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## 4.6 Soil and Vegetation Surveillance

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Soil and vegetation surveillance provides information on atmospheric deposition of radioactive materials in uncultivated areas, long-term trends, and baseline environmental radionuclide concentrations in undisturbed locations (DOE 1994a). Accordingly, concentrations of radionuclides in soil and natural vegetation provide a baseline against which unplanned releases can be compared.

Soil and natural vegetation have been collected on and around the Hanford Site for more than 40 years. Consequently, a large database has been established that thoroughly documents onsite and offsite concentrations of manmade radionuclides in soil and natural vegetation at specific locations. Because the current site mission is environmental restoration and cleanup and because routine plutonium production operations have ceased, the need for continuous soil and natural vegetation surveillance has diminished. There are several additional reasons for the reduced need for soil and natural vegetation sampling. Manmade radionuclides with short half-lives have decayed to stable isotopes and are no longer detectable. Moreover, radionuclide releases from Hanford in recent years have been small; therefore, baseline radionuclide concentrations have not changed appreciably. Because only natural or manmade radionuclides with relatively long half-lives are found in soil and vegetation samples, annual sitewide environmental surveillance sampling of soil and vegetation can be less frequent. As a result, no soil or natural vegetation surveillance samples were collected for the sitewide surveillance program in 1996. Future sampling of soil and natural vegetation will be conducted on an as-needed basis in support of site cleanup activities and facility operations.

Other soil and vegetation sampling conducted by the management and operations contractor (January through September 1996) and the management and integration contractor (October through December 1996) occurred near active facility release points and waste sites on the site. Results are discussed in Section 3.2, "Near-Facility Environmental Monitoring."

In 1996, two special investigations were conducted that addressed contaminants in soil. These included a special investigation of potential polychlorinated biphenyl contamination on onsite roads and a review of historical and current soil sampling locations and analytical methods. Results of these investigations are summarized below.

### Road Contamination

Surface crust and soil samples from two unimproved and generally unused roads on the Hanford Site, which had been treated during past site operations with oil for dust suppression, were analyzed for potential polychlorinated biphenyl contamination (Figure 4.6.1). Each of the roads had an intact crust of oil/tar on top of the underlying soil surface. Control samples were collected at an untreated soil site near the Prosser Barricade air sampling station.

Several samples were collected at each location. These included portions of the oil/tar surface crust, the soil immediately beneath the surface crust (0 to 3 cm below the crust), and a deeper soil sample (12 to 20 cm below the surface crust). Samples were collected at two locations on each road. The samples were extracted with methylene chloride using a roller technique, cleaned using column chromatography and high-pressure liquid chromatography, and analyzed by capillary gas chromatography using electron capture detection. The samples were analyzed for polychlorinated biphenyls as the following technical mixtures: Aroclor 1242, Aroclor 1248, Aroclor 1254, and Aroclor 1260.

Concentrations of Aroclor mixtures at all locations were less than the following detection limits: 42 µg/kg dry weight for surface crust and 2.1 µg/kg dry weight for soil. These concentrations are below the EPA's preliminary remediation goals for polychlorinated biphenyls in residential soil (66 µg/kg) and well below the preliminary remediation goal in industrial soil (340 µg/kg) (Smucker 1995).

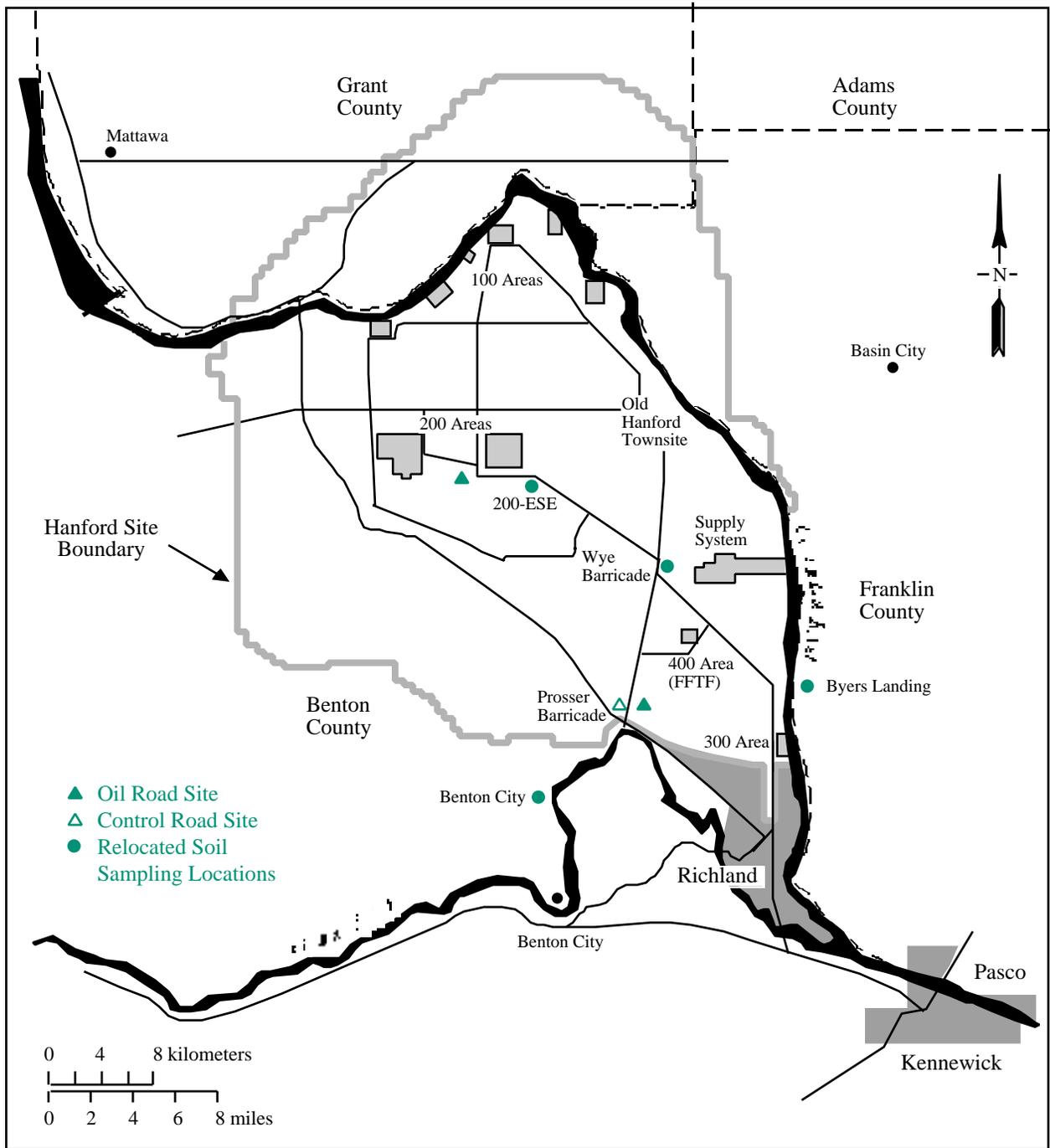


Figure 4.6.1. Relocated Soil Sampling and Road Sampling Locations

## Historical and Current Soil Sampling

In response to interest in past releases of radionuclides, a review of archived monitoring and surveillance records for soil sampling was conducted. This review documented changes in soil sampling locations, procedures, and methods used for the analysis of radiological contaminants over the past 26 years of soil surveillance. Four stations have been relocated since 1971. The Wye Barricade location was relocated across the road from the original site in the late 1980s. The Byers Landing location was moved approximately 0.16 km (0.1 mi) east of

the original site also in the late 1980s. The 200-ESE location was moved approximately 3.6 km (2.25 mi) closer to the Plutonium-Uranium Extraction Plant stack in 1976 or 1977. The Benton City location was apparently relocated in the mid-1970s to a position several kilometers (miles) closer to the southern boundary of the site. The current positions of these four sampling locations are shown in Figure 4.6.1. Additionally, the current state of these sampling locations was evaluated, vegetation cover and disturbance was documented, and global positioning coordinates established for recently active sampling locations. This information will provide useful guidance when soil sampling is conducted in the future.