1.0 INTRODUCTION

This report is submitted in accordance with DOE Order 5484.1 and presents a summary of environmental monitoring data collected at the West Valley Demonstration Project (WVDP) from January 1, 1986 through December 31, 1986. The program implemented by West Valley Nuclear Services Company provides data in compliance with DOE guidelines and recommendations which is reported annually in the WVDP-040 series of reports.

On February 26, 1982, the responsibility for operation and maintenance of the former Nuclear Fuel Services, Inc. (NFS) reactor fuel reprocessing facility was transferred to the Department of Energy (DOE). Public Law No. 96-368, enacted in 1980, mandated the demonstration of technology for solidification of the 2.2 million litres (580,000 gallons) of liquid high-level radioactive waste that were produced by commercial fuel reprocessing at the West Valley plant and are now held in underground storage tanks at the facility. The DOE selected West Valley Nuclear Services Company (WVNS) as the contractor to implement the provisions of this law.

When WVNS assumed operational control, NFS was conducting an environmental monitoring program appropriate to the shutdown maintenance operating status of the facility in accordance with Technical Specification 5.1 under NRC License CSF-1. WVNS recognized that the NFS program required substantial change in order to prepare for the high-level waste solidification operations currently scheduled for start-up in October of 1989. Accordingly in 1982, WVNS began to implement a full-scale environmental surveillance program in support of these planned operations and by 1985 had fully implemented this program. As recommended in DOE Order 5484.1, Chapter III, Paragraph 1, this program has provided more than two years of environmental baseline data prior to solidification operations.

During 1986, the environmental surveillance plan was revised in response to suggestions of DOE-ID and DOE-HQ personnel during their environmental monitoring appraisal of May 21-23, 1985. The revisions also reflected Project monitoring experiences to date. The revised plan provides more detailed coverage of on-site waste management areas and monitoring of more nonradiological parameters. The off-site monitoring program also was augmented to include more monitoring stations and additional parameters (both radiological and nonradiological). Also included were changes to the program dictated by revised sampling requirements in the Project's SPDES permit. The revised plan is described in detail in Appendix A which includes a summary of the changes. As this summary indicates, many additions and modifications to procedures, equipment and sampling locations were completed by year's end.

A comprehensive Environmental Evaluation (EE) was published in June, 1984 to initiate the decision-making process for disposal of Project low-level radioactive waste (LLW). The intent of the Project is to phase out the methods used by NFS and replace them with state-of-the-art engineered disposal technology. Based on the review of the EE by the Department of Energy Headquarters and the Idaho Operations Office, the Project staff was directed to assist the DOE with the preparation of an Environmental Assessment which analyzed alternative disposal options more thoroughly than was appropriate in the EE. After extensive review of a draft by DOE, the final EA was published in February 1986. In April of 1986, the Department of Energy approved the LLW disposal EA, and after an appropriate public comment period, issued a Finding of No Significant Impact (FONSI) in August of the same year.

EE's were also prepared in 1985 and 1986 for the major solidification process support systems, including the High Level Waste Vitrification System, Supernatant Treatment System (STS), Cement Solidification System (CSS), and Liquid Waste Treatment System (LWTS). These documents were approved by Project management and submitted to DOE-ID for review and approval.

Although the reprocessing plant is not being used for its original purpose, major portions have been and are being decontaminated for use in support of the vitrification process. This requires continued operation of basic services, including low-level radioactive waste management. Facility operation through 1986 included periodic disposal of low level solid radioactive waste from decontamination and maintenance activity (plant wastes*) in the formerly licensed disposal area. Throughout 1986 liquid wastes resulting from plant activities continued to be processed on-site at the low-level waste treatment facility (LLWT) prior to discharge. Construction was initiated in 1986 on an above-ground storage facility for certain types of low level radioactive wastes. This drum storage cell is located to the southwest of the plant and adjacent to the NRC licensed disposal area.

The WVDP site is located in a rural setting approximately 50 km (30 mi) south of Buffalo, New York (Figure 1-1), at an average elevation of 400 m (1,300 ft) on New York State's western plateau. The plant facilities used by the Project occupy approximately 63 hectares (156 acres) of chain-link fenced area within a 1,350 hectare (3,300 acre) reservation that constitutes the Western New York Nuclear Service Center (WNYNSC). The communities of West Valley, Riceville, Ashford Hollow, and the village of Springville are located within 8 km (5 mi) of the plant. Several roads and one railway pass through the Center, but no human habitation, hunting, fishing, or public access are permitted on the WNYNSC.

The land immediately adjacent to the WNYNSC is used primarily for agriculture and arboriculture. Cattaraugus Creek to the north serves as a water recreation area (swimming, canoeing, and fishing). Although limited irrigation of adjacent golf course greens and tree farms is taken from the Cattaraugus Creek, no public water supply is drawn from the creek downstream of the WNYNSC.

---

* Plant wastes are those wastes which result from maintaining the plant in a safe shutdown condition and would have been generated if there were no West Valley Demonstration Project.

The average annual temperature in the region is 7.2°C (45.0°F) with recorded extremes of 37°C (98.6°F) and -42°C (-43.6°F). Rainfall is relatively high, averaging about 104 cm (41 in) per year. Precipitation is evenly distributed throughout the year and is markedly influenced by Lake Erie to the west and Lake Ontario to the north. All surface drainage from the WNYNSC is to Buttermilk Creek which flows into Cattaraugus Creek and ultimately into Lake Erie. Regional winds are predominantly from the west and south at over 4 meters per second (9 mph) during most of the year.

The WNYNSC lies within the northern hardwood forest region, and the diversity of its vegetation is typical of the area. Equally divided between forest and open land, the site provides habitats especially attractive to white-tailed deer and the various birds, reptiles, and small mammals indigenous to the region. No endangered species are known to be present on the reservation.

The geology of the site is characterized by glacial deposits of varying thickness in the valley areas, underlain by sedimentary rocks which are exposed in the upper drainage channels in hillsides. The soil is principally silty till consisting of unconsolidated rock fragments, pebbles, sand, and clays. There is an aquifer in the upper 6 m (20 ft) of granular fluvial materials concentrated near the western edge of the site; high ground to the west and the Buttermilk Creek drainage to the east intersect this aquifer, precluding off-site continuity. Several shallow, isolated, water-bearing strata also occur at various other locations within the site boundary but do not appear to be continuous. The zone at which the till meets bedrock forms another aquifer that ranges in depth from 2 m (6 ft) underground on the hillsides to 170 m (560 ft) deep just east of the boundary of the facility exclusion area.

LOCATION OF WESTERN NEW YORK NUCLEAR SERVICE CENTER

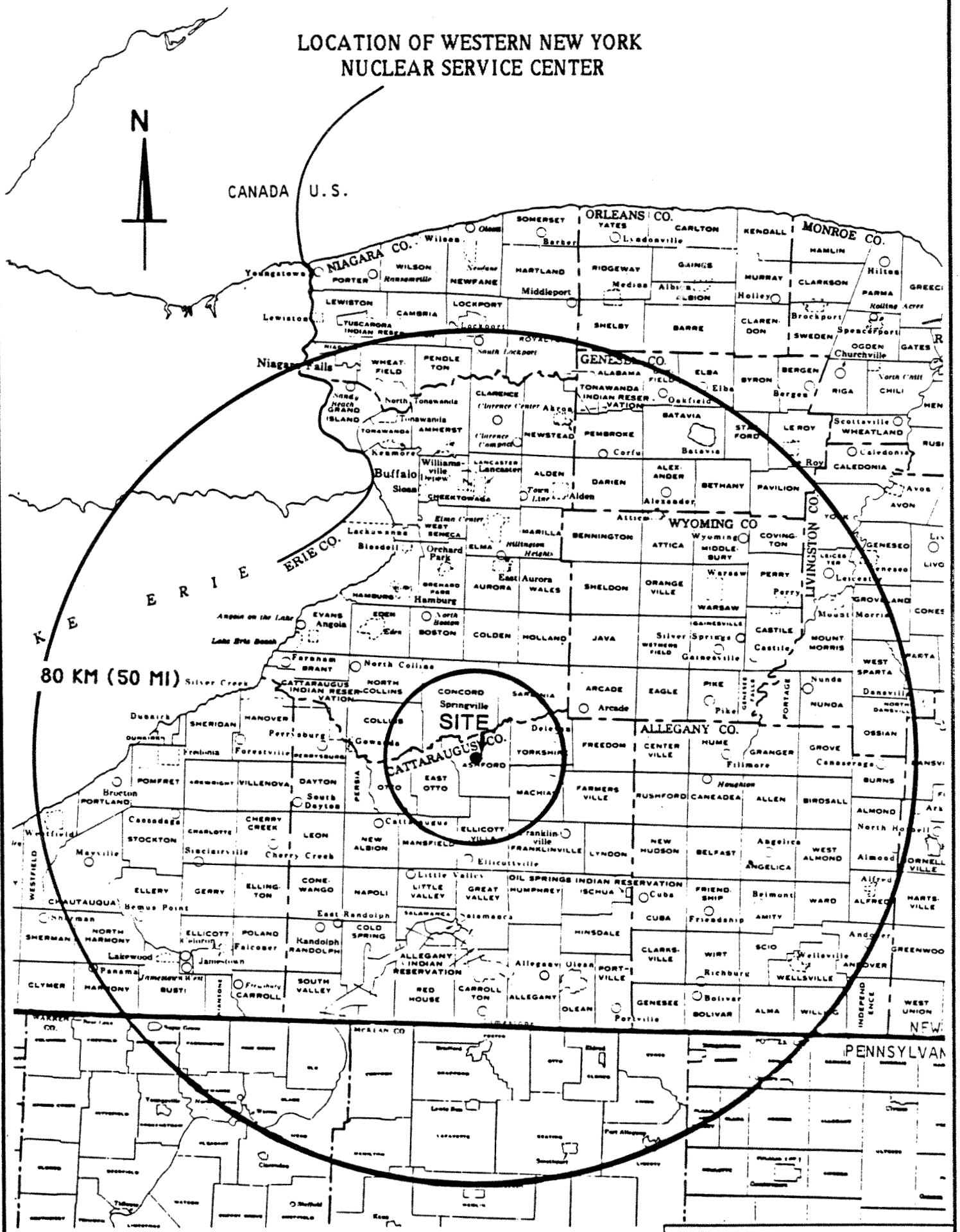

FIGURE 1-1

2.0 SUMMARY

In most environmental media collected from the Project environs, any contributions to the radionuclide concentrations which might have resulted from WVDP activities were too low to be distinguished from radioactivity which occurs naturally or was deposited from global fallout. The accident at Chernobyl (USSR) in April 1986 also added to background radioactivity in environmental media (Roberts, 1986). Radioactivity levels in surface water and in fish directly downstream of the Project are comparable to background concentrations of previous years. The content of radioactivity in venison from a deer collected near the plant (inside the WNYNSC) was comparable to levels in samples from the past several years. Although small amounts of radioactivity were discharged during routine Project activities, radioactivity levels in air and water effluents were well below the concentration guides provided by the DOE orders. A total of 0.0015 curies (0.056 GBq) of particulate radioactivity was discharged to the air, and 0.074 curies (2.7 GBq) of radioactivity, excluding 1.2 curies (44 GBq) of tritium as tritiated water, were released to Buttermilk Creek. The resultant collective and individual dose estimates to the surrounding population from these releases imply negligible consequences with regard to impacts on human health.

The maximum hypothetical effective or whole body dose equivalent an off-site individual at the nearest residence could have received via the air pathway in 1986 from WVDP activities is less than 0.01% of the 40 CFR 61 protection standard of 25 mrem (0.25 mSv) per year. The collective population dose to persons living within 80 km (50 mi) of the site was estimated to be 0.08 person-rem (0.0008 person-sievert). This is equivalent to an average individual dose of 0.00005 millirem (0.0000005 mSv), as compared to approximately 100 millirem (1 mSv) received annually from natural sources.

Concentrations of particulate radioactivity in air measured at the site boundary were statistically no different than those from background samples collected by the Project in 1986 with the exception of Fox Valley for gross alpha activity (see Section 4.3.5). Water from Cattaraugus and Buttermilk Creeks downstream of the site drainage contained three

detectable man-made isotopes (H-3, Sr-90, and Cs-137); however, the average concentrations of radionuclides downstream were not significantly higher than the values in Buttermilk Creek above the site. Buttermilk Creek is not used as a drinking water supply for humans, but the water is accessible to dairy cattle at one location on the creek downstream of the site. Radionuclide concentrations in milk samples from this herd were at or below background levels for all fuel-cycle isotopes.
Thermoluminescent dosimeters placed around the WNYNSC perimeter indicated that direct external radiation exposure was within the range expected from natural background in this region and was statistically the same as background measurements at remote locations.

No significant increase in radioactivity over previous years' levels was observed in groundwater monitoring wells on-site and off-site in nearby shallow wells. Continued surface and groundwater monitoring demonstrated that radioactivity associated with organic material (kerosene/tributyl phosphate) which had migrated to a disposal area monitoring well was confined to that immediate area and did not appear in surface water. Monitoring in 1986 confirmed that both the source of this groundwater contamination and effluents from activities designed to eliminate the source remained within the controlled area, and were not identified in adjacent wells or surface runoff water. Several new monitoring wells were installed to provide additional coverage for present and planned operations which have the potential to affect ground water quality.

Chemical water quality measurements indicated no discharges which would adversely affect the receiving waters. During 1986, several water quality measurements exceeded the SPDES permit limits at the discharge point. These excursions were for relatively innocuous parameters, and were of such limited duration and magnitude that they precluded any discernible environmental impacts. Upgraded waste water treatment facilities are now in place, and new permit conditions have been fully implemented. This has resulted in a marked decline in the number of parameters for which excursions were encountered. The few recurring excursions are being addressed by improved operation methods and minor modifications to the treatment systems.