ENVIRONMENTAL NONRADIOLOGICAL PROGRAM INFORMATION

Overview of New York State Water Classifications, Water Quality Standards, and Water Effluent Limits

The objective of the Clean Water Act of 1972 (CWA) (as stated in Section 101 of the Act) is to restore and maintain the integrity of the nation's waters and ensure that, wherever attainable, waters be made useful for fishing and swimming. To achieve this goal, New York State is delegated with authority under Sections 118, 303, and 510 of the CWA to (1) classify and designate the best uses for receiving waters, such as streams and rivers, within its jurisdiction; and (2) establish and assign water quality standards – goals for achieving the designated best uses for these classified waters. In addition to achieving CWA goals for fishing and swimming, New York has further classified its jurisdictional waters and established ambient water standards, guidelines, and maximum contaminant levels (MCLs) to achieve objectives under the Safe Drinking Water Act for drinking water. These standards serve as the basis for periodic evaluation of the integrity of the receiving waters and identification of needed controls, such as New York State Pollutant Discharge Elimination System (SPDES) permits and effluent limitations.

The definitions for best usage classifications of New York's jurisdictional waters and the water quality standard goals for these classifications are provided in Title 6 of the Official Compilation of Codes, Rules, and Regulations of the State of New York (6 NYCRR) Parts 701–704. Mapping of the Cattaraugus Creek drainage basin and assignment of best usage designations and classification to each receiving water segment within this drainage basin are described in 6 NYCRR Part 838. According to these regulations, Frank's Creek, Quarry Creek, and segments of Buttermilk Creek under the influence of West Valley Demonstration Project (WVDP) water effluents are identified as Class "C" receiving waters with a minimum designated best usage for fishing with conditions suitable for fish propagation and survival. Cattaraugus Creek, in the immediate downstream vicinity of the Western New York Nuclear Service Center (WNYNSC), is identified as a Class "B" receiving water with best designated usages for swimming and fishing. All fresh (nonsaline) groundwaters within New York are assigned a "GA" classification with a designated best usage as a potable water supply source.

Presented in Appendix C-1[CD] is a summary of the numerical water quality standards, guidelines, and MCLs assigned to these water classifications for those substances and parameters that are included

in the WVDP environmental monitoring program for ambient water. Also included in Appendix C-1 are SPDES permit discharge limits for site effluents.

Surface Water, Subsurface Drainage Water, and Water Effluent Monitoring

Appendix C-2 contains process effluent data with SPDES permit limits provided for comparison with these data. Appendix C-3 contains storm water runoff monitoring data for storm water outfalls designated in the WVDP SPDES permit. Appendices C-4 through C-6 present data for ambient surface water, subsurface drainage water, contained water, and potable water monitoring locations. Also provided for side-by-side comparison with these data are reference values, where available, including background ambient water monitoring data and/or pertinent ambient water quality standards (AWQS), guidelines, or MCLs.

SPDES Permit-Required Monitoring. Liquid discharges from the WVDP are regulated under the SPDES permit as identified in Table ECS-2. This SPDES permit identifies outfalls from which liquid effluents are released to Erdman Brook (Fig. A-2) and specifies the sampling and analytical requirements for each outfall. In January 2005, the permit was modified by the New York State Department of Environmental Conservation (NYSDEC) to include monitoring requirements for 20 storm water discharge outfalls from the site. The conditions and requirements of the SPDES permit are summarized in Appendix C-1. The permit identifies 25 outfalls and compliance points with monitoring requirements and discharge limits. The monitored outfalls include:

• outfall 001 (monitoring point WNSP001), discharge from the low-level waste treatment facility (LLWTF)

• outfall 007 (monitoring point WNSP007), discharge from the sanitary and industrial wastewater treatment facility

• outfall 008 (monitoring point WNSP008), a groundwater french drain around the perimeter of the LLWTF storage lagoons (closed in May 2001 but still in the permit)

• outfall 116 (pseudo-monitoring point WNSP116), a location in Frank's Creek that represents the confluence of outfalls WNSP001, WNSP007, and WNSP008, as well as storm water runoff, groundwater seepage, and augmentation water. Samples from upstream sources are used to calculate total dissolved solids (TDS) at this location and to demonstrate compliance with the SPDES permit limit for this parameter. (Outfall 116 is referred to as a "pseudo-monitoring" point on the SPDES permit.)

• outfall 01B (monitoring point WNSP01B), an internal monitoring point for the liquid waste treatment system evaporator effluent, being monitored for flow and total mercury.

The 20 storm water discharge outfalls that also receive flows from other minor sources, such as fire hydrant testing and groundwater seepage, are required to be monitored on a rotational basis.

Some of the more significant features of the SPDES permit are the requirements to report five-day biochemical oxygen demand (BOD_5), TDS, iron, and ammonia data as flow-weighted concentrations and to apply a net discharge limit for iron. The net limit allows the Project to account for the iron that is naturally present in the site's incoming water. The flow-weighted limits apply to the flow-proportioned sum of the Project effluents.

There were no SPDES effluent limit exceptions in CY 2005.

Mercury Analytical Method Study. In a July 2002 SPDES permit modification, NYSDEC required that samples being collected for measurement of mercury be analyzed by two different methods to conduct a comparison study. The methods are United States (U.S.) Environmental Protection Agency (EPA) Method 245.1 (or 245.2) with a detection level of 0.2 micrograms/liter (µg/L) (parts per billion) and EPA Method 1631E, which allows determination of mercury at a minimum level of 0.5 nanograms/liter (ng/L) (parts per trillion). The latter ("ultraclean") method supports the EPA's effort to make available an additional analytical method capable of measuring mercury accurately at ambient water quality criteria levels.

Since the SPDES permit enforcement compliance limit of 0.2 µg/L for total mercury is several orders of magnitude higher than the AWQS of 0.0007 µg/L for dissolved mercury, the comparison study is required under the terms of the SPDES permit. A report summarizing the analytical results from these two methods and its findings is required to be submitted semiannually to NYSDEC.

Fourteen sets of samples from outfall 001 were analyzed for mercury by the two test methods in 2005. Samples were analyzed at Severn Trent Laboratories using Method 245.1 and at General Engineering Laboratories using Method 1631E.

All sample results from Method 245.1 were less than 0.2 µg/L, the practical quantitation limit for Method 245.1. Results generated with Method 1631E were consistent with results generated with Method 245.1. That is, all sample results generated with Method 1631E were reported at levels below 0.2 µg/L. The average concentration for samples collected at outfall 001 using Method 1631E was 0.0044 µg/L (4.4 ng/L).

Storm Water Discharge Monitoring. The SPDES permit was modified by NYSDEC in January 2005 to support the regulatory objective to define and control the risk to human health and aquatic resources from contaminated storm water runoff. The objectives of permit requirements are to determine (1) the levels of water quality and specific chemicals in storm water discharges from specified locations on the WVDP, (2) the amount of rainfall, (3) duration of the storm event, and (4) the resulting flow at the outfalls. The 20 storm water outfalls at the WVDP are grouped into eight representative drainage basins that could potentially be influenced by industrial or construction activity runoff. The modified SPDES permit, effective January 1, 2005, requires that one outfall, representative of each of the eight outfall groups listed in Appendix B[CD], be sampled on a semiannual basis.

The SPDES permit recommends the following guidelines for a qualifying storm water event eligible for monitoring:

- a period of 72 hours between the monitored event and the previous measurable event of 0.1 inches of precipitation;
- a total rainfall of more than 0.1 inch;
- resultant storm discharge at the outfall.

During the first half of 2005, five of the eight sampling groups were sampled during qualifying rain events, and all eight groups were sampled during qualifying rain events during the second half of the year. The permit requirement to sample one of each outfall group was not met due to the low precipitation during early calendar year 2005.

Appendix C-3[CD] presents all storm water discharge event monitoring data. The analysis of storm water discharge samples produced noticeable concentrations of indicator parameters (in particular BOD_5,

TDS, and total suspended solids) and associated inorganic parameters (in particular aluminum, copper, iron, and lead). The sources for the noteworthy concentrations in storm water runoff of these naturally occurring substances include residuals from deicing material (sand and salt mixture) applications, fine sediments from placement of quarried materials delivered from off-site sources, residuals from corrosion of material and equipment, vegetation particles, and natural silts and fine sediments from soil erosion, including those that escape strategically placed erosion and sediment control devices, such as fabric filter fences.

South Plateau Surface and Subsurface Water Monitoring. An inactive underground radioactive waste disposal site, the U.S. Nuclear Regulatory Commission (NRC)-Licensed Disposal Area (NDA), lies on the south plateau of the site. Surface waters, which flow from the south to the north, are routinely monitored at several points around this area (Fig. A-2). Two of these points, WNNDATR and WNNDADR, are used to monitor (respectively) waters within the NDA water collection trench system and surface runoff and seepage immediately downstream of the NDA. Sampling point WNNDATR is an underground sump at the lowest point in the collection trench system that intercepts groundwater from the NDA. If radiological or nonradiological contamination were to migrate through the NDA, it would most likely be first detected in samples from WNNDATR.

Interceptor Trench and Pretreatment System. Radioactively-contaminated n-dodecane (similar to kerosene) in combination with tributyl phosphate (TBP) was discovered at the northern boundary of the NDA in 1983. To contain migration of this subsurface radioactive organic contaminant, an interceptor trench and a liquid pretreatment system (LPS) were built. (See "NRC-Licensed Disposal Area [NDA] Interceptor Trench and Pretreatment System" in Chapter 1.)

The trench was designed to intercept and collect subsurface water, which could be carrying n-dodecane/TBP, to prevent the material from entering the surface water drainage ditch leading into Erdman Brook, and to prevent contamination of downgradient groundwater. The LPS was installed to separate the n-dodecane/TBP and to remove iodine-129 from the collected water before its transfer to the LLWTF. The separated n-dodecane/TBP would be stored for subsequent treatment and disposal.

In 2005, as in previous years, no water containing TBP was encountered in the trench. Results of surface and groundwater monitoring in the vicinity of the trench are discussed under "South Plateau Surface Water and NDA Interceptor Trench" in Chapter 2 and "Results of Monitoring at the NDA" in Chapter 4.

Total Organic Halides. Total organic halides (TOX) measurements are used as a screening mechanism to detect the presence of certain organic compounds and associated radionuclides. In 2005, concentrations of TOX at both WNNDATR and WNNDADR remained within the range of historical values.

Other On-Site and Off-Site Surface Water Monitoring. As part of the routine monitoring program, two sets of grab samples for nonradiological parameters at WNSP006 (Frank's Creek at the security fence), WNSWAMP (northeast swamp drainage), WNSW74A (north swamp drainage), WFBCTCB (Buttermilk Creek at Thomas Corners), and WFBCBKG (Buttermilk Creek at Fox Valley) were taken in 2005. These samples were screened for organic and inorganic constituents and selected anions, cations, and metals.

At surface water monitoring locations WFBCTCB, WNSP006, and background reference location WFBCBKG, the maximum concentrations of total

iron exceeded the water quality standard (0.30 milligrams/liter [mg/L]). NYSDEC, in its 2002 CWA 303(d) report to the EPA, indicated it found the scientific basis for the 0.30 mg/L standard to be insufficient. NYSDEC also indicated that its upcoming standards review is expected to include a proposed replacement of the 0.30 mg/L standard with a 1.0 mg/L guidance value, based on 1976 EPA criteria. Nonetheless, iron concentrations at these locations also exceeded this replacement value. Elevated iron concentrations are attributable to elevated background concentrations, runoff from industrial activities, fine sediments from placement of quarried materials delivered from off-site sources, and natural silts and fine sediments from soil erosion.

The maximum observed concentrations of dissolved aluminum at surface water locations WFBCTCB, WNSP006, and WFBCBKG exceeded the water quality standard for this parameter. Elevated aluminum concentrations are attributable to the same sources as identified for iron.

With the exception of iron and aluminum, the other nonradiological constituents remained within the range of historical values. Results of measurements for these locations are found in Appendices C-4 and C-5.

Drinking Water Monitoring

Site drinking water is monitored at the distribution entry point (WNDNKUR) and at other site tap water locations to verify compliance with EPA and New York State Department of Health (NYSDOH) regulations. (See "Safe Drinking Water Act" in the Environmental Compliance Summary.) Samples are collected and analyzed for metals, nitrate, fluoride, cyanide, principal organic contaminants, residual chlorine, and biological constituents. A detailed sampling schedule and listing of constituents is presented in Appendix B. Analytical results may be found in Appendix C-6.

Results indicated that in 2005, the Project's drinking water continued to meet MCLs and drinking water standards of the EPA, NYSDOH, and the Cattaraugus County Health Department.

Soil and Sediment Monitoring

Sediments are found at the bottom of surface waters, including streams located within the WVDP and the WNYNSC premises. Sediments provide habitat for a wide variety of bottom-dwelling (benthic) organisms, as well as juvenile forms of open-water (pelagic) organisms. These organisms in sediments are in constant contact with substances that may be adsorbed to sediment particles. Contaminated sediments are potential diffuse sources of contamination to the overlying body of water.

In 1999, NYSDEC issued updated guidance for screening contaminated aquatic sediments. This guidance includes sediment quality criteria correlated to the severity of environmental impact. These criteria, which are derived from National Oceanic and Atmospheric Administration (Long and Morgan, 1990) and 1992 Ministry of Ontario "Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario" (Persaud et al., 1992), are presented in Appendix G-1.

Contaminants in soils are potential sources for contamination of groundwater, ambient air, flora, and fauna. Appendix G-1 includes a summary of reference criteria, including background concentration ranges for eastern United States soils and sediment screening levels. Data for soil and sediment monitoring locations are provided in Appendix G-2. Also, provided for side-by-side comparison with these data, are available reference values, including background concentrations and/or sediment screening levels.

At SNSP006, all analytical results for sediments were below the Severe Effect Level and No Appreciable Contaminant Levels specified in the NYSDEC guidance. According to the NYSDEC "Technical Guidance for Screening Contaminated Sediments," these results suggest there is no pronounced disturbance of the sediment-dwelling biological community and that there is no significant harm to benthic life at this location.

The results for arsenic, copper, manganese, and nickel in the sediment sample obtained at SNSP006 exceeded the Lowest Effect Level but was below the Severe Effect Level. Based on the NYSDEC sediment screening guidance, moderate impacts to benthic life could be expected at this location.

At SNSW74A and SNSWAMP, concentrations of zinc exceeded the eastern United States background soil concentration range identified in the NYSDEC Technical Administrative Guidance Memorandum (TAGM) #4046 "Determination of Soil Clean-Up Objectives and Clean-Up Levels." Calcium and magnesium at SNSW74A also exceeded the eastern background soil concentration range. Concentrations of these naturally occurring metals above the natural background ranges may be indicative of localized, naturally elevated background concentrations of metals in soils or deposition of sediment from runoff from areas where industrial activities are occurring. Calcium and magnesium are also constituents used in deicing salts on site.

Lag Storage Area (LSA) #2 Hardstand. In 2005, soils from the truck staging area for LSA #2, a radioactive and Resource Conservation and Recovery Act hazardous waste storage area, were sampled and analyzed for chemical residuals. The test results indicated that the soil did not have any appreciable contamination, as all but one result (lead) were within proposed site-specific soil cleanup objectives specified in NYSDEC guidance, TAGM #4046. The single noted result for lead was determined to be an anomaly associated with analytical imprecision as re-analysis of the same sample produced two additional results that were closer to each other, lower than the original result, and within the proposed NYSDEC guidance. Refer to Appendix G-2 for these test results.

Air Emission Monitoring

Nonradiological air emissions are permitted under NYSDEC and EPA regulations. The regulations that apply to the WVDP are listed in Appendix K. The New York State Air Facility Registration Certificate for the WVDP is described in the WVDP Environmental Permits table, ECS-2, in the "Environmental Compliance Summary."

The nonradiological air certificate covers emissions of regulated pollutants that include nitrogen oxides and sulfur dioxide.

The main source of oxides of nitrogen and sulfur at the WVDP was the vitrification system melter, which was shut down in September 2002. Site boilers are left as the only sources of nitrogen and sulfur oxides, at levels much lower than those emitted by the melter. During 2005, approximately 3,700 kilograms (kg) (4.1 tons) of nitrogen oxides and less than 10 kg (0.01 tons) of sulfur dioxide were emitted from these remaining units. These releases comprised about 4.1% and 0.01%, respectively, of the 99-ton annual capping limit for each.