

(30 miles) northeast of the site, is the only significant structural feature in the western New York region. From 1737 to 1999, there have been 119 recorded earthquakes within 480 kilometers (300 miles) of the WVDP with epicentral intensities of Modified Mercalli Intensities V to VII. Of the 119 recorded earthquakes, 25 occurred within 320 kilometers (200 miles) of the WVDP (WVNS 2000b). The highest Modified Mercalli Intensity estimated to have occurred at the Center within the last 100 years was an Intensity of IV, which is similar to vibrations from a heavy truck that might be felt by people indoors, but do not cause damage (DOE 1996).

3.2 HYDROLOGY

This section describes the existing hydrology at the Project Premises and surrounding area.

3.2.1 Surface Water

The WVDP facilities and its two water supply reservoirs lie in separate watersheds, both of which are drained by Buttermilk Creek (Figure 3-1). Buttermilk Creek, which roughly bisects the Western New York Nuclear Service Center, flows in a northwestward direction to its confluence with Cattaraugus Creek, at the northwest end of the Center. Several tributary streams flow into Buttermilk Creek at the Center. The flow length of Buttermilk Creek through the Center is about 7,600 meters (25,000 feet). About 2,700 meters (9,000 feet) of this is adjacent to the Project Facilities and the water supply reservoirs (WVNS 2000b).

Buttermilk Creek lies in a deep, narrow valley cut into glacial soils. A downstream portion of the creek has downcut to shale bedrock. The reach of stream to the east of the facilities has downcut through the Lavery till and the underlying Kent recessional units and is currently incising the Kent till. The stream invert drops from an elevation of 400 meters (1,300 feet) at the southern site boundary, to 370 meters (1,200 feet) at the northern edge of the Project Facilities, to 340 meters (1,100 feet) at the confluence with Cattaraugus Creek. The drainage area of the Buttermilk Creek basin was estimated to be 80 square kilometers (30 square miles) (DOE 1996). The drainage area to this point is estimated to be about 76 square kilometers (29 square miles) (WVNS 2000b).

Cattaraugus Creek flows westward from the Buttermilk Creek confluence to Lake Erie, 63 kilometers (39 miles) downstream. The total drainage area is estimated to be 1,360 square kilometers (520 square miles). A gauging station has been maintained at Gowanda, New York, since 1939. The drainage basin to this point is estimated to be about 1,120 square kilometers (430 square miles). The drainage area of Cattaraugus Creek upstream of the Buttermilk Creek confluence is 560 square kilometers (220 square miles) (WVNS 2000b).

The drainage basin on the Project Premises is relatively small, consisting of approximately 5 square kilometers (2 square miles). The outfall of the watershed (that is, the point where all surface runoff from the site reaches a single stream channel) is at the confluence of Frank's Creek and Quarry Creek, north of the main Project Facilities. The watershed extends in a southwest direction from this point. Ground cover consists of the main Project Facilities, forest, abandoned farmlands, and a small amount of active farmland.

The watershed on the Project Premises is drained by three named streams: Quarry Creek, Frank's Creek, and Erdman Brook (Figure 3-2; WVNS 2000a). Erdman Brook and Quarry Creek are tributaries to Frank's Creek, which in turn flows into Buttermilk Creek. Erdman Brook, the smallest of the three streams, drains the central and largest fraction of the developed WVDP premises, including a large portion of the disposal areas and the areas surrounding the lagoon system; the plant, office, and warehouse areas; and a major part of the parking lots. Following treatment, the WVDP's waste waters

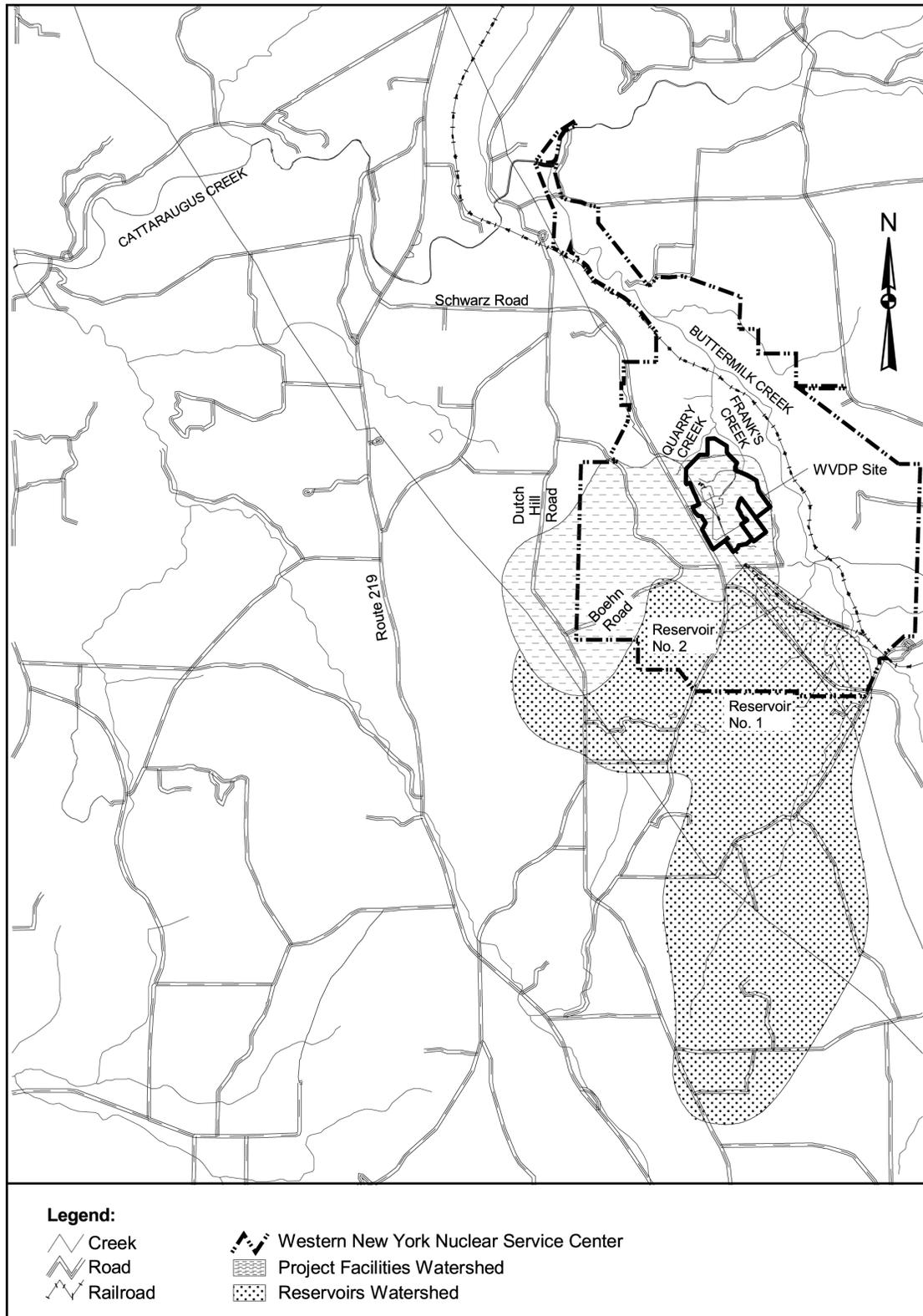


Figure 3-1. Watersheds on WVDP Premises

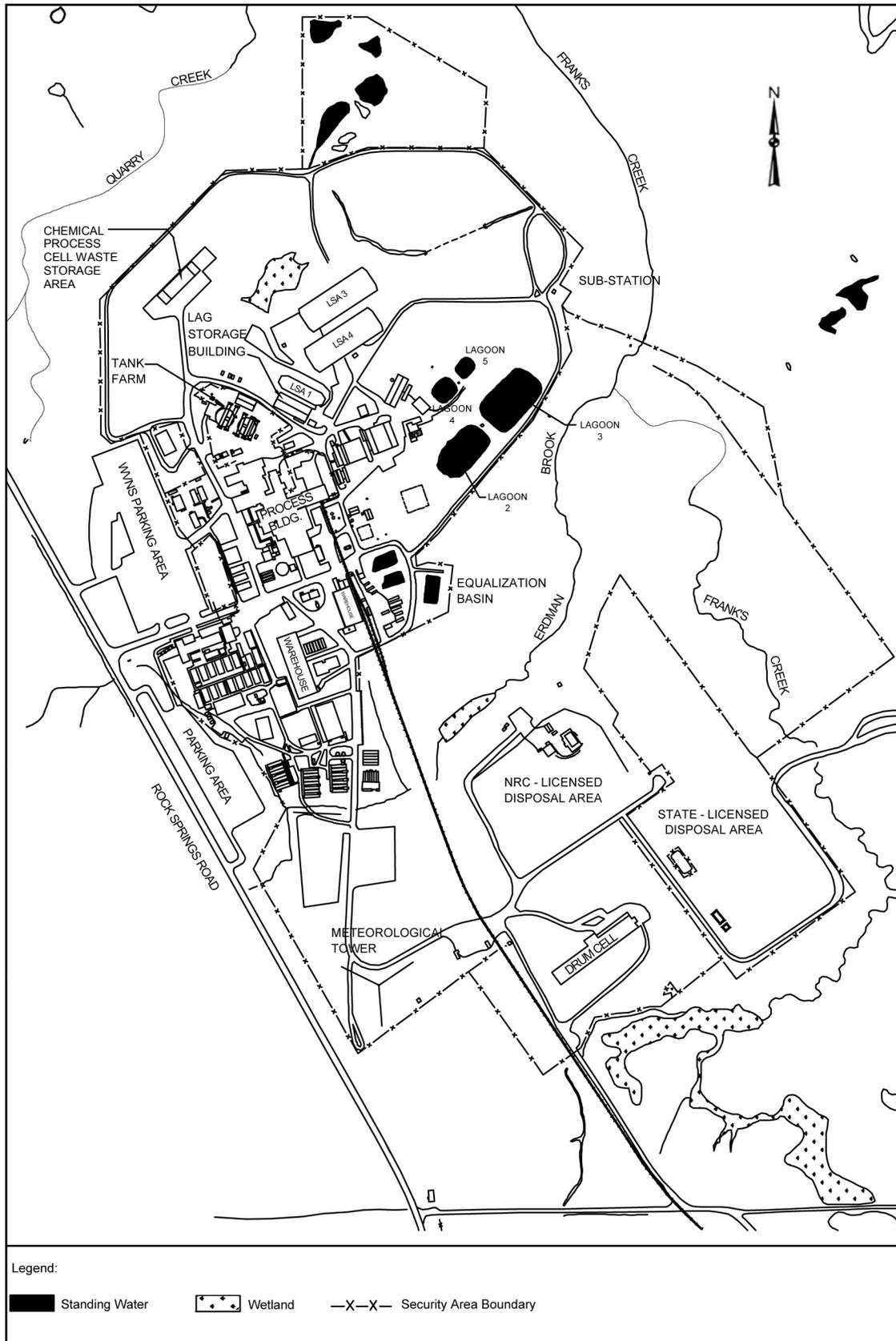


Figure 3-2. Surface Water on WVDP Premises

are also discharged to this brook. Erdman Brook flows from a height of over 430 meters (1,400 feet) west of Rock Springs Road to 400 meters (1,300 feet) at the confluence with Frank's Creek northeast of the lagoons. It flows for about 900 meters (3,000 feet) through the Project Facilities.

Quarry Creek, which drains the largest area of the three named streams, receives runoff from the tank farm, the north half of the northern parking lot, and the temporary radioactive waste storage tents. It flows from an elevation of 590 meters (1,900 feet) west of Dutch Hill Road to 380 meters (1,250 feet) at its confluence with Frank's Creek. The segment that flows along the north side of the project is about 900 meters (3,000 feet) in length.

A small dam formerly used for hydroelectric power and water impoundment is located on Cattaraugus Creek about 300 meters (1,000 feet) upstream of the Soby Road bridge, southwest of Springville, New York. Neither Buttermilk Creek nor Cattaraugus Creek downstream of the WVDP are used as a regular source of potable water. The steep-walled nature of the downstream valley and the region's annual precipitation combine to make irrigation from the creeks impracticable and unnecessary. Cattle from a neighboring dairy farm have access to Buttermilk Creek near the confluence of Cattaraugus Creek. Milk from the cattle is routinely monitored for radioactivity. Cattaraugus Creek downstream of Buttermilk is a popular fishing and canoeing/rafting waterway. As such, Cattaraugus Creek water, fish, and sediments are monitored as part of the WVDP environmental monitoring program (WVNS 2000a, WVNS 2000b).

The two water supply reservoirs, which are interconnected by a short canal, are located to the south of the main Project Facilities. They were formed by blocking off two tributaries to Buttermilk Creek with earthen dams. The south reservoir drains to the north reservoir, which then discharges to Buttermilk Creek through a sluice gate water-level control structure. The emergency spillway is located on the south reservoir. The reservoirs collect drainage from numerous small streams over a 13-square-kilometer (5-square-mile) drainage basin. The watershed ground cover is a mix of forest, cultivated fields, and pastures. Several small farm ponds are located throughout the basin.

Frank's Creek receives runoff from the east side of the WVDP, including the Drum Cell, part of the state radioactive waste burial area, and the former construction demolition and debris landfill. It flows into Buttermilk Creek about 600 meters (2,000 feet) downstream of its confluence with Quarry Creek. It flows from an elevation of 550 meters (1,800 feet) west of Rock Springs Road, to 380 meters (1,250 feet) at the Quarry Creek confluence, to 360 meters (1,200 feet) at the Buttermilk Creek confluence. About 1,800 meters (6,000 feet) of its length is adjacent to WVDP Facilities.

Supplemental information on surface water hydrology may be found in Volume III of the Environmental Information Document (Part 2) (WVNS 1993b). Additional information pertaining to the geomorphology of stream valleys, both onsite and offsite, is presented in Volume III of the Environmental Information Document (Part 1) (WVNS 1993a).

3.2.2 Groundwater

The Center is located within the Cattaraugus Creek Basin Aquifer System, a system that has been designated by the U.S. Environmental Protection Agency (EPA) as a sole or principal source of drinking water for the surrounding towns (52 Fed. Reg. 36102(1987)). This means that all projects with federal financial assistance constructed in this basin are subject to EPA review to ensure that they are designed and constructed so as not to create a significant hazard to public health. WVDP waste management actions would not require any facility construction at the Center and are not expected to cause construction or any other impacts requiring EPA review on the surface water or groundwater resources described in this section.

The groundwater flow patterns pertinent to the site relate to recharge and downgradient movement for these two aquifers. Groundwater in the surficial unit tends to move in an easterly or northeasterly direction from the western boundary of the site, close to Rock Springs Road. Most of the groundwater in this unit discharges via springs and seeps into Frank's Creek or into small tributaries of that creek (for example, Erdman Brook). Groundwater recharging the weathered shale and rubble zone tends to move eastward toward the thalweg of the buried valley (the locus of the lowest points in the cross-section of the buried valley), located about 300 to 350 meters (980 to 1,150 feet) west of Buttermilk Creek. Once attaining the thalweg, the direction of groundwater movement shifts to the direction of the thalweg, about 25 degrees west, and proceeds toward the northwest (WVNS 2000b).

Wells identified near the Western New York Nuclear Service Center serve residences and farms; the maximum number of persons served per well was ten. Most of the wells are located on the higher elevations east and west of the Center, along the principal north-south county roads. A second concentration of wells is located on the lowlands north of the Center in the vicinity of Bond Road and Thomas Corners Road. The wells are upgradient of or are otherwise hydraulically isolated from groundwater at the site (WVNS 2000b).

Water supplies north of the Western New York Nuclear Service Center and south of Cattaraugus Creek derive mainly from springs and shallow dug wells completed in Defiance Outwash, which overlie the Lavery till in this area. The distribution of springs and the general geologic relationships indicate that the groundwater system here is perched above the Lavery and that flow patterns are much the same as those that characterize the North Plateau at the WVDP. This hydrostratigraphic unit clearly is disconnected from the WVDP both hydraulically and topographically. Nonetheless, water supplies developed from bedrock wells in this same area downstream and downgradient of the WVDP might be hydraulically connected to water originating on the site via the surface water system and shale exposures in the lower reaches of Buttermilk Creek (WVNS 2000b).

Supply wells on the uplands bordering the Western New York Nuclear Service Center, such as along Route 240 and Dutch Hill Road, are completed in bedrock. A nominal 15 meters (50 feet) of till overlie a fractured bedrock aquifer on the summit levels west of the site; a comparison of screen depths and static water levels indicate that the aquifer is confined (WVNS 2000b). A similar situation exists on the uplands east of the Center, except that most of these wells intersect from 20 to 45 meters (66 to 150 feet) of the Kent till and ground moraine layers above their completion depths in shale bedrock. Groundwater supplies in both of these areas can be assumed to be isolated hydraulically from groundwater in bedrock at lower elevations beneath the Center and the WVDP (WVNS 2000b).

The Lavery till and underlying lacustrine sequence currently are not drawn upon for groundwater supplies, and there is no reason to anticipate that the till, given its hydraulic properties, ever will be considered a source of groundwater (WVNS 2000b).

3.3 METEOROLOGY AND AIR QUALITY

The WVDP is situated approximately 50 kilometers (30 miles) inland from the eastern end of Lake Erie in western New York State. The climate of western New York State is of the moist continental type prevalent in the northeastern United States. The climate is diverse due to the influence of several atmospheric and geographic factors or controls (WVNS 2000b).

Western New York is exposed to a variety of air masses. Cold dry air masses that form over Canada reach the area from the northwesterly quadrant. Prevailing winds from the southwest and south bring warm, humid air masses from the Gulf of Mexico and neighboring waters of the subtropical Atlantic