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 CD are SPDES permit discharge limits for site effluents.

Table 3-1 presents a summary of those nonradiological results that exceeded background results or applicable limits or guidance levels in 2006.

Surface Water, Subsurface Drainage Water, and Water Effluent Monitoring

Appendix C-2 CD contains process effluent data with SPDES permit limits provided for comparison with these data. Appendix C-3 CD contains storm water runoff monitoring data for storm water outfalls designated in the WVDP SPDES permit. Appendices C-4 CD through C-6 CD 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), identifies 20 storm water outfalls (Figs. A-3 and A-4), and specifies the sampling and analytical requirements for each. In September 2006, the permit was modified by the New York State Department of Environmental Conservation (NYSDEC) to reduce monitoring frequency requirements for 17 analytical parameters at outfall 001 and to modify the methods and requirements for monitoring mercury. The conditions and requirements of the SPDES permit are summarized in Appendix C-1 CD. 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.

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

There were no SPDES effluent limit exceptions in CY 2006.

Mercury Analytical Method Study. In a July 2002 SPDES permit modification, NYSDEC required that samples being collected for measure-

Table 3-1
2006 Comparison of Nonradiological Results With Backgrounds and Applicable Standards or Guidance Limits

Sample Type	*Number of Sampling Locations*	*Locations with Results Greater than Applicable Limits or Screening Levels (Constituent)*	*Locations with Results Greater than Background*	*Locations with Results Statistically Greater than Background (Constituent)*
Surface water (1 background location)				
On-site controlled effluents	2	0	1	**WNSP001** (total dissolved solids, sulfate)
On-site surface waters	3	**WNSP006** (iron, sulfide, total dissolved solids)	3	**WNSP006** (chloride, total sodium); **WNSWAMP** (non-purgeable organic carbon); **WNSW74A** (total dissolved solids)
Off-site surface waters[a]	1	**WFBCTCB** (iron, sulfide)	1	**WFBCTCB** (chloride, nitrate-nitrogen, total sodium)
Standing water (1 historical background location that is no longer sampled)				
Standing water	1	**WNSTAW9** (iron)	0	None
On-site soils/sediments (no background location)				
On-site soil/ sediments	3	**SNSWAMP** (magnesium, zinc)[b], **SNSP006** (arsenic, copper, manganese, nickel)[c], **SNSW74A** (magnesium[b], manganese[d], zinc[b,d])	NA	NA

NA - Not applicable; no background data for these constituents are available from the upstream location.

[a] *Background location WFBCBKG also exceeded the water quality standard for iron.*

[b] *Recommended soil cleanup objectives from NYSDEC Technical Administrative Guidance Memorandum (TAGM) #4046.*

[c] *Lowest effect level screening guidelines for chemical constituents from NYSDEC "Technical Guidance for Screening Contaminated Sediments"*

[d] *6 NYCRR Subpart 375-6.8(a) remedial program soil cleanup objective.*

ment 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 1631, which allows determination of mercury at a minimum level of 0.5 nanograms/liter (ng/L) (parts per trillion). The latter ("ultra-clean") 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 was required under the terms of the SPDES permit. A report summarizing the analytical results from these two methods and its findings has been required to be submitted semiannually to NYSDEC.

Eight sets of samples from outfall 001 were analyzed for mercury by the two test methods in 2006. Samples were analyzed at Severn Trent Laboratories using Method 245.1 and at General Engineering Laboratories using Method 1631.

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 1631 were consistent with results generated with Method 245.1. That is, all sample results generated with Method 1631 were reported at levels below 0.2 µg/L. The average concentration for samples collected at outfall 001 using Method 1631 was 0.0057 µg/L (5.7 ng/L).

The September 2006 SPDES permit modification eliminated the requirement to continue the comparison study and required the exclusive use of Method 1631 for mercury monitoring. Although compliance limits were not changed, the reporting units of measurement and significant figures were modified. The limit at outfall 001 was changed from 0.2 µg/L to 200 ng/L and that for outfall 01B was changed from 10 µg/L to 10,000.0 ng/L.

Storm Water Discharge Monitoring. The objectives of SPDES permit requirements for monitoring storm water runoff 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. One representative outfall for each of the eight outfall groups listed in Appendix B[CD] must 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.

In 2006, samples were collected semiannually from each of the eight groups. Appendix C-3[CD] presents data from all storm water discharge monitoring events. The analysis of storm water discharge samples produced noticeable concentrations of indicator parameters (in particular five-day biochemical oxygen demand, 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-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 in groundwater 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 "Nuclear Regulatory Commission-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 2006, 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 Nuclear Regulatory Commision-Licensed Disposal Area Interceptor Trench" in Chapter 2 and "Monitoring on the South Plateau: Weathered Lavery Till and 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 2006, no elevated concentrations of TOX requiring further investigation were detected at either WNNDATR or WNNDADR.

Other On-Site and Off-Site Surface Water Monitoring. As part of the routine monitoring program, two sets of timed continuous composite and 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 2006. These samples were screened for organic constituents and selected anions, cations, and metals. Results were compared with background results and with applicable standards. (See Table 3-1.)

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]). 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.

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 WNSP006 also exceeded this replacement value.

Results of measurements for these locations are found in Appendices C-4 CD and C-5 CD. Measurements of nonradiological constituents remained within the range of historical values.

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 sample from a standing water location (WNSTAW9), collected from the reservoir near the site's tap water intake, is also analyzed for select chemical parameters. A detailed sampling schedule and listing of constituents is presented in Appendix B CD. Analytical results may be found in Appendix C-6 CD.

Results indicated that in 2006, 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 CD.

Contaminants in soils are potential sources for contamination of groundwater, ambient air, flora, and fauna. Appendix G-1 CD 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 CD. Also, provided for side-by-side comparison with these data, are available reference values, including sediment screening levels. See Table 3-1 for a listing of constituents exceeding screening levels.

At SNSP006, all analytical results for sediments were below the "Severe Effect Levels" 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 Levels" but were less than the "Severe Effect Levels." Based on the NYSDEC sediment screening guidance, moderate localized 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." The manganese and zinc concentrations at SNSW74A also exceeded the 6 NYCRR Subpart 375-6.8(a) Remedial Program Cleanup Objective. Magnesium at SNSW74A and SNSWAMP exceeded the eastern background soil concentration range. Concentrations of these naturally occurring metals above background may be indicative of localized, naturally elevated concentrations of these metals in soils. Magnesium is also a constituent used in deicing salts on site, and runoff from road-salting could be effecting these locations.

Air Emission Monitoring

Nonradiological air emissions are permitted under NYSDEC and EPA regulations. The regulations that apply to the WVDP are listed in the "Environmental Compliance Summary," Table ECS-1. 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. Two site utility steam boilers are left as the only sources of nitrogen and sulfur oxides, at levels much lower than those emitted by the melter. During 2006, approximately 2,800 kilograms (kg) (3.1 tons) of nitrogen oxides and less than 1 kg (0.0011 tons) of sulfur dioxide were emitted from these remaining units. Together, these releases comprised about 6.3% and 0.002%, respectively, of the 49.5-ton annual capping limit for each.

Special Monitoring

Special monitoring refers to that conducted outside the scope of the routine environmental monitoring program. Two special monitoring efforts for nonradiological constituents were conducted in 2006.

In 2006, questions arose regarding the possible environmental impact to wetlands from the live fire range (LFR) on the WNYNSC. The LFR is a small arms range used by the WVDP security force and the Cattaraugus County Sheriff's Department for practice and for firearms qualification courses. The primary contaminant of concern was lead, in both particulate and soluble forms. Lead, especially in soluble form, may be transported by storm water runoff away from the LRF and into surface waters.

Late in 2006, four surface water samples were collected near the LFR and analyzed for total and soluble lead. Results provided information for char-

acterizing the locations, identifying potential environmental concerns that may exist, and developing management plans for current and future usage (and eventual closure) of the LFR. A nearby storm water runoff location was tentatively identified and a full suite of storm water characterization samples was collected in 2007. The analytical results will be submitted to NYSDEC, as well as other SPDES permit modifications that are expected to be submitted in 2007.

In accordance with the Resource Conservation and Recovery Act, clean closure was initiated in 2006 at two facilities: the lag storage building and the interim waste storage facility. Sampling for hazardous constituents was performed in accordance with the RCRA closure plans for the facilities. The results of the clean closure confirmation sampling showed levels of contaminants of concern below the cleanup levels established in the closure plans. Clean closure certification reports are being prepared and will be submitted by the DOE to NYSDEC.