied and the liner repaired.

Richland city sewage plant sludge is sampled monthly and analyzed for uranium. If a running average of the analyses over a 6-month period exceeds 25 pico-curies per gram, or any single confirmed result equals or exceeds 30 pico-curies per gram discharges to the sewer will be stopped and an investigation will be performed.

The environmental monitoring program will not change as a result of the dry conversion process expansion.

Environmental Impacts From Normal Operations

The release of radioactive material to air and water represents a potential negative impact on the health and safety of the surrounding population. This impact results in a very small increase in the risk of cancer due to low levels of radiation exposure. The risk has been calculated and presented in terms of committed effective dose equivalent and organ doses resulting from a single year of operation. For doses resulting from inhalation or ingestion of uranium, this quantity is the total effective dose equivalent or organ dose that will accrue to an individual over a 50-year period beginning with the year the intake occurs. Doses to a hypothetical maximally exposed individual and collective dose to the population living within an 80 kilometer (50 mile) radius of the SPC facility were calculated and are summarized below.

Based on effluent data for the past 5 years, the SPC facility is expected to release approximately 15 microcuries per year (μCi/yr) of alpha activity and 1.4 μCi/yr of beta activity via gaseous emissions and less than 0.06 curies per year of uranium via sewer discharges. The amount of gaseous alpha emissions is expected to be reduced significantly when the change from ADU conversion to dry conversion is completed.

Doses to the maximally exposed individual via the atmospheric and aqueous release pathways were calculated using the Hanford Environmental Dosimetry Software system (GENII code) and realistic and conservative assumptions.

The total effective dose to a hypothetical resident at the site boundary would be 0.024 millirems per year from atmospheric emissions. The total effective dose to the nearest existing downwind residence, 3.4 kilometers (2.1 miles) southeast of the plant, is calculated at 0.0002 millirem per year from atmospheric emissions. These doses are far below the 25 millirem per year standard in 40 CFR Part 190 for organ doses from fuel cycle operations and the 10 millirem per year standard in 40 CFR Part 61, Subpart I, for doses from atmospheric releases.

The collective dose to the population from routine atmospheric releases is estimated at 0.0035 person-rem per year, less than 0.00005 percent of the 85,000 person-rem per year that the same population is exposed to from natural background sources.

Radioactive material released from the SPC facility to the Richland sewer system, and ultimately to the Columbia River, may result in radiation exposure to humans through a variety of pathways. The primary pathways considered in the analysis were ingestion of drinking water from the Columbia River, consumption of fish from the river and terrestrial foodstuffs irrigated with river water, and exposure during recreational activities such as swimming and boating. Doses to a maximally exposed individual living near the site and to the population within 80 kilometers (50 miles) downstream were calculated. The radionuclide release rates used in the analysis are from measurements of the effluent discharged to the sewer system. Because most of the reported concentrations were at or below the lower limit of detection for the analytical procedure, the aqueous release used in the dose calculation conservatively overestimates the actual release. The total effective dose from aqueous effluents to the Columbia River from the ADU conversion process was calculated at 0.00056 millirem, which is well below applicable regulatory standards in 40 CFR Part 190 and 10 CFR Part 20, Subpart D. Most of the dose is from U–234, and the bone surface receives the highest dose. Liquid releases from the dry conversion process, after the lagoon contents are processed, are expected to average about 30 percent of the current levels.

The dose to the surrounding population from aqueous releases is estimated at 0.074 person-rem per year. This dose is less than 0.004 percent of the 21,000 person-rem per year from natural background radiation sources to the downstream population.

The treatment in the city sewage treatment plant of liquid releases results in some reconcentration of uranium in sewage sludge. Sludge from the sewage plant is shipped daily to the Richland city landfarm where it is mixed with approximately equal amounts of petroleum-contaminated soils and native soils. After 6 months, the mixture is used as intermediate cover at the city landfill. SPC samples the sludge on a monthly basis and analyzes it for uranium content. The concentration of uranium in the sludge has been on the order of 10 picocuries per gram (pCi/g) of sludge (wet weight basis), and SPC has committed to action levels of 25 pCi/g for any 6-month running average or 30 pCi/g for a single sample. If these action levels are exceeded, discharges to the sewer will be halted and an investigation performed.

Environmental Impacts From Accidental Releases

Release of radioactive or hazardous materials under off-normal or accident conditions poses a potential risk to public health and safety and the environment. The potential consequences of these accidents include personal injury, health effects from acute exposures to toxic materials, non-stochastic effects from acute radiation exposure, and risk of latent cancer fatality from exposure to radioactive material.

A set of four accidents spanning the range of potential consequences was selected and evaluated. Three of the four scenarios evaluated the accidental release of radioactive materials. The intakes and predicted doses for the three