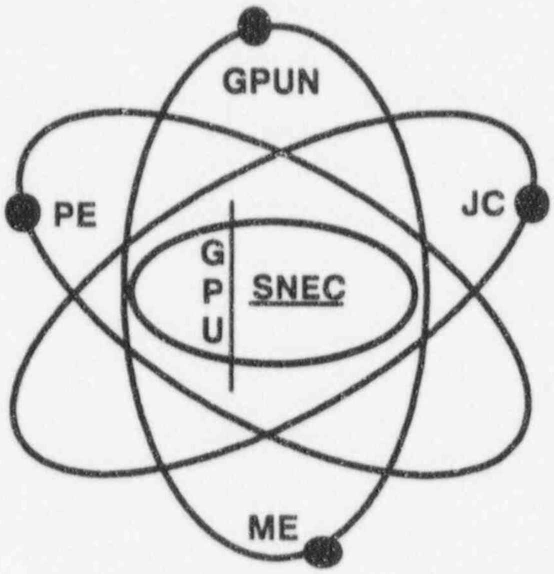
Saxton Nuclear Experimental Corporation facility



Decommissioning Environmental Report Prepared by:

GPU Nuclear

April 1996

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1.0 INTRODUCTION AND SUMMARY

1.1 Introduction

The Saxton Nuclear Experimental Corporation (SNEC) plans to decommission the SNEC facility Containment Vessel (CV), the concrete shield wall located around the northwest and northeast quadrant of the CV, the tunnel sections that are immediately adjacent to the outer circumference of the CV and remaining portions of the septic system, weirs, and associated underground piping in preparation for release of the site for unrestricted use.

The SNEC facility is a deactivated, pressurized water reactor (PWR),that was originally licensed to operate at 23.5 megawatt thermal (23.5 MWT). The SNEC facility is maintained under a Title 10 Code of Federal Regulations Part 50 License and associated Technical Specifications. The license was amended to possess but not operate the reactor in 1972. The license expires on February 11, 2000 or upon expiration of the SNEC corporate charter, whichever occurs first.

The facility was built from 1960 to 1962 and operated from 1962 to 1972 primarily as a research and training reactor. The facility was placed in a condition equivalent to a status later defined by the United States Nuclear Regulatory Commission (NRC) as SAFSTOR after it was shutdown in 1972. Since then, it has been maintained in a monitored condition.

All fuel was removed from the CV in 1972 and shipped to the Atomic Energy Commission (AEC) facility at Savannah River, South Carolina, who remained owner of the fuel. As a result, neither SNEC nor GPU Nuclear Corporation has any responsibility relative to the spent fuel from the SNEC facility. In addition, the control rod blades and the superheated steam test loop were shipped offsite. Following fuel removal, equipment, tanks, and piping located outside the CV were removed. The buildings and structures that supported reactor operations were partially decontaminated in 1972 through 1974 (Reference 1).

Radiological decontamination of reactor support structures/buildings was performed in 1987, 1988, and 1989, in preparation for demolition of these structures (Reference 2). This included the decontamination of the Control and Auxiliary Building, the Radioactive Waste Disposal Facility, Yard Pipe Tunnel, and the Filled Drum Storage Bunker, and the removal of the Refueling Water Storage Tank. Upon acceptance of the final release survey by the NRC (Reference 3), these buildings were demolished in 1992.

In November 1994, the Soil Remediation Project was completed. This was a comprehensive project of soil monitoring, sampling, excavation, packaging and shipment of radiologically contaminated site soil. This program successfully reduced radiological contamination levels below the NRC current and presently proposed levels required to meet site cleanup criteria for unrestricted use (Reference 4).

1.2 Purpose

The purpose of this Environmental Report (ER) is to present an evaluation of the actual or potential environmental impacts resulting from the decommissioning of the facility, including decontamination, dismantlement, and site restoration activities. The potential environmental effects of the construction and operation of the SNEC facility were reported in the "Final Safeguards Report" (Reference 5).

This Environmental Report is submitted in accordance with the requirements of 10CFR51.53 (b) to address the post operating license stage of the facility. As required by 10CFR51.53 (b), this ER addresses new information and significant environmental change associated with the proposed decommissioning activities.

The NRC prepared a generic environmental impact statement (GEIS), NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities" (Reference 6), to assess the environmental effects associated with decommissioning alternatives for various types of nuclear facilities. This evaluation led to the following conclusions:

1) The technology for decommissioning nuclear facilities is well in hand and while technical improvements in decommissioning techniques are to be expected, decommissioning at the present time can be performed safely and at reasonable cost. Radiation dose to the public due to decommissioning activities should be very small and be primarily due to transportation of decommissioning waste to waste burial facilities. Radiation dose to decommissioning workers should be a small fraction of their exposure experienced over the operating lifetime of the facility and be well within the occupational exposure limits imposed by regulatory requirements. Decommissioning costs are reasonable and are, at least for the larger facilities such as reactors, a small fraction of the present worth commissioning costs (i.e., less than 10%).

2) Decommissioning of nuclear facilities is not an imminent health and safety problem. However, planning for decommissioning as an integral activity prior to commissioning as well as during facility life is a critical item that can have an impact on health and safety as well as cost. Essential to such planning activity is reasonable assurance that funds will be available for performing required decommissioning activities at the cessation of facility operations.

3) Decommissioning of a nuclear facility generally has a positive environmental impact. At the end of the facility life, termination of a nuclear license is the goal. Termination requires decontamination of the facility so that the level of any residual radioactivity remaining in the facility or on the site is low enough to allow unrestricted use of the facility and site. Commitment of resources, compared to operational aspects, is generally small. The major environmental impact of decommissioning is the commitment of small amounts of land for waste burial in exchange for reuse of the facility and site for other purposes. Since in many instances, such as at a reactor facility, the land is a valuable resource, return of this land to the commercial or public sector is highly desirable.

Where applicable, the SNEC facility information is compared to the generic assessments of NUREG-0586.

1.3 Regulatory Basis

Decommissioning of nuclear power plants is a regulated process whereby the radioactive materials contained in structures, systems, components, and portions of the site are reduced to residual levels, and the 10CFR50 license is terminated by the NRC. The termination of the Part 50 license requires NRC approval as specified in 10CFR50.82. Pursuant to 10CFR50.82, GPU Nuclear Corporation has prepared a SNEC facility Decommissioning Plan (Reference 8). This Environmental Report supports the SNEC facility Decommissioning Plan submittal.

Decommissioning activities will be accomplished in accordance with all applicable regulations. Radiation exposures to both plant personnel and the public will be controlled and monitored in accordance with 10CFR20. The shipment and disposal of all radioactive materials will be accomplished in accordance with 10CFR61, 10CFR71, and the appropriate parts of 49CFR. A quality assurance program will be implemented to assure decommissioning activities are conducted in a safe and controlled manner.

This ER has been prepared in accordance with the requirements outlined in 10CFR51.45, 10CFR51.52, and 10CFR51.53(b). The report is also intended to assist the NRC in meeting the National Environmental Policy Act (NEPA) requirements of Title 10 CFR Part 51.

Additionally, those federal, state, and local regulations that are required for safety and environmental purposes, are also identified.

1.4 Decommissioning Alternatives

The decommissioning alternatives described in NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities" are: NO ACTION, DECON (immediate dismantlement), and SAFSTOR (long term storage followed by dismantlement).

The SNEC facility was placed in a condition equivalent to a status later defined by the NRC as SAFSTOR when it was shutdown in 1972. Since then, it has been maintained in a monitored condition and the plant structures, external to the containment vessel, have been dismantled. The present NRC possession-only license for the facility expires on February 11, 2000. In recognition of this, SNEC has evaluated several options for decommissioning of the facility in light of current facility conditions and factors external to the facility.

Since the facility has been maintained in a condition equivalent to SAFSTOR for more than 20 years, radioactivity levels at the facility have decayed naturally, thereby reducing occupational radiation exposure during future decontamination activities.

The two decommissioning alternatives that have been evaluated are: SAFSTOR with dismantlement deferred an additional 30 years; and DECON - Immediate Dismantlement and Site Restoration.

The NO ACTION alternative, as described in NUREG-0586, implies that a licensee would abandon or leave a facility as is. This is not a viable decommissioning alternative and, therefore, is not considered.

As described in Section 4.2, the most appropriate alternative for the facility is Immediate Dismantlement and Site Restoration for the following reasons:

- It can be accomplished at this time with no significant impact to the health and safety of the workers, public, and the environment.
- Radioactive materials are removed from the site which is located in a 100 year flood plain and transported to a facility designed for long term disposal, thereby reducing overall environmental risk.

- Twenty years of radioactive decay have already reduced radiation exposure rates. The majority of personnel exposure savings to be gained from deferring dismantlement has already been achieved.
- A high groundwater condition could lead to loss of containment which could either cause an unmonitored release path or groundwater flooding of the lower elevations of the containment vessel.
- Degradation of containment vessel systems and structural components (e.g., polar crane and related equipment) which are needed to support dismantlement activities could start to occur.
- The skills of the people who worked on the SNEC facility and the TMI-2 Post-Defueling Monitored Storage (PDMS) projects have skills and knowledge directly applicable to the remaining work and are currently available.
- A low level radwaste disposal facility is available now. Its future availability and costs are uncertain.
- It eliminates the ongoing maintenance expense.

1.5 Final Release Criteria

GPU Nuclear Corporation plans to meet the proposed site release criteria of 10CFR20 for release of the site for unrestricted use. The dose to an average member of the critical public will not exceed 15 millirem in any year for the following 1000 years due to any residual radioactive material of plant origin.

1.6 Summary And Conclusions

This Environmental Report demonstrates that the decommissioning of the SNEC facility will not result in any significant impact to the health and safety of the workers and public or to the environment. Removal of radioactive materials from the site and placement in a facility designed for long term disposal along with restoration of the site will result in a positive benefit to the environment.

The following is projected for the decommissioning of the facility:

- Decommissioning activities will be conducted within the bounds evaluated by the GEIS (NUREG-0586).
- Occupational radiation exposures are now lower following the 20 years of radioactive decay and within the bounds evaluated by the GEIS (NUREG-0586).
- Exposure to onsite workers and the offsite public as a result of waste transportation are expected to be maintained well below the levels projected by the GEIS (NUREG-0586).

- The use of Low-Level Radioactive Waste (LLRW) disposal land will be much less than projected by the GEIS (NUREG-0586).
- Radiological effluents will be monitored and minimized through engineering controls and treatment, and will be much lower than federal regulatory limits. Doses to the public will also be far below limits established by federal regulations.
- Radiological environmental monitoring will be conducted to confirm that effluents are minimal and that controls and treatment are effective.
- Residual radioactivity will be limited such that upon release of the site for unrestricted use following decommissioning, an individual of a critical population group, living on the site, would not be expected to receive a dose greater than 15 millirem per year from all combined environmental exposure pathways.
- Accident analyses demonstrate that no adverse public health and safety or environmental impacts are expected from accidents that might occur during decommissioning operations.
- Ecological impacts (wildlife, plants, etc.) will be minimal.
- The proposed SNEC facility Decommissioning Plan is environmentally sound and will result in the removal of radioactive materials from the site and permit unrestricted access.
- Non-radiological effluents will be permitted and discharged in accordance with the National Pollutant Discharge Elimination System (NPDES).
- The generation of hazardous waste and the potential for hazardous material spills will be minimized.

2.0 SITE AND FACILITY DESCRIPTION

2.1 Location Of The Site

The site of the SNEC facility is located about 100 miles east of Pittsburgh and 90 miles west of Harrisburg, Pennsylvania in the Allegheny Mountains, three fourths of a mile north of the Borough of Saxton in Liberty Township, Bedford County, Pennsylvania . The site is on the north side of Pennsylvania Route 913, 17 miles south of U. S. Route 22, and about 15 miles north of the Breezewood Interchange of the Pennsylvania Turnpike (Figure 2.1-1).

2.2 Description Of SNEC Facility Site

The SNEC facility was built adjacent to the Saxton Steam Electric Generating Station of Pennsylvania Electric Company, a subsidiary of General Public Utilities. This coal fired station operated from 1923 to 1974 and was demolished between 1975 and 1977 (See property map, Figure 2.2-1). The SNEC facility site consists of 1.148 fenced acres of the approximate 150 acres owned by Pennsylvania Electric Company. An additional 9.6 acre area is fenced in around the electrical switchyard and buildings under Pennsylvania Electric Company control. The site as well as a portion of the Pennsylvania Electric Company area and the surrounding uncontrolled lands are in the 100-year floodplain of the Raystown Branch of the Juniata River, which borders the north and west portion of the property. A small stream known as Shoup's Run crosses the central portion of the property and joins the Juniata River. Normal elevation of the River near the facility is about 794 feet mean sea level (MSL), the site and adjacent property lie about 17 feet above river level. Much of the property is comprised of gently sloping open land of grasses that are a result of restoration activities following the demolition of the Saxton Steam Electric Generating Station.

2.3 Facility Description

The only remaining structures of the original facility are the Containment Vessel (CV), the concrete shield wall located around the northwest and northeast quadrants of the CV, tunnel sections that are immediately adjacent to the outer circumference of the CV and portions of the septic system, weirs, and associated underground discharge piping (Figure 2.3-1). Concrete barrier walls have been installed to isolate the open ends of the tunnel that were connected to the Control & Auxiliary Buildings, the Radioactive Waste Disposal Facility, and the Steam Plant. Portions of the Steam Plant Tunnel still exist beyond the location where it is blocked off.

Containment Vessel

The Containment Vessel (CV) (Figure 2.3-1) is a circular steel structure approximately 109 feet tall by 50 feet. in diameter with approximately 50 percent of the structure below grade. The CV is subdivided into a reactor compartment/storage well, primary compartment, auxiliary compartment, and an operating floor. These areas are separated from each other by concrete walls, floors, and ceilings. Additionally the below grade portion of the CV is lined with concrete.

Concrete Shield wall

The concrete shield wall is a small exterior wall built along the northwest and northeast quadrant of the containment vessel. It is slightly radiologically contaminated.

Tunnel

The tunnel section immediately adjacent to the CV originally carried system piping between the CV and other facility buildings. This piping was removed as part of decommissioning activities that occurred following plant shutdown in 1972. The tunnel interior is slightly radiologically contaminated.

Other Plant Structures

Portions of the septic system, weirs, and associated underground piping still exist at the site.

PENNSYLVANIA

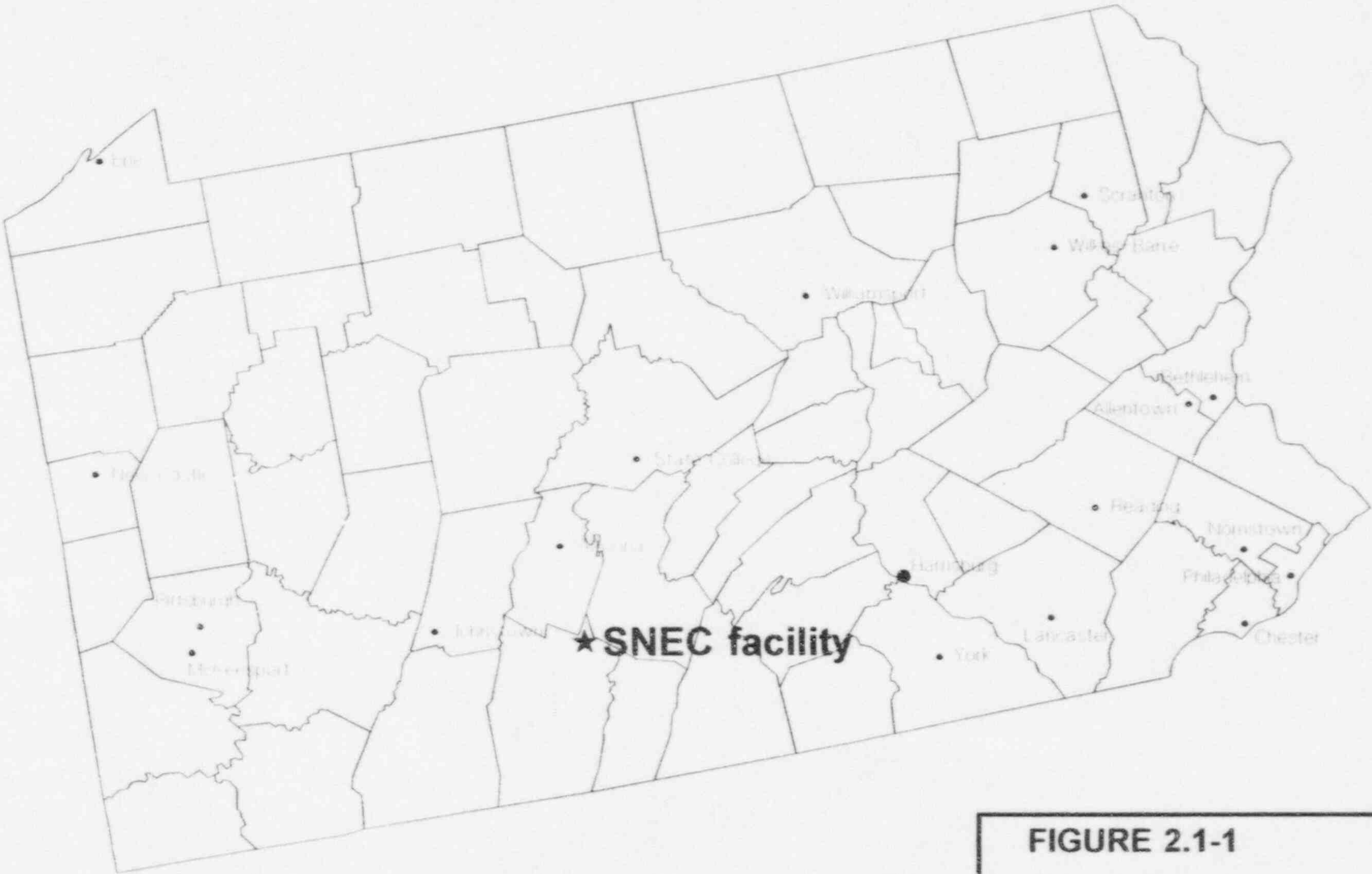
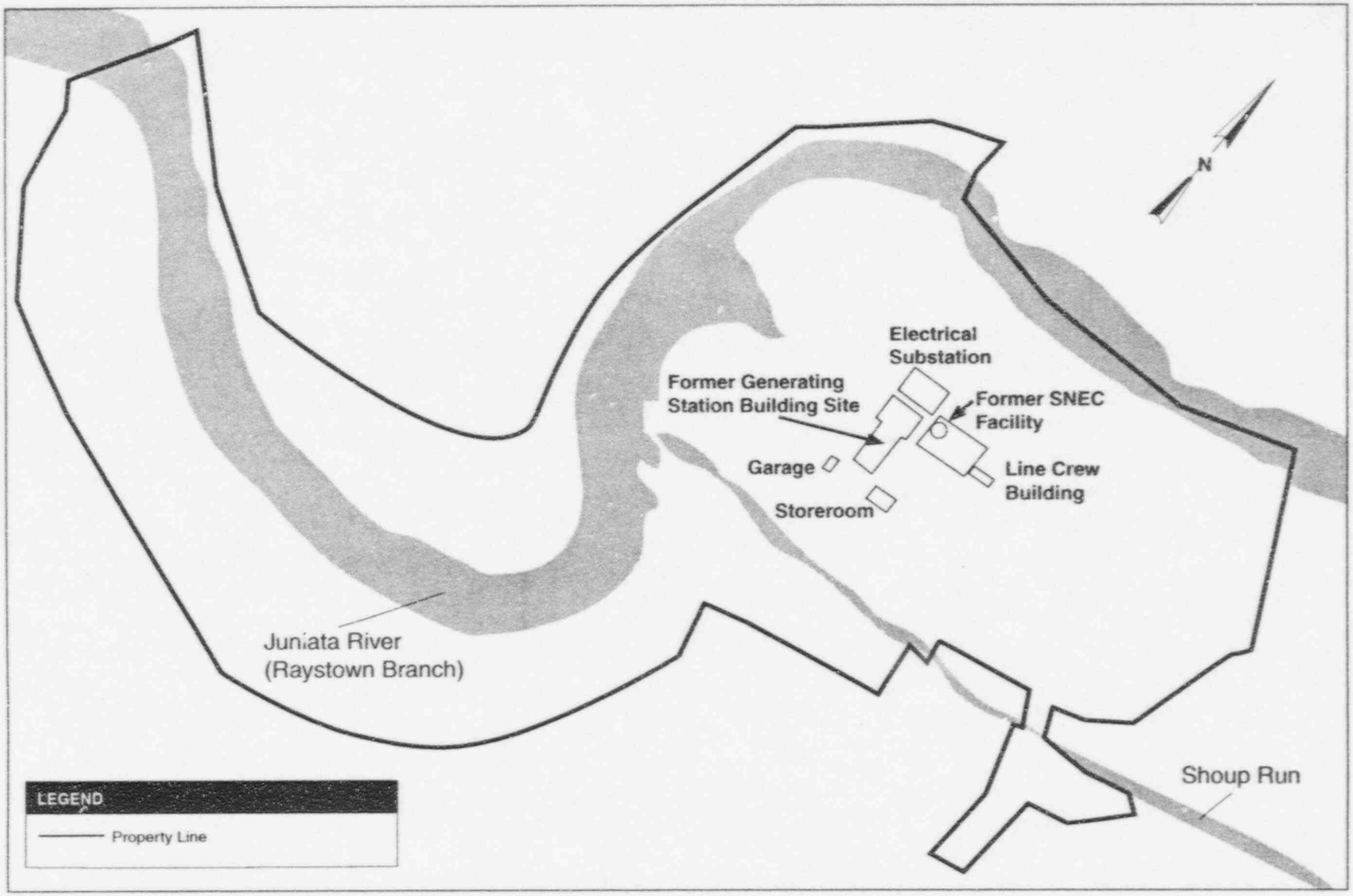


FIGURE 2.1-1

Location of Saxton Nuclear Experimental facility Saxton, Pennsylvania



-550 -275 0 275 550

SCALE IN FEET

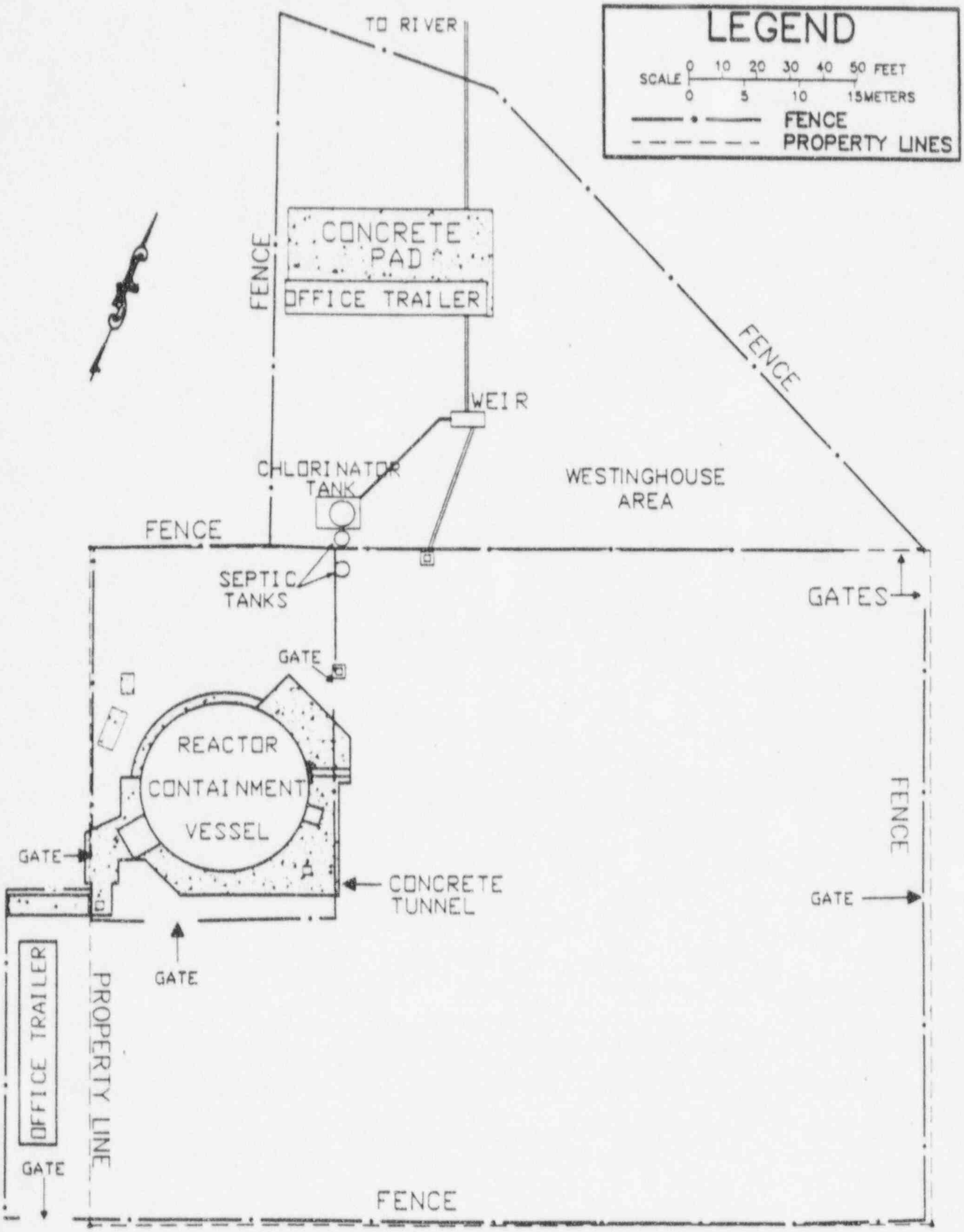
ALL LOCATIONS ARE APPROXIMATE

SCALE: 1" =550 feet

GENERAL PROPERTY LAYOUT

Figure 2.2-1

SAXTON SITE LAYOUT



3.0 PLANT ENVIRONMENTAL INTERFACES

3.1 Demography - Human Activities In The Environs

The area surrounding the site is generally rural, forested and mountainous terrain. The population density of the area is low with small concentrations in the valleys and along main highways. The site lies about three-fourths of a mile north of the Borough of Saxton in Liberty Township, Bedford County, Pennsylvania. The population and population trends for the Borough of Saxton, Bedford County and the adjacent counties of Blair and Huntingdon are shown in Table 3.1-1. The population of these three surrounding counties has decreased between 1980 and 1990. At the time the SNEC facility was constructed, the estimated population of the Borough of Saxton was 975, as recorded during the 1960 census. Thirty years later the population as recorded during the 1990 census was 838, a decline of 16.3%.

The nearest population center (as defined by 10CFR100) of 25,000 or more is the city of Altoona which lies about 20 miles north-northwest of the SNEC facility site. The 1990 population of Altoona was 51,881. The closest incorporated towns other than the Borough of Saxton are Coalmont Borough about 2.5 miles to the east, Dudley Borough about 3.4 miles to the east and Broad Top about 5.3 miles also to the east.

Current uses of adjoining properties include undeveloped wooded and residential areas. A cemetery is present along the eastern property boundary, undeveloped wooded and residential areas along the northern, southern, and western property boundaries.

The Raystown Branch of the Juniata River in the vicinity of the site is widely used for recreation by local residences primarily for boating and fishing. However the vast majority of recreational activities along the river are centered downstream of the site on Raystown Lake.

Approximately 34 miles downstream from the site the Raystown Branch of the Juniata River is dammed impounding the river to form Raystown Lake. The dam was built by the US Army Corps of Engineers (COE) from 1968 to 1973 for flood control, recreation, and water quality purposes. At normal pool level the lake is 27 miles long and has an area of 8,300 acres. The lake provides one of the better recreational areas in this part of Pennsylvania. The lake has been intensively developed by the Federal Government for recreational activities including boating, fishing, camping, hunting, and picnicking. Over 475,000 visitors annually make use of the many recreational activities offered.

3.2 Geology

The site lies in the Appalachian highlands in the Ridge and Valley physiographic province. This province comprises alternate successions of narrow ridges and broad or narrow valleys trending generally northeast. This is a region of alternating hard and soft sedimentary rocks that have been severely folded by lateral compression into a series of anticlines and synclines. The ridge is of Tuscarora quartzite and small amounts of Pleistocene gravel and recent alluvium are found along the river. Most of the area is underlain by strata of Upper Devonian age. A generalized geologic cross section of the region is shown in Figure 3.2-1. This geologic cross section is drawn at a northwest - southeast orientation and shows that the SNEC facility is located on the limb of a major syncline that dips generally towards the east (Reference 7). Although coal is mined in the general area of the site, no coal has been reported to lie beneath the site, nor has the site been undermined. The ridges immediately to the northwest of the site rise to 1,300 feet and to the southeast rise to 1,500 feet with site elevation being about 811 feet MSL. (Figure 3.2-2).

Soil Description

Split-spoon samples collected during an extensive hydrogeological investigation (Reference 7) and samples from hand-dug pits indicate that the surficial soil, in the vicinity of the CV, is comprised of two types of construction backfill: (1) well graded reddish silty fine to coarse sand with some fine to medium gravel and (2) a well graded mixture of ash and cinders. Both of these fill materials were placed during station construction. The depth of the fill generally ranges from three to six feet, although the fill may be deeper at locations where building construction excavation took place.

Underlying the fill materials is a boulder layer. This layer is generally four to six feet thick and separates the fill material from the top of the bedrock. The material making up the boulder matrix is a silty clay. The silt and clay were found to be localized in the boulder layer and did not appear to be present in the fractured bedrock below that zone (Reference 7).

Bedrock Geology

The bedrock underlying the facility has been identified as "marine beds" of upper Devonian age per the Pennsylvania Geological Survey (PaGS). The PaGS assigned this bedrock as the "Foreknobs Formation" but this unit has also been called a lower member of the "Catskill Formation". The bedrock is composed of interlayered red and green siltstone and sandstone (also identified as gray to olive brown shales, graywackes and sandstones). Depth to bedrock at the site is generally about 8 to 12 feet below the surface (Reference 9).

During the 1981 hydrogeologic investigation (Reference 7) many bedrock outcrops were examined throughout the region. These outcrops substantiate the premise that the plant site is located on the western limb of a major syncline which strikes (is aligned) generally N 25E - 42E E and dips (tilts) approximately 15E - 45E E. Some minor internal folding is present within various bedding members though the overall dip of the major structure is to the east. The bedrock orientations along with various fracture patterns of these Devonian rocks are important in understanding the groundwater flow directions in the bedrock as discussed in the following section.

3.3 Hydrology

Surface Water

The primary water body in the vicinity of the facility is the Raystown Branch of the Juniata River, which meanders along its water course in an overall flow direction to the northeast and generally borders the northern and western edges of the property. Approximately 34 miles downstream from the site the Raystown Branch of the Juniata River is dammed impounding the river to form Raystown Lake. The dam was built by the COE from 1968 to 1973 for flood control, recreation, and water quality purposes. At normal pool level the lake is 27 miles long and has an area of 8,300 acres. Normal elevation of the river near the site is about 794 feet MSL in comparison to the site which lies at about 811 feet MSL. A small stream known as Shoup's Run flows west and transects the Company property to the south of the SNEC facility and empties into the Raystown Branch of the Juniata River. The watershed extending upstream from Saxton, Pennsylvania is about 756 square miles.

Because the vicinity of the site contains old field and forest vegetation and very little impervious cover, precipitation falling on the SNEC facility generally will percolate into the local soils and become incorporated into the groundwater regime as opposed to direct overland flow into the adjacent streams. Significant precipitation will cause minor intermittent ponding in the immediate site area, further demonstrating that surface runoff from the site is minimal. Therefore, an understanding of groundwater hydrology at the SNEC facility is of primary importance. Extensive groundwater monitoring in the site vicinity has been undertaken to ensure that groundwater degradation is not occurring.

A detailed description of the hydrology of the major surface water bodies in the vicinity of the site is provided in the SNEC Final Safeguards Repcrt (Reference 5).

Groundwater

Underlying the site are three distinct subsurface zones that have different water-bearing and transmitting properties. As previously mentioned in Section 3.2 ("Geology"), the site is immediately underlain by a fill layer comprised of flyash, cinders and/or silt and sand-size sediment. This fill layer is underlain by a layer of boulders in a silty clay matrix. Bedrock lies beneath this boulder layer. Field permeability tests were conducted in selected bore holes and laboratory mechanical analyses were performed on construction fill material to obtain a relative indication of the ability of the various subsurface zones to transport water (Reference 7).

The red silty sand fill material was well-graded, containing about 45% passing a #200 sieve. The well graded nature of the fill suggests a very low permeability, probably ranging between 1E-6 cm/sec to 1E-8 cm/sec. The ash fill material, however, is believed to have substantially greater permeability than the red silty sand fill. Actual permeability values for the ash fill are unavailable since the friable particles may have been altered by the mechanical analysis technique.

In general, the construction fill and boulder layers were less permeable than the bedrock. Tests indicated that the boulder layer acted as a barrier or confining layer to the flow of groundwater between the construction fill and the bedrock. Essentially isolating the shallow groundwater from the deeper, bedrock groundwater. The permeability of the bedrock varied with depth. Results indicated rock permeability ranging from moderate values (about 1.06E-3 cm/sec), to negligible values (no flow recorded in the test sections). The highest permeability was at the boulder layer-bedrock interface. This probably was a function of the weathered, fractured nature of the top of the bedrock. Other zones of comparatively high permeability may be present in the bedrock based on test borings.

Groundwater was measured at depths of about three to five feet below the surface in the immediate site vicinity. Groundwater level observations in test borings also indicate a groundwater gradient of 10 to 15 feet over a distance of 600 to 800 feet from the site to the river. An additional hydrogeological investigation was conducted in 1992 to determine the actual groundwater flow direction in the shallow aquifer of the SNEC facility (Reference 10). Eight overburden (shallow) groundwater monitoring wells were installed for this purpose. Groundwater elevation contour maps indicating the groundwater flow direction can be seen on Figures 3.3-1 and 3.3-2. The contour maps indicate that groundwater within the overburden soil flows west, towards the Raystown Branch of the Juniata River. Additional information was gathered during the 1992 investigation for installing deeper, bedrock monitoring wells for reliably monitoring the CV with a minimal number of wells. The CV is seated approximately 50 feet into the bedrock which warrants special attention to these types of deeper, bedrock monitoring wells.

Groundwater movement within the bedrock beneath the site is predominantly controlled by fractures in the bedrock. Groundwater also moves within the spaces (bedding planes) between the individual rock layers of the bedrock. The direction of groundwater is controlled by the orientation of these fractures and bedding planes.

The 1992 hydrogeologic investigation revealed specific orientations of the two dominant fracture patterns and of the bedding planes. One fracture pattern trended northeast-southwest, and dipped (tilted) moderately to the northwest. The second fracture pattern trended northwest-southeast, and dipped steeply toward the southwest. The bedding planes trended northeast-southwest, and dipped moderately toward the southeast. This information was essential for the proper placement of bedrock monitoring wells which are discussed in Section 7.5 ("Environmental Radiological Surveillance Program").

3.4 Meteorology

Applicable references for this section are contained in references 12, 13, and 14.

Regional Climate

The climate of the south-central Pennsylvania region can best be described as a region of contrast. During the late spring, summer and early fall, the region is dominated by air masses that originate from the southeastern United States. Warm and humid conditions are normal during this time along with air mass thunderstorms and precipitation associated with cold fronts. These frontal boundaries are more active (weather-wise) during the spring and autumn, when the polar jet stream is over the region. The winter season is cold and often times overcast. Air masses are generally cold and dry. Winds associated with these air masses are generally from the west-northwest. They originate from central Canada and move into the region behind active cold fronts and low pressure systems that move north along the Atlantic seaboard. The region will experience a large percentage of cloud cover, in part, due to its close proximity to the Great Lakes. As the cold, polar air passes over the relatively warm lakes, condensation occurs along with lake-effect snows close to the shore of these large bodies of water. Drying will occur as the distance increases from the lakes and a constant cloud cover will dominate in western Pennsylvania. In addition, in this region of steep-sided valleys, mountain winds during the day will lead to an increase in clouds as daytime heating will cause rising air motions and subsequent condensation (clouds).

Precipitation in the region is mainly due to air mass thunderstorms, cold front passages from the west and low pressure storms that move along the Appalachian Mountains through the St. Lawrence Valley region.

These storms will generally produce copious amounts of rain from a northeast direction. Annual amounts can range from 30 - 40 inches. One-quarter of the winter precipitation is snowfall. The major fall and winter coastal storms that produce large amounts of precipitation in the eastern half of the state have minimal effect on the site.

Winds in the Saxton region are influenced by topographic features. The facility lies in the main valley formed by the Terrace and Saxton Mountains to the east, and Tussey Mountain to the west. The Allegrippis Ridge is also located to the west. The mountains and valley are generally southwest to northeast. With the large scale wind flow out of the west, "wind channeling" occurs at the lower levels which give rise to a small-scale southwesterly flow up the valley. On a smaller scale, the varying topographic regime will cause valley-slope circulation patterns. During the daytime, beginning in mid-morning and continuing until near sunset, the wind will cross the valley and blow up the sides of the mountain as daytime heating near the surface creates unstable, rising air and, as previously mentioned, an increase in clouds. Beginning around midnight and continuing until shortly after sunrise, the wind tends to blow down the mountain slope as the land surface along the slopes cools more rapidly than at the base of the valley. This cooler, more dense, stable air will sink towards the valley and move down the canyon. Wind speeds are generally light at the SNEC facility site (below ten miles per hour), primarily due to the wider valley around the site.

Past Meteorological Facility Operations

An onsite meteorological program at the SNEC facility site was instituted in 1960 and operated for one year. Data from the program were used to establish estimates of dispersion and diffusion characteristics of the site. The network contained three towers located east, west and north of the site. Instrumentation at each location included wind speed, wind direction and ambient temperature. Temperature probes were mounted at different vertical levels to try and obtain a better understanding and determination of the inversion stable layer that develops with valley flow at night. Other readings from the site such as barometric pressure, river water temperature, relative humidity and rainfall were available.

Meteorological Dispersion Assessment

Due to the steep mountain slopes in the Saxton region, direct heating, which leads to unstable meteorological conditions and strong mixing (dispersion), are minimal. In fact, conditions of strong mixing occur only 3 percent of the time. Air dispersion in the region is either neutral or stable. The former condition is synonymous with a cloud cover or moderate wind while the latter condition is characteristic of cold air "pooling" due to mountain winds at night.

Under neutral conditions in which mixing throughout the layer occurs, the ultimate dispersion is in a direction determined by the wind direction in the main valley. As previously mentioned, the two wind directions are southerly, along the mountain-valley range and westerly, blowing up out of the valley through the gap between Terrace and Saxton Mountains to the east. These winds range between 5-10 miles per hour.

Under stable conditions, the stratification of air isolates the valley flow from the large-scale wind flow of the main valley. Cold air "pooling" in the valley will cause a temperature inversion to develop. This inversion will tend to "trap" dispersion within a well-mixed region in the first several hundred feet. Fifty percent of the time, these stable conditions exist. Of this, approximately 25 percent are extreme in that pollutant "trapping" or fumigation in the lower levels will occur. Wind speeds will be 3-5 miles per hour with flow generally down the valley away from the Saxton region. Since daytime heating takes place in the region, prolonged periods of pollutant "trapping" do not exist.

Since the release from the SNEC facility is considered "ground" in nature, highest radioactive dispersion values will be close to the site boundary and in the direction of the prevailing wind flow. It can be expected that the major portion of the particulate matter originating at the site will be deposited in the valley north-northeast of the site. These areas are sparsely occupied and almost completely covered by forests. It should be noted that an elevated release, by definition, is a release that is 2-2.5 times the height of the nearest adjacent building structure.

Wet deposition of radioactive particulate matter will occur during periods of precipitation. Since most major precipitation events occur from a northeast direction, radioactive material would be deposited towards the south and southwest directions. In addition, with a ground release, this washout will occur close to the source and within the plant's property line.

3.5 Other Environmental Features

Historical

The SNEC facility site and adjoining Pennsylvania Electric Company property do not contain any known historical or archaeological areas. The project site has been previously disturbed by the construction of the SNEC facility.

Endangered Species

There are no known endangered or threatened plant or animal species on the SNEC facility site or adjacent Pennsylvania Electric site.

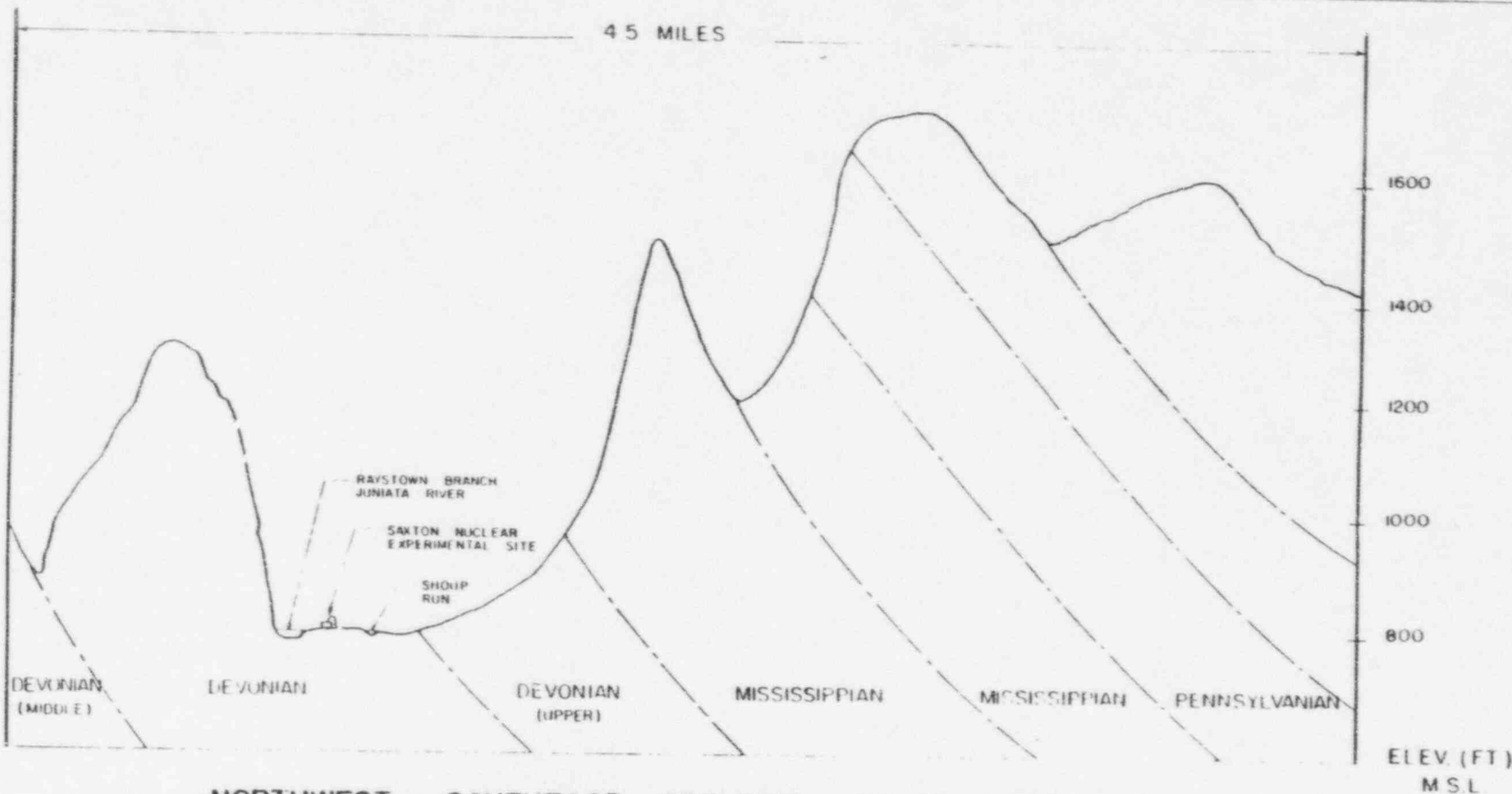
Table 3.1-1

Population and Population Trends for the Borough of Saxton, Bedford and Adjacent counties

Saxton Borough

Year	Population
1960	975
1980	814
1990	838
1994 (est.)	837

Year	Bedford County	Blair County	Huntingdon County
1980	46,784	136,621	42,253
1990	47,919	130,542	44,168
1994 (est)	48,984	131,819	44,529



NORTHWEST – SOUTHEAST GEOLOGIC CROSS SECTION*

(VIEW LOOKING NORTHEAST)

SAXTON NUCLEAR EXPERIMENTAL STATION & VICINITY

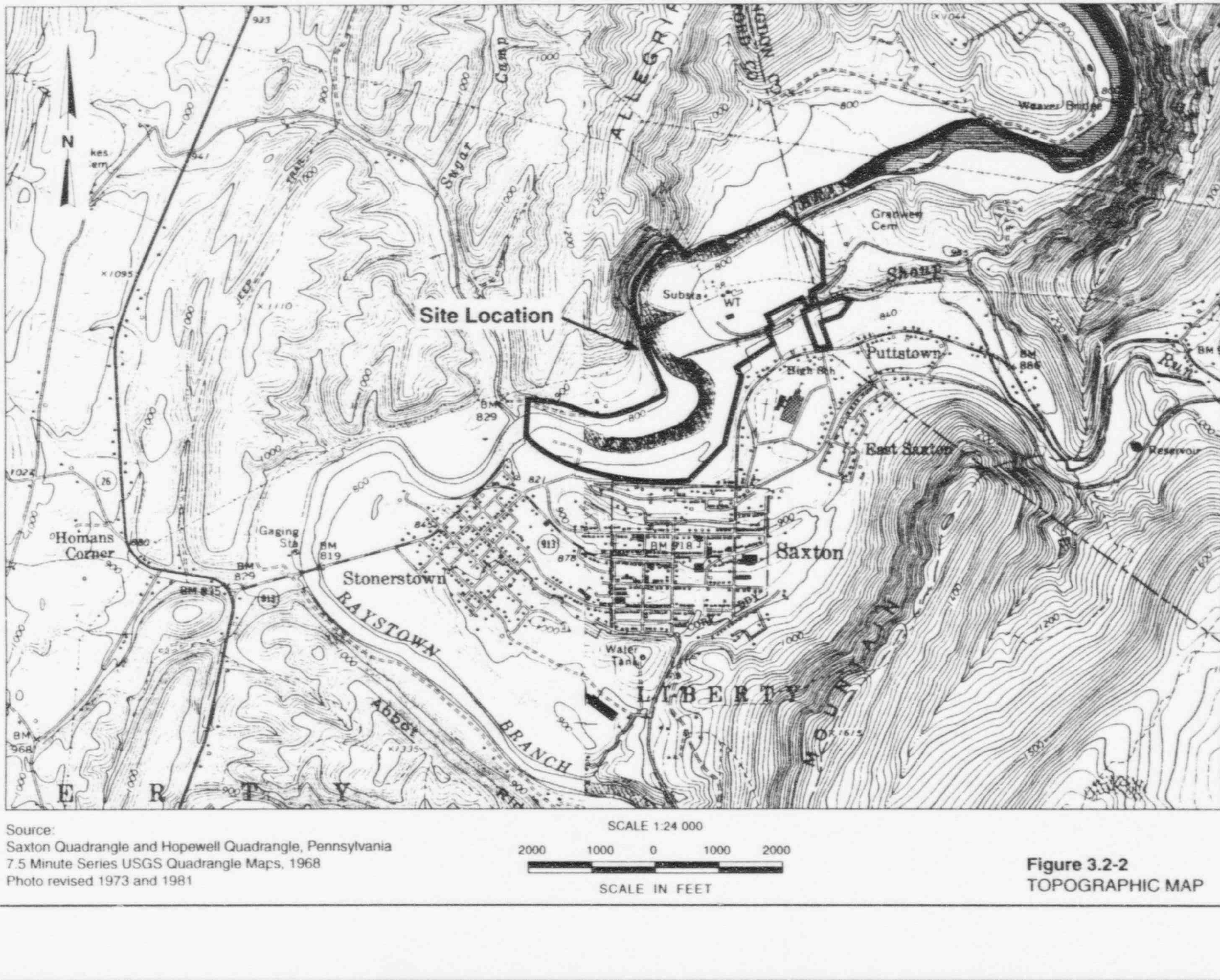
VERTICAL SCALE = 10 x HORIZONTAL SCALE

* INTERPRETED CROSS-SECTION FROM GEOLOGIC MAP OF PENNSYLVANIA – COMPILED BY PENNSYLVANIA GEOLOGICAL SURVEY (4th SERIES)

GROUNDWATER TECHNOLOGY, INC

G/WT FILE NO 81513

Figure 3.2-1



Source:
Saxton Quadrangle and Hopewell Quadrangle, Pennsylvania
7.5 Minute Series USGS Quadrangle Maps, 1968
Photo revised 1973 and 1981

SCALE 1:24 000

2000 1000 0 1000 2000

SCALE IN FEET

Figure 3.2-2
TOPOGRAPHIC MAP

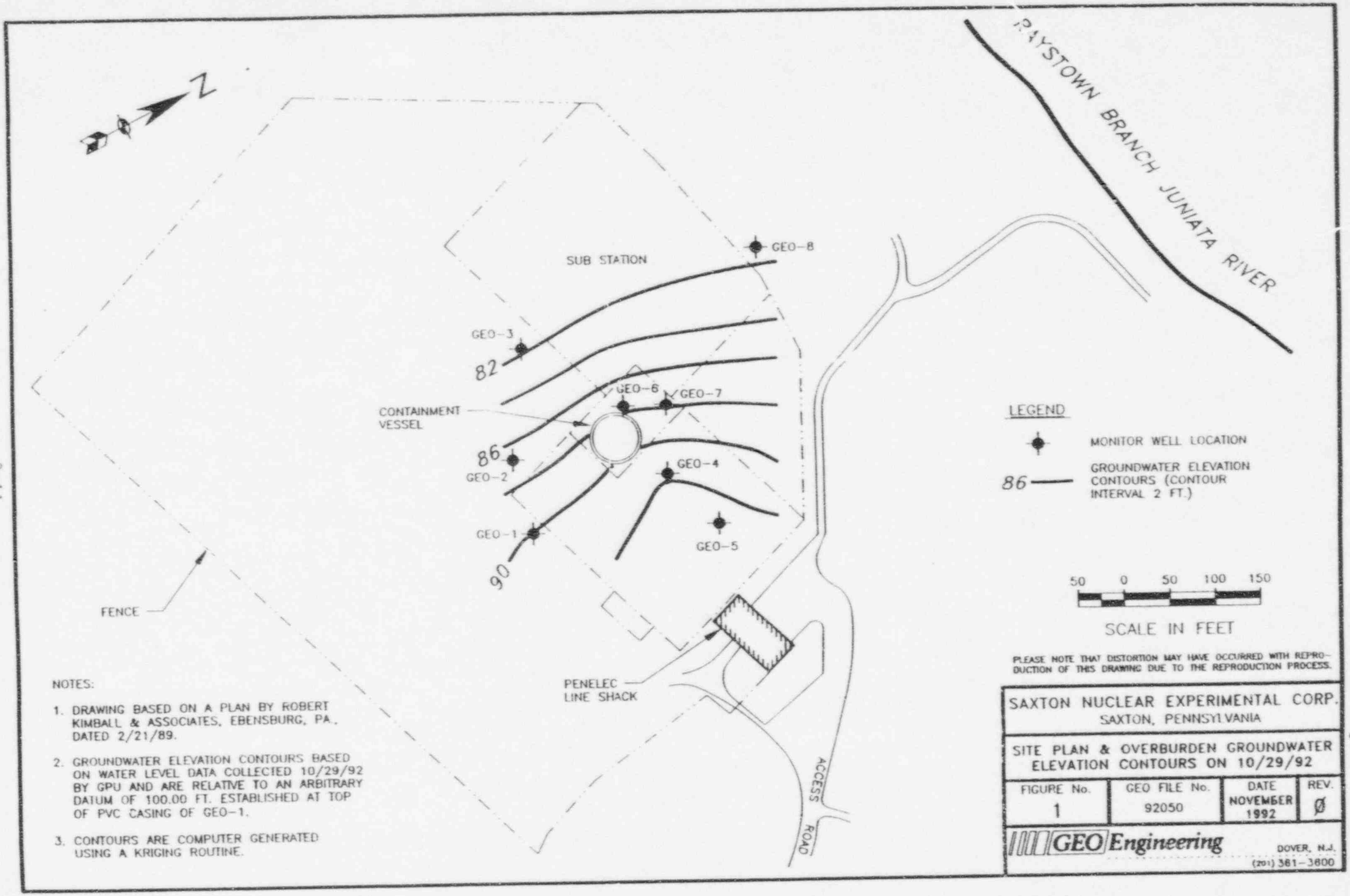
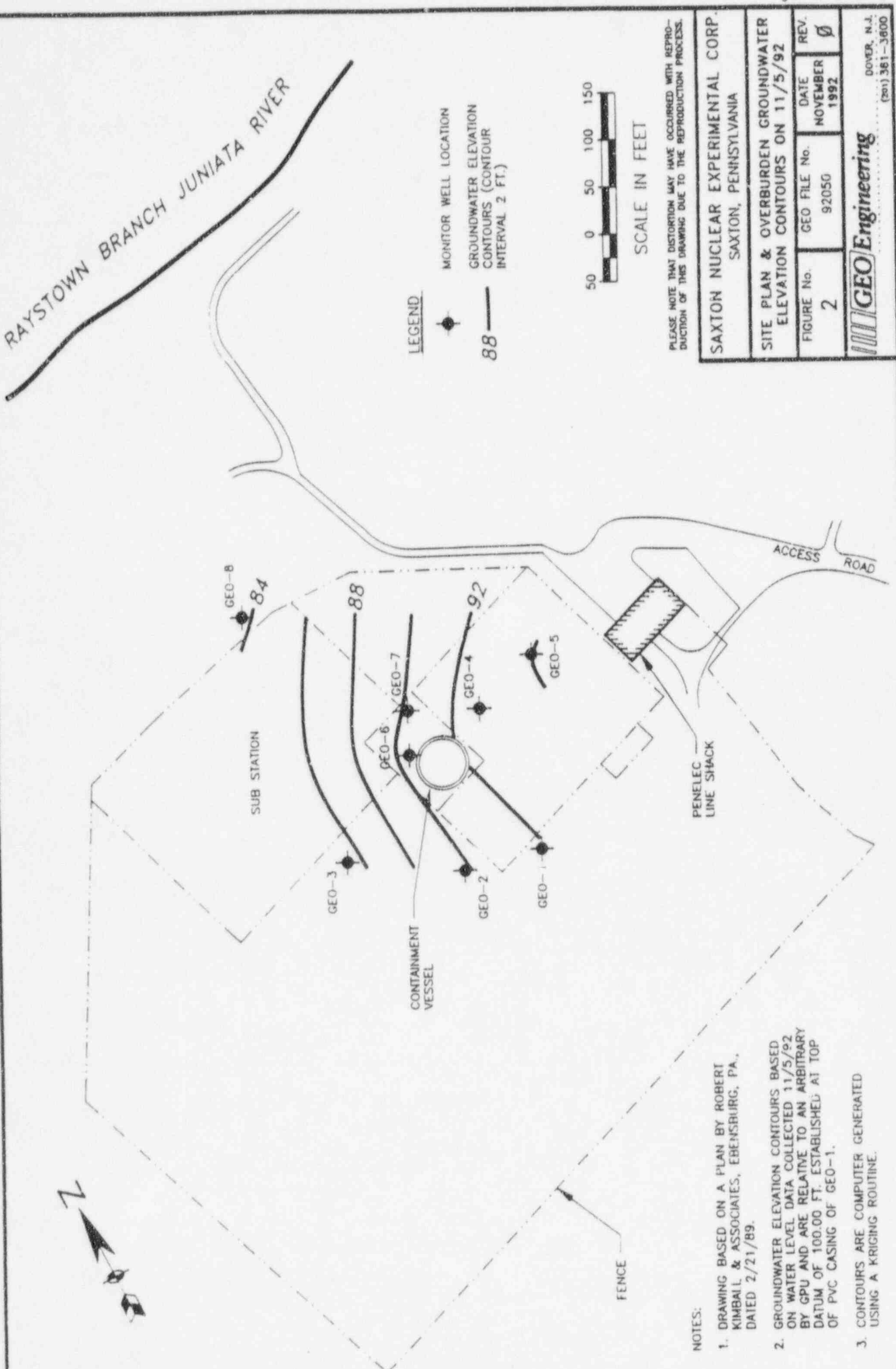

N
RAYSTOWN BRANCH JUNIATA RIVER
SUB STATION
GEO-8
GEO-3
82
GEO-6
GEO-7
CONTAINMENT VESSEL
86
GEO-2
GEO-4
GEO-1
GEO-5
90
FENCE
PENELEC LINE SHACK
ACCESS ROAD
LEGEND
MONITOR WELL LOCATION
86 GROUNDWATER ELEVATION CONTOURS (CONTOUR INTERVAL 2 FT.)
50 0 50 100 150
SCALE IN FEET
PLEASE NOTE THAT DISTORTION MAY HAVE OCCURRED WITH REPRODUCTION OF THIS DRAWING DUE TO THE REPRODUCTION PROCESS.
NOTES:
1. DRAWING BASED ON A PLAN BY ROBERT KIMBALL & ASSOCIATES, EBENSBURG, PA., DATED 2/21/89.
2. GROUNDWATER ELEVATION CONTOURS BASED ON WATER LEVEL DATA COLLECTED 10/29/92 BY GPU AND ARE RELATIVE TO AN ARBITRARY DATUM OF 100.00 FT. ESTABLISHED AT TOP OF PVC CASING OF GEO-1.
3. CONTOURS ARE COMPUTER GENERATED USING A KRIGING ROUTINE.
SAXTON NUCLEAR EXPERIMENTAL CORP.
SAXTON, PENNSYLVANIA
SITE PLAN & OVERBURDEN GROUNDWATER ELEVATION CONTOURS ON 10/29/92
FIGURE No. 1
GEO FILE No. 92050
DATE NOVEMBER 1992
REV. Ø
GEO Engineering
DOVER, N.J.
(201) 361-3600

Figure 3.3-1

Figure 3.3-2



RAYSTOWN BRANCH JUNIATA RIVER
LEGEND
MONITOR WELL LOCATION
88 GROUNDWATER ELEVATION CONTOURS (CONTOUR INTERVAL 2 FT.)
50 0 50 100 150
SCALE IN FEET
PLEASE NOTE THAT DISTORTION MAY HAVE OCCURRED WITH REPRODUCTION OF THIS DRAWING DUE TO THE REPRODUCTION PROCESS.
SAXTON NUCLEAR EXPERIMENTAL CORP.
SAXTON, PENNSYLVANIA
SITE PLAN & OVERBURDEN GROUNDWATER ELEVATION CONTOURS ON 11/5/92
FIGURE No. 2
GEO FILE No. 9205G
DATE NOVEMBER 1992
REV. Ø
GEO Engineering
DOVER, N.J. (201) 361-3600
SUB STATION
GEO-1
GEO-2
GEO-3
GEO-4
GEO-5
GEO-6
GEO-7
GEO-8
84
88
92
CONTAINMENT VESSEL
PENELEC LINE SHACK
ACCESS ROAD
FENCE
N
NOTES:
1. DRAWING BASED ON A PLAN BY ROBERT KIMBALL & ASSOCIATES, EBENSBURG, PA., DATED 2/21/89.
2. GROUNDWATER ELEVATION CONTOURS BASED ON WATER LEVEL DATA COLLECTED 11/5/92 BY GPU AND ARE RELATIVE TO AN ARBITRARY DATUM OF 100.00 FT. ESTABLISHED AT TOP OF PVC CASING OF GEO-1.
3. CONTOURS ARE COMPUTER GENERATED USING A KRIGING ROUTINE.

4.0 DECOMMISSIONING ACTIVITIES AND PLANS

4.1 Introduction

This section describes the selection of the decommissioning alternative that is most appropriate for the SNEC facility and the decommissioning activities required to implement it.

4.2 Selection of Decommissioning Alternative

GPU Nuclear Corporation has selected DECON with Immediate Dismantlement as the alternative for decommissioning the facility. The following sections provide a detailed description of the selection of this alternative.

4.2.1 No Action

The NO ACTION alternative, as described in NUREG-0586, implies that a licensee would abandon or leave a facility as is. This is not a viable decommissioning alternative and, therefore, is not considered.

4.2.2 Further Deferral Of Dismantlement

The SNEC facility has been shut down since 1972, therefore, dismantlement has already been deferred for greater than 20 years. The option of deferral of dismantlement for an additional 30 years has been evaluated.

Thirty (30) year additional deferral has the advantage of further radioactive decay thus reducing overall radiation exposure during dismantlement. Table 4.2-1 provides a comparison of radiation exposure for the various alternatives.

In spite of this advantage, deferral for 30 years has several overriding disadvantages. The first is the loss of an experience base currently available. SNEC's parent company, General Public Utilities (GPU), currently employs individuals who worked at the SNEC facility while it operated. Their knowledge of the plant from that era has proven and will continue to be invaluable. In addition, GPU Nuclear Corporation has recently remediated and demolished the reactor support buildings and structures at the facility and placed Three Mile Island Unit 2 in Post-Defueling Monitored Storage (PDMS). The skills of the people who worked on these projects are directly applicable to the remaining work at the SNEC facility and those same people will not be available in 30 years.

In addition, a high groundwater condition could lead to loss of containment which could either cause an unmonitored release path or groundwater flooding of the lower elevations of the containment vessel. As shown on Figure 4.2-1, the reactor vessel and other associated radiologically contaminated systems are located below ground level and groundwater flooding would create an extremely difficult dismantlement scenario, increase the quantity of resulting radwaste, thus increasing the overall cost. Further, since the inside of the steel liner below grade is covered by concrete on the inside, degradation of the liner could go undetected. Additionally, the high moisture content of the atmosphere inside the facility would hasten degradation of containment vessel systems and structural components (e.g., polar crane and related equipment) which will be needed to support dismantlement activities. This would result in making decommissioning activities less safe for workers as the components continue to deteriorate.

There is also the disadvantage of the continuing maintenance requirements including an escalating effort to manage the deterioration of the facility over the next 30 years. It makes no economic sense to spend money to monitor and maintain a facility that will never be used again.

Finally, the cost of the radioactive waste disposal in 30 years is likely to be much greater than the cost of disposal at the presently available facilities. The cost of the radioactive waste disposal has been rising at a much higher rate than that of inflation and therefore, it would be more expensive to wait until later to decommission the facility. Sites for the disposal of low level radioactive waste generated in Pennsylvania are currently available at the Barnwell, South Carolina Waste Management Facility and/or Envirocare of Utah, therefore the waste can be sent directly to burial. Future waste disposal choices are less certain, introducing the possibility of long term radioactive waste storage at the site. This is clearly undesirable due to the location of the site in a flood plain. The facility was never intended to be a long-term radioactive waste storage site.

For these reasons, the 30 year additional deferral of dismantlement was not selected.

4.2.3 <u>Immediate Dismantlement</u>

The major advantages of immediate dismantlement of the SNEC facility are that it most quickly removes components from below ground level, stabilizes the radiological conditions at the site and allows the site to be released for unrestricted use. Immediate dismantlement also allows GPU Nuclear Corporation to make use of GPU's remaining SNEC facility and TMI-2 expertise for planning and implementing dismantlement activities. In addition, sites for the disposal of low level radioactive waste generated in Pennsylvania are currently available at the Barnwell, South Carolina Waste Management Facility and/or Envirocare of Utah under present contracts, therefore the waste can be sent directly to burial, thus further minimizing decommissioning costs.

The major disadvantage to proceeding with immediate dismantlement is that radiation exposure to dismantlement personnel is the highest for this option as compared to additional deferral. Since the SNEC facility has been shutdown for over 20 years, the majority of personnel exposure savings to be gained from deferring dismantlement has already been achieved. The person-rem determination for the immediate dismantlement option is reasonable and in-line with current industry experience. The 17.2 person-rem difference is small and provides no overall benefit compared with removing the site as a source of radioactive material.

Radiological conditions at the facility now are at a level that allows workers to safely remove components from the facility without threat to the safety of workers or local residents. Additionally, the technology exists to safety and efficiently decommission the site now.

Immediate dismantlement places the SNEC facility in a stable and secure condition in the shortest amount of time. It has been chosen as the preferred option.

4.3 Decommissioning Schedule

The general schedule for decommissioning/site restoration activities is presently in Section 2.2 of the SNEC facility Decommissioning Plan (Reference 8).

4.4 Plant Dismantlement Activities

It is the objective of GPU Nuclear Corporation to complete the decommissioning of the SNEC facility in a safe and efficient manner that protects the health and safety of the workers, public and environment.

The scope of work includes the following major activities associated with the proposed decommissioning of the facility: removal and disposal of the steam generator, pressurizer, and the reactor pressure vessel, dismantlement and disposal of system components, the decontamination/disposal of radiologically contaminated facility structures, waste management demolition of non-contaminated plant structures, and site restoration.

Based on the results of the site characterization study, conceptual engineering and planning have been performed to determine the most advantageous approach to decommissioning. Both conceptual and detailed engineering and planning have and will incorporate such considerations as: regulatory guidance, maintenance of occupational radiation exposure as low as reasonably achievable (ALARA), management of low level radioactive waste (LLRW), industrial safety, environmental impacts, costs, and schedule. Another aspect considered is tho use of field-proven and state-of-the-art dismantlement techniques. Saxton decommissioning activities will be performed under a quality assurance program.

<u>Temporary Support Facilities</u>

In order to facilitate decommissioning activities, temporary support facilities such as trailers and a Decommissioning Support Building will be located on previously disturbed areas of the property. The Decommissioning Support Building will be constructed adjacent and connected to the containment vessel and used for segregating and packaging of waste for transportation to offsite licensed disposal sites.

<u>System and Structure Dismantlement</u>

Those systems or structures that do not meet the release criteria will be dismantled and removed. Pipe and metal dismantlement and removal will be performed using shears, portable band saws, diamond wire saws, abrasive wheel cutting, OD milling machine, or other suitable techniques. Scabblers, and CO_2 blasters are options for removal of fixed radiological contamination from concrete. Evaluations of the best alternatives are continuing as part of the further detailed engineering and planning. The use of water will be minimized due to the cost and schedule impact of disposing of the water.

Radiological surveys, after dismantlement of systems and structures, will be performed to ensure that all radiological contamination levels are at or below the release criteria. If radiological contamination levels are discovered above the release criteria, remedial measures will be evaluated and implemented.

Steam Generator and Pressurizer

The steam generator and pressurizer will first require that all process piping attachments to the vessels be cut. Openings created by cutting the attached piping will be temporarily sealed to prevent release of radiological contamination to the surrounding areas during handling. Removal of the steam generator and pressurizer vessels from the containment may be through the equipment hatch or, if coordinated with reactor vessel removal, they may be taken out through the same containment dome opening as the reactor vessel. The vessels will be prepared for shipment by removing, fixing, or covering any external radiological contamination.

Reactor Vessel

An opening of sufficient diameter will be made in the steel containment vessel dome above the reactor vessel so that the vessel can be removed in one piece. Piping and instrumentation lines attached to the reactor vessel will be cut using appropriate cutting technologies. Openings created by cutting operations will be temporarily sealed to preclude the release of surface radioactive contamination. The reactor vessel will be removed through the dome opening from the containment vessel and placed into a sheltered laydown area to package the vessel for transportation to a licensed disposal facility. The internals will be contained within the vessel and the internal void space will be filled with concrete/grout.

When not transferring material through the dome opening, it will be covered to ensure the weather-tight integrity of the containment vessel dome. Appropriate radiological contamination and airborne control measures will be implemented to prevent the spread of such material prior to removal of the reactor vessel. Any external loose radiological contamination will be removed or fixed to meet federal shipping regulations.

Demolition Of Non-Contaminated Structures And Site Restoration

When all systems, components, radiologically contaminated concrete and other internal building structures, and exposed steel have been removed from the CV, the building demolition and site restoration phase will begin. This phase will start once the facility has been released by the NRC from the requirements of the NRC license. This phase includes:

- removal and scrapping of the Containment Vessel steel shell to three feet below grade;
- demolition of all remaining concrete to three feet below grade;
- backfilling of CV and other facility voids with uncontaminated concrete from facility demolition and additional structural fill;
- removal of all temporary support facilities; and
- grading and placement of soil and the revegetation of the site.

Structural fill and soil will be used as necessary to fill the CV void, and to grade and revegetate the site.

Control Of Airborne Radioactivity And Effluents

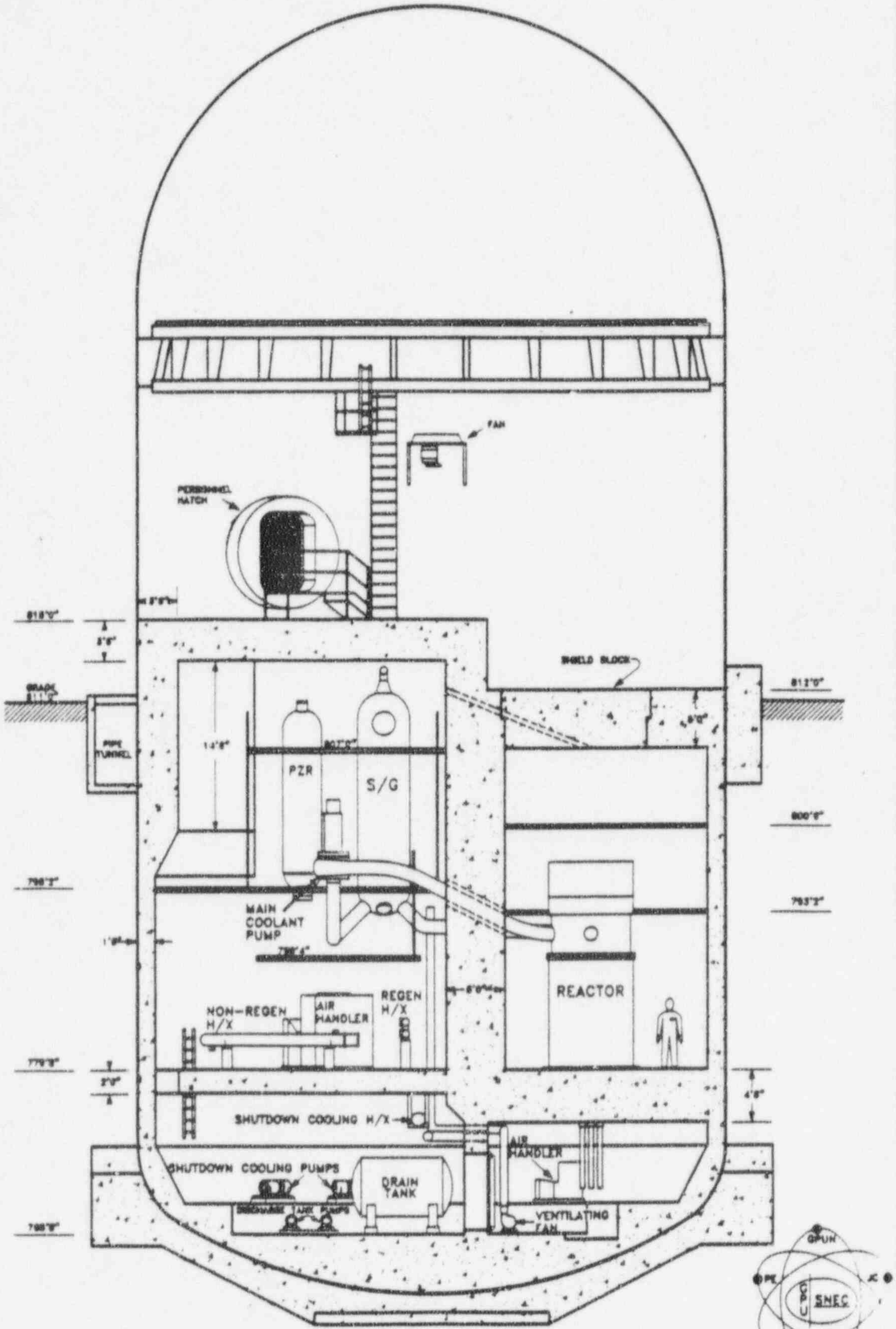
All work performed as part of SNEC facility decommissioning will be in accordance with current industry standards and practices. These include appropriate radiological controls, radiological monitoring, radiological contamination control envelopes, local ventilation control with High-Efficiency Particulate Air (HEPA) filters, etc., as necessary to prevent the spread of radiological contamination and radiation exposure to both workers, members of the public, and the environment.

Releases of radioactive liquid and airborne effluents during decommissioning will be minimized by the use of temporary effluent treatment systems. Decontamination and dismantlement of facility system and structures will result in the generation of radioactive liquid waste. These wastes will be processed as necessary by GPU Nuclear Corporation or by experienced vendors and contractors where appropriate to meet NRC effluent requirements.

4.5 Decommissioning Workforce

The make up of the workforce during decommissioning is expected to be GPU Nuclear Corporation employees and several contractors due to the specialized nature of some work involved with demolition/construction activities. It is expected that the maximum number of workers at any one time will be approximately 40.

Figure 4.2-1



Containment Vessel, Sectional View (looking West)

TABLE 4.2-1

Occupational Dose Comparison Between Decommissioning Alternatives

Task	30 Year Deferral	Immediate
	Person-Rem	Person-Rem
Asbestos Remediation	2.30	4.90
System Dismantlement	8.10	17.70
Reactor Vessel and Steam Generator Removal	2.90	6.30
Structure Decontamination and Dismantlement	0.20	0.35
Waste Management	1.10	2.50
Total	14.60	31.80

5.0 ENVIRONMENTAL EFFECTS OF DECOMMISSIONING ACTIVITIES

5.1 Effects On Human Activities

The number of workers is expected to be approximately 40. Due to the small number of workers required there are no significant adverse impacts expected on temporary housing or schools as a result of the decommissioning activities.

Transmission lines in the vicinity of the site will be unaffected by decommissioning activities.

5.2 Effects On Terrain, Vegetation And Wildlife

No endangered or threatened plant or animal species occur on or make use of the SNEC facility site. That portion of the 1.14 acre site not occupied by facility structures, is composed primarily of open grass land that does not provide good habitat for wildlife. No endangered or threatened species are known to occur on the adjacent Pennsylvania Electric Company property. This property is essentially composed of open grass land with scrub vegetation and trees along the property boundaries. Areas that have remained undisturbed following the cessation of the coal-fired station's operations and razing are generally open field or wooded and provide better wildlife habitat.

The decommissioning activities will take place on the previously developed areas of the site or adjacent open areas of the Pennsylvania Electric Company property. This includes temporary support facilities such as office trailers, the construction of a Decommissioning Support Building needed for segregating and packaging of waste, and the borrow of fill material needed to backfill the CV void. Those areas of the site that have been left in their natural state will not be disturbed by activities required for decommissioning. Therefore there will be no effect on the existing terrain or vegetation in the previously undeveloped areas of the site.

During the removal/demolition of the facilities, waterfowl and other wildlife may from time to time make use of adjacent areas and will be disturbed and/or displaced by demolition activities. However, demolition activity in the area will last a very short period of time and will be limited to as small an area as necessary thus disturbing as little area as possible.

5.3 Effects On Adjacent Waters And Aquatic Life

The decommissioning activities of the facility are not expected to have any adverse impact on the adjacent surface waters or associated aquatic life. Given that the majority of the decommissioning work will be done in previously developed areas of the site, the adjacent river and the aquatic life therein will not be adversely affected by decommissioning activities.

Although decommissioning activities will involve minor construction activities to remove/demolish facilities, a comprehensive Soil Erosion and Sedimentation Control Plan will be implemented to minimize the area of disturbance and potential siltation of the river. The content and implementation of the Soil Erosion and Sedimentation Control Plan will meet the requirements of Pennsylvania Code 102.4.

5.4 Effects Of Released Radioactive Materials

As part of routine decommissioning operations, limited quantities of radioactivity are released to the environment in liquid and airborne effluents. An effluent control program is implemented to ensure radioactivity released to the environment is minimal and does not exceed release limits. Federal effluent limits are set at low levels to protect the health and safety of the public. GPU Nuclear Corporation conducts operations in a manner that holds radioactive effluents to small percentages of the federal limits.

The Offsite Dose Calculation Manual (ODCM) is a support document of the Technical Specifications and implements SNEC facility radiological effluent controls. The ODCM contains the controls, bases, and surveillance requirements for liquid and gaseous radiological effluents. This document also describes the methodology used for calculations of the liquid and gaseous effluent monitoring instrumentation alarm and trip set points. The ODCM follows the methodology and models suggested by NUREG-0133 and Regulatory Guide 1.109, Revision 1, for calculation of offsite doses due to plant effluent releases. Simplifying assumptions have been applied in this manual where applicable to provide a more workable document for implementation of the Radiological Effluent Controls requirements.

<u>Airborne Radioactive Effluents</u>

Radiation doses to the public were calculated for the airborne releases from routine decommissioning operations of the Reference PWR in NUREG/CR-0130, "Technology, Safety and Costs of Decommissioning a Reference Pressurized Water Reactor Power Station" (Reference 16). The calculations show that decommissioning results in extremely small airborne radionuclide releases and the radiation dose to the public is expected to be negligible.

Since termination of the SNEC facility operation in 1972 and prior to dismantlement of all radiological waste systems, radioactive gas had been decayed and released. Therefore, processing of gaseous waste will not be necessary.

Temporary high-efficiency particulate air-purifying (HEPA) filtration systems may be required to contain airborne particulate radionuclides that may be generated during the performance of various decommissioning activities. The Decommissioning Support Building will be vented through HEPA filters and exhausted to the CV atmosphere. The CV atmosphere will be monitored by portable air samplers and, if necessary, by Continuous Air Monitors (CAMs). The CV ventilation will exhaust via a HEPA filtered ventilation system. If other activities require control of airborne radiological contamination, portable HEPA filtration units, including those built into vacuum cleaners, will be used. The effluent monitoring instrumentation will be used to monitor discharges of airborne effluent as required, and to demonstrate compliance with the SNEC facility ODCM limits as promulgated by applicable regulations.

<u>Liquid Radioactive Effluents</u>
Radioactive liquid wastes will be generated during the decontamination and dismantlement of the SNEC facility systems and structures.

Liquid radioactive wastes generated during decommissioning will be processed as necessary using temporary systems supplied by GPU Nuclear Corporation or by experienced vendors and contractors where appropriate. The temporary waste treatment system will be connected to tanks for storage of processed water prior to discharge. Once it has been verified that the stored processed water meets the allowable discharge limits specified in the ODCM, the water will be released. These systems may include temporary ventilation with filtration for airborne radiological contamination control.

The liquid waste stream will be processed using techniques which are cost effective and meet ALARA goals. During earlier demolition activities, installed plant equipment used to process liquid radwaste had been removed. Therefore, temporary filtration units or demineralizers will be used as the primary means of treatment for all planned releases. Any processed liquids may then be discharged after it has been monitored and approved for release. The effluent monitoring instrumentation will be used to monitor discharges of liquid effluent as required, and to demonstrate compliance with the SNEC facility ODCM limits as promulgated by applicable regulations.

Additionally, compliance with applicable Pennsylvania Department of Environmental Protection (PaDEP) National Pollutant Discharge Elimination System (NPDES) requirements will be accomplished.

No impact on the existing quality of the nearby water resources is expected.

5.5 Effects on Groundwater

The generation of radiologically contaminated water at the SNEC facility will be minimized to keep water processing costs as low as possible and to minimize liquid effluent discharges. Some radiologically contaminated water, however, will be generated during the decontamination and decommissioning of the SNEC facility. The majority of this water will likely be generated during decontamination activities. Groundwater that has infiltrated the CV pipe tunnel contains low levels of radioactive materials, and will need to be dispositioned. These liquid wastes will be processed as necessary using temporary systems supplied by GPU Nuclear Corporation or by experienced vendors and contractors. Any processed water may then be discharged after they have been monitored and approved for release. All discharges of processed water will be verified to be within the limits of the ODCM prior to approval for release.

Radionuclide concentrations in groundwater at the facility will not be significantly impacted by the presence of radiologically contaminated water on the site. Processed water will not intentionally be directed to the ground, so the only mechanism for the transport of radionuclides to the groundwater will be a spill of radiologically contaminated water. Temporary systems used for processing of water will be designed to minimize the possibility of spills to the ground. Procedures and work instructions at the facility will be written so as to minimize the potential for spills. These procedures will also be written to mitigate the spillage in a timely fashion should a spill occur.

If a spill of radiologically contaminated water occurs, groundwater at the facility should not be adversely affected. Fission and activation products in the water (primarily cesium-137, cobalt-60 and small quantities of transuranics) will be adsorbed onto the soil as the water percolates through the ground. Numerous studies of the retention by soil for these radionuclides (Reference 24) show that they are typically retained in the first 10 to 30 cm of soil. As a result they are not immediately available for transport to the groundwater. Should such a spill occur at the SNEC facility, the affected soil would be sampled and analyzed for radionuclide content. Soil containing appreciable quantities of these nuclides would be excavated and disposed of offsite. As a result, these types of radionuclides would not find their way into the groundwater at the site.

The only radionuclide that could reach the groundwater would be tritium, since this nuclide is not retained by the soil. Concentrations of tritium in the water that is currently at the SNEC facility are relatively low. The highest concentrations are found in the Containment Vessel Sump. These concentrations range from 3E-4 to 6E-4 uCi/cc. Since there is no source of tritium production at the site, the concentration of tritium will not increase with time. In fact, as decontamination activities create radiologically contaminated water, the concentration of tritium in liquid wastes will decrease through dilution. The low concentrations of tritium in this water, coupled with the finite nature of such a spill, will not appreciably affect tritium concentrations in groundwater at the site.

The service tunnel which surrounds the Saxton Nuclear Experimental Facility Site Containment Vessel (C. V.) contains significant quantities of groundwater. The tunnel is a below grade concrete structure whose location is shown in figures 2.3-1 and 4.2-1. The tunnel ceiling is at grade, approximately 811 feet, 6 inches above MSL, while the floor of the tunnel is at approximately 805 feet above MSL or about six feet below grade. Groundwater levels vary at the site depending upon season and weather but generally average about 807 feet above MSL, (Reference 7). Hydraulic pressure forces groundwater into the tunnel through the construction joint between the tunnel floor and the C. V. shell. Water levels in the tunnel have been observed to fluctuate considerably with the groundwater changes. During periods of severe drought the tunnel has been dry while at other times the water level has reached the ceiling. The current water level is about 808 feet, 6 inches above MSL. Contamination on the inner concrete tunnel surfaces, principally Cs-137, has leached into the water leading to minor contamination of the water.

In 1986 a similar situation existed in the other below grade structures at the site which have since been demolished. At that time approximately 210,000 gallons of very slightly radioactively contaminated groundwater was removed from these structures and discharged to the Raystown Branch of the Juniata River (Reference 27).

It is anticipated that a similar process will be used to remove the groundwater from the service tunnel. A bounding calculation has been performed to determine the maximum possible dose to a member of the public if this water were to be discharged under the worst conditions (Reference 29). Under these conditions of maximum batch release flow rate and historic minimum river flow, the maximum organ dose would be 6.82E-3 millirem (0.00682 millirem) while the maximum whole body dose would be 4.47E-3 millirem (0.00447 millirem). These levels are significantly below any applicable release limits. All releases will be in accordance with the Saxton Off-site Dose Calculation Manual and applicable procedures.

5.6 Effects Of Released Chemical And Sanitary Wastes

During decommissioning water from an existing groundwater well, located on the adjacent Pennsylvania Electric Company property, will be the source for sanitary water. The use of groundwater for sanitary and drinking water is regulated by the Pennsylvania Department of Environmental Protection (PaDEP). If the groundwater well is used as a drinking water source, it may be necessary to provide water treatment to permit it as a drinking water source.

The use of water during decommissioning will be kept to a minimum. No chemical radiological decontamination is planned and the use of hazardous chemicals is not anticipated during the decommissioning process. Liquid discharges from the facility are regulated by the NPDES permitting system administered by the PaDEP. All liquid wastes streams will be sampled, tested and processed as necessary prior to discharge to ensure effluents are in compliance with applicable PaDEP - NPDES permit limits. No impact on the existing quality of the nearby water resources is expected.

Holding tanks will be used during decommissioning for the collection of sanitary waste. These tanks shall be closely monitored and pumped out by a PaDEP licensed contractor for offsite disposal at a licensed facility.

5.7 Radioactive Waste

Members of the public will be exposed to small amounts of direct radiation associated with the shipment of low-level radioactive waste for burial. The GEIS (NUREG-0586), (Reference 6), estimates this radiation exposure to total 2.2 person-rem. The estimated cumulative radiation exposure to the public is the sum of the small individual radiation exposures that are assumed to occur when members of the public are in the vicinity of a low-level radioactive waste shipment (truck) for brief periods. The packaging and amount of radioactive waste in each shipment is restricted by NRC regulations (10CFR71) and U.S. Department of Transportation (DOT) regulations (49CFR170-189).

NUREG-0586 estimate for radiation exposure to the public was based on the shipment of an estimated volume of 4,930 cubic meters of low-level radioactive waste for burial. The current estimated volume of low-level radioactive waste to be shipped to offsite burial facilities is 580 cubic meters, or less than twelve percent of the bounding conditions of NUREG-0586. The projected cumulative radiation exposure to the public is well within NRC estimates and regulations. The SNEC facility Decommissioning Plan calls for shipment of LLW by truck from the site to the final burial sites. The radiation exposure levels of each individual low-level radioactive waste shipments will be below the regulatory limits established by the NRC and DOT.

5.8 Non Radiological Waste

Asbestos

Surveys for asbestos were conducted in the containment vessel during May, 1995. Bulk insulation samples were taken of various components, piping systems and vessels throughout the containment building. The quantity of asbestos to be removed is approximately 32 cubic meters. Both the U.S. Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) have established regulations that apply to the removal of asbestos-containing material. These regulations contain requirements for asbestos removal notification, record keeping, handling, air emissions limits and disposal. All activities involving asbestos at the facility will be conducted in accordance with Federal and State regulations. It is expected that all asbestos found in the facility will be radiologically contaminated and will be disposed of as low-level radioactive waste.

Hazardous Waste

The generation, storage, transportation and disposal of hazardous waste are regulated by the PaDEP under Pennsylvania's Solid Waste Management Act (35 P.S. 6018.101 et. Seq.). Decommissioning of the facility may be expected to generate very small amounts of hazardous waste. Decontamination and dismantlement activities primarily utilize non-hazardous chemicals or mechanical processes. Potential sources of hazardous waste include lead-based paint that was used to cover much of the painted surfaces of the facility and mercury-containing instruments and switches. Other minor sources of hazardous waste may be encountered during decommissioning; however it is expected that the amount of waste generated will be well less than the limit for a small quantity generator under Pennsylvania hazardous waste regulations.

5.9 Socioeconomic Effects

The socioeconomic impacts were mainly from the shutdown of the facility in 1972 which resulted in the loss of certain jobs and income to the community. Decommissioning of the SNEC facility should provide a short term small increase in income to the community.

5.10 Other Effects

The total estimated occupational radiation exposure associated with the planned decommissioning activities at the facility is 32 person-rem. This is well within the bounds of the estimated total occupational exposure of 344 person-rem contained in the NRC's Generic Environmental Impact

Statement. The occupational radiation dose to any individual worker will be limited by federal regulations and SNEC facility administrative procedures. The as low as reasonably achievable or "ALARA" principle will be used to minimize occupational radiation dose associated with decommissioning activities.

5.11 Summary of Environmental Effects Of Decommissioning Activities

The environmental impact due to decommissioning of the facility is generally favorable. In most cases, dismantlement eliminates or further reduces the already small environmental effects that are associated with maintaining the facility in its current condition. In addition, decommissioning by immediate dismantlement avoids potential environmental impacts associated with alternative decommissioning options that defer dismantlement. There are certain short term environmental effects which will be increased due to decommissioning activities. These include the occupational radiation exposure necessary for dismantlement activities, the radiation exposure to the public associated with transportation of low-level radioactive waste and small radiological effluent releases, and the commitment of small amounts of land at the burial site for disposal of this low-level radioactive waste. However, these estimated effects for the proposed SNEC facility decommissioning are well below those which have been previously evaluated by the NRC on a generic basis (NUREG-0586).

FINAL GENERIC ENVIRONMENTAL IMPACT STATEMENT (GEIS)
NUREG-0586
ENVIRONMENTAL CONSEQUENCES

1. Summary of Radiation Safety Analysis for Decommissioning the Reference Test Reactor (Person-Rem)

		SAFSTOR		
	DECON	10 years	30 years	100 years
Occupational Exposure	344	212	130	125

2. The Volume of Low-Level Radioactive Waste to be Disposed of for the Reference Test Reactor (cubic meters)

	SAFSTOR		
DECON	30 years	50 years	100 years
4930	4930	2960	2940

3. The dose to the public from routine releases during DECON or SAFSTOR activities at the reference test reactor is estimated to be negligible.

4. The dose to the public from truck transport of wastes during DECON activities from the reference test reactor is estimated to be 2.2 person-rem. During SAFSTOR activities, the doses are estimated to be 0.35, 0.14, and 0.11 person-rem for storage periods of 10, 30, and 100 years respectively.

5. The waste volumes requiring burial would represent a use of about one-half acre for the reference test reactor.

6.0 ENVIRONMENTAL EFFECTS OF ACCIDENTS AND DECOMMISSIONING EVENTS

The EPA has established protective action guidelines (Reference 15) that specify the potential offsite dose levels at which actions should be taken to protect the health and safety of the public. The EPA protective action guidelines (PAGs) are limiting values based on the total effective dose equivalent (TEDE) resulting from exposure to external sources and the committed effective dose equivalent (CEDE) incurred from the significant inhalation pathways during the early phase of an event. The EPA PAG limits are:

EPA PAGs (millirem)

Total Whole Body (TEDE)	1000
Thyroid Committed Dose Equivalent (CEDE)	5000
Skin (CDE)*	50,000

*Committed dose equivalent

Because there is no irradiated fuel stored at the site, there are no radioactive noble gases or radioiodines available for release from the facility. This preempts the possibility of accidental offsite radiological releases that could approach the PAGs for the skin and thyroid. As a result, the PAG for TEDE is the limiting criteria for decommissioning activities at the facility.

GPU Nuclear Corporation has analyzed the decommissioning activities described in the SNEC facility Decommissioning Plan (Reference 8) to ensure that they will not create the potential for accidental releases that could cause doses at the site boundary to be more than a small fraction of the EPA PAGs. Performing decommissioning activities in a manner that keeps offsite doses from even the most unlikely events at a small fraction of the EPA PAGs provides for the protection of the health and safety of the public without the need for protective actions.

Section 3.4 of the SNEC facility Decommissioning Plan (Reference 8)analyzes a number of potential events which could be postulated to occur during decommissioning activities and result in the release of radioactive materials.

The decommissioning activities evaluated included events with the potential for liquid and/or airborne radioactive releases.

The analyses of these events used very conservative approaches in treating the source terms, as well as in the methods of calculation. To the extent applicable, these analyses are consistent with approaches used in the NRC's examination of postulated accidents during the decommissioning of the Reference PWP (Reference 16).

The accident analyses demonstrate that no adverse public health and safety or environmental impacts are expected from accidents that might occur during decommissioning operations. The highest calculated dose to an individual located at the site boundary was 1.5 millirem to the whole body during a postulated materials handling accident. The results of other onsite accidents are below this value. As a result, it is concluded that there are no significant radiological consequences to the general public from postulated credible accidents during the planned decommissioning operations at the SNEC facility.

Offsite radiological events related to decommissioning activities are limited to those associated with the shipment of radioactive materials. Radioactive shipments will be made in accordance with the applicable regulatory requirements. The facility's Radioactive Waste Management Program will ensure compliance with these requirements. The facility's Quality Assurance Program (QAP) is further implemented to assure decommissioning activities are conducted in a safe and controlled manner. Compliance with these requirements ensures that both the probability of occurrence and the consequences of an offsite event do not significantly affect health and safety of project workers, the public or the environment.

7.0 FACILITY RADIOLOGICAL STATUS AND ENVIRONMENTAL MONITORING

7.1 Introduction

Operation and decommissioning of nuclear power plants results in releases of small amounts of radioactive materials to the environment. Radiological environmental monitoring is conducted to monitor radiation and radioactive materials in the environment. The important objectives of this monitoring are:

- to verify controls for the containment of radioactive materials,
- to assess dose impacts to the public,
- to determine buildup of long-lived radionuclides in the environment and changes in background radiation levels,
- to provide reassurance to the public that the program is capable of adequately assessing impacts and identifying noteworthy changes in the radiological status of the environment.

Once released, radioactive materials move through the environment in a variety of ways and may eventually reach humans via breathing, drinking, eating, and direct exposure. Samples may be collected from the aquatic, atmospheric, and terrestrial environments and may include air, soil, river water, precipitation, sediment, finfish, milk, vegetables, and groundwater. They are analyzed for the various types of radiation such as alpha, beta, and gamma.

A preoperational radiological survey of the environment around the SNEC facility was initiated in 1960. Data gathered in the preoperational survey was used as a basis for evaluating radiation levels and radioactivity in the vicinity of the plant after the plant became operational. The data documented the natural background radiation levels and naturally occurring and fallout radioactive materials in the environment.

The operational phase began in 1962 at the time the SNEC facility became operational and concluded in 1972. Releases of radioactive materials to the environment were within the bounds of the hazards analysis in the Final Safeguards Report (Reference 5).

Four unplanned releases of radioactive materials occurred during the operation of the SNEC facility. These releases occurred May 14 and August 26, 1970, and November 29 and December 15, 1971. These releases were reported to the Atomic Energy Commission as required. The maximum amount of exposure to anyone standing at the site boundary from each of these releases would have been 0.387 millirem, 0.0018 millirem, 4.28 millirems, and 1 millirem, respectively. To put this into perspective, the average individual may receive up to 300 millirems a year from a variety of natural sources in the environment. On average, an individual also receives about 60 millirems a year from radiation use in the medical and dental fields.

The SNEC facility was placed in a condition equivalent to a status later defined by the NRC as SAFSTOR after it was shutdown in 1972. All fuel was removed from the containment vessel (CV) in 1972. Following fuel removal, equipment, tanks, and piping located outside the CV were removed. The buildings and structures that supported reactor operations were partially decontaminated in 1972 through 1974. Since that time, the SNEC facility no longer produced radioactive liquid or gaseous effluents in the conventional manner of operating nuclear plants. The radiological environmental monitoring program confirmed there were no offsite adverse effects on the environment or public health and safety.

7.2 Final Release Survey Of The Reactor Support Buildings

Radiological decontamination of the reactor support structures/buildings was performed in 1987, 1988, and 1989, in preparation for demolition of these structures. A final release survey documented that the NRC release criteria guidelines were met. One component of the final release survey was the measurement of offsite background radiation and radioactivity. Exposure rate measurements were made and soil samples were collected at 12 locations around the site at distances ranging from 0.61 to greater than 3.0 kilometers. The results are documented in a report to the NRC (Reference 27). Oak Ridge Associated Universities performed a confirmatory radiological survey of the reactor support buildings for the NRC. They also performed offsite exposure rate measurements and soil sample analyses. Exposure rates and radionuclide concentrations were typical of normal background levels (Reference 28).

7.3 Demolition Of The Reactor Support Buildings

Upon acceptance of the final release survey by the NRC, the reactor support buildings were demolished in 1992. Controls were put in place to minimize fugitive emissions and soil erosion. Environmental air particulate sampling stations were operated during this evolution. The particulate filters were analyzed for gross alpha, gross beta, and gamma radioactivity. Three indicating air stations are located around the site and one control station is located 10 miles from the site. Generally, the weekly trends of gross alpha and gross beta activity at all stations were similar. Gamma-emitting radionuclides related to the SNEC facility were not detected in any of the samples during the demolition process.

Aquatic sediment samples were collected near the SNEC facility stormwater discharge to the river. Low levels of cesium-137 and cobalt-60 were detected in samples following the demolition of the support buildings when site soil was carried to the river from the site storm drain discharge. Upon detection that a small amount of soil erosion was occurring, the storm drain discharge line was plugged.

7.4 Soil Remediation

Operation of the SNEC facility resulted in low levels of radioactive contamination in the soil surrounding the facility. Some of this soil was transported outside the SNEC facility fence but within the property limits of GPU due to construction activities, erosion, etc. Various radiological surveys were conducted. If radiologically contaminated soil was found outside the SNEC facility fence, it was excavated and either disposed of as low level radwaste or stored inside the fenced area.

In late 1987, GPU Nuclear Corporation conducted a radiation survey of the restricted area onsite, which showed a greater-than-normal background activity of cesium-137 (Cs-137) as well as detectable amounts of another radioactive by-product material cobalt-60 (Co-60). The Pennsylvania Bureau of Radiation Protection, Department of Environmental Resources (DER), was concerned that the soil could have been dispersed to offsite areas by natural forces over the years since operations had ceased. The DER contacted the U.S. Department of Energy (DOE) requesting assistance in evaluating the extent, in any, of offsite Cs-137 radiological contamination, possibly through the use of an aerial survey. DOE responded by tasking EG&G Energy Measurements, Inc., (EG&G/EM) to determine the feasibility of an aerial survey.

EG&G/EM aerial operations dispatched a field team to the Saxton area to make *in-situ* measurements to determine the relative Cs-137 concentrations. The measurements were made in June 1988 (Reference 25) using a high purity germanium (HPGe) detector.

The prevailing winds at the site flow from the southwest to the northwest, up the valley. Since the site is so heavily influenced by the surrounding terrain, it is unlikely that any radiologically contaminated material would have escaped the valley under normal weather conditions.

Additionally, an aerial radiological survey, was conducted from July 5 through July 22, 1989, over the SNEC facility and surrounding area (Reference 26). The survey covered an 83-square-kilometer (32-square-mile) area around the plant. The purpose of the survey was to map the gamma environment of the area surrounding the SNEC facility. Particular attention was to be paid to the possible presence of Cs-137 in the areas surveyed.

The survey was conducted at a nominal altitude of 61 meters (200 feet) with line spacing of 91 meters (300 feet).

Pressurized ion chamber measurements and soil samples were collected during the survey at six sites within the survey boundaries.

The isotopic and ion chamber measurements generally agree with the inferred aerial data for each site.

A contour map of the terrestrial gamma exposure rate (extrapolated to 1 meter above ground) was prepared. The Cs-137 activity inferred from aerial data was within the limits of the deposition from world-wide fallout. No other man-made contaminants were detected in the survey area.

In November 1993 comprehensive soil monitoring and sampling work was performed at the site to assess the extent of radioactive contamination levels present on the site. NUREG/CR-5849 (Reference 19) was used as a basis document for the development of methods and guidelines in establishing survey and assessment protocols. After completion of the soil characterization work radiologically contaminated soil was excavated, packaged, and shipped offsite and disposed at both an NRC licensed low level radwaste (LLRW) and a state licensed low activity radwaste (LARM) facility.

Approximately 105 cubic feet of soil containing 1.2 millicuries of radioactivity was shipped to Barnwell, South Carolina, LLRW facility on May 26, 1994. Between July 25 and October 26, 1994, 56,161 cubic feet of soil containing 9.8 millicuries was shipped to the Envirocare LARM facility located in Clive, Utah. Soil containing radioactivity in concentrations below 560 pCi/g was shipped to Envirocare and soils containing greater concentrations was shipped to Barnwell.

Non-radiological analysis results indicated all chemical constituents for hazardous material classification were below EPA 40CFR261.21-24 limits. Soil density analysis indicated that moisture content ranges were within a suitable range to ensure adequate disposal compatibility.

The results of radiological analyses for transuranics and "hard to detect" radionuclides (strontium-90, nickel-59-63, iron-55, carbon-14, niobium-94, technetium-99, and iodine-129) indicate that these materials were present in quantities at or below background levels or the lower limit of detection (LLD). The results of the remaining radiological analyses of site soil indicated that the predominant radionuclides were Cs-137 and Co-60.

The pre-remediation site average concentration of predominant radionuclides were 15 pCi/g for Cs-137 and 0.5 pCi/g for Co-60. Approximately 14 percent of the soil samples contained Cs-137 in concentrations greater than 5 pCi/g with 3393 pCi/g being the highest concentration, and 10 percent contained detectable quantities of Co-60 with 23.7 pCi/g being the highest concentration. From a public dose perspective, the pre-remediation postulated dose rates to a theoretical onsite resident would have been 40.2 millirem per year due to Cs-137 and 5.6 millirem per year due to Co-60, for a total of 45.8 millirem per year, (total of all pathways as analyzed using the RESRAD Code (Reference 23)).

The current site average concentration of Cs-137 is below 1.0 pCi/g and Co-60 is below 0.1 pCi/g. However, small pockets of residual radiological contamination of Cs-137 in the range of 5-10 pCi/g remain in the exclusion area adjacent to the CV. These areas will be remediated during subsequent decommissioning activities. The current postulated dose rates to a theoretical onsite resident would be below 3 millirem per year due to Cs-137 and below 1 millirem per year due to Co-60, for a total of less than 4 millirem per year.

7.5 Environmental Radiological Surveillance Program

GPU Nuclear Corporation continues to conduct a comprehensive radiological environmental monitoring program (REMP) at the SNEC facility to monitor radiation and radioactive materials in the environment. The information obtained from the REMP is available to determine the effects of the SNEC facility, if any, on the environment and the public. The results of the REMP to date indicate that the operation and maintenance of the facility has not had a significant radiological impact on the environment and the public.

Environmental monitoring at the SNEC facility currently involves high volume air sampling; sediment, groundwater, potable water, soil, pipe-tunnel water, surface water and thermoluminescent dosimeter (TLD) monitoring.

A total of 27 TLD stations are in place in the vicinity of the SNEC facility for measuring gamma radiation exposure rates. Each TLD station consists of two TLD badges (Panasonic Model 814), each of which has three phosphors or elements. Since each TLD phosphor responds to radiation independently, this provides six independent detectors at each station. Three of the stations are considered controls while 24 are used as indicator stations.

The current groundwater monitoring program includes eight overburden monitoring wells and two deeper, bedrock monitoring wells. The bedrock wells were installed in 1994 after extensive investigations into the bedrock hydrology were performed (Reference 11). These deeper wells were drilled into bedrock at an angle to maximize the interception of significant fractures and bedding planes as discussed in Sections 3.2 ("Geology") and 3.3 ("Hydrology"). Construction specifications for these angled wells can be found on Figure 7.5-1. Gas displacement samplers were installed into the boreholes (MW-1 and MW-2) for the bedrock groundwater detection system (refer to Figure 7.5-2 for well locations). The overburden monitoring wells (GEO-1 through GEO-8) were retrofitted with gas displacement samplers in 1994 as an upgrade to the monitoring system. The major advantage to using gas displacement samplers in MW-1 and MW-2 is that discrete areas of significance (i.e., fractures and bedding planes) are able to be monitored. Monitoring well MW-1 was installed at a diagonal along a northeast-southwest trend (from the northeast toward the southwest), whereas MW-2 was installed along a southwest-northeast trend (from the southwest toward the northeast). In addition, a vertical piezometer (GEO-9) was installed in 1994 to solely monitor bedrock groundwater elevation.

Periodically, low level of tritium (200-600 pCi/l) have been detected in one of the environmental groundwater monitoring wells (GEO-5). Beneath this area is the former site of the Radiological Waste Disposal Facility tunnel. It is likely that this positive result is due to residual tritium from activity in this area arising from plant operation. Nevertheless, tritium concentrations from this station are well below the United States Environmental Protection Agency Primary Drinking Water Standard of 20,000 pCi/l. Gamma scans from this station, as well as all other groundwater well stations, have always resulted in less than detectable limits.

Other environmental monitoring currently employed at the SNEC facility includes two potable groundwater stations, four sediment stations, four high-volume air samplers for measuring air particulate activity and two surface water stations. Soil sampling is conducted on an as needed basis.

During decommissioning, GPU Nuclear Corporation will continue to monitor the environment in the vicinity of the site for the presence of radioactivity. It is anticipated that the current REMP may change during the course of decommissioning to reflect changes in site conditions.

The REMP includes the monitoring, sampling, analysis and reporting of radiation and radionuclides in the environment in accordance with the methodologies and parameters as contained in SNEC facility Procedures.

7.6 Final Radiation Survey And Release Criteria

Final Survey Plan

After completion of decommissioning activities, GPU Nuclear Corporation will conduct a final radiation survey of the site to verify that surface radiological contamination levels, concentrations of radioactive materials in the soil and water, and direct radiation levels have been reduced to levels that will allow release of the site for unrestricted use. GPU Nuclear Corporation will design its survey plan using current technical documents published by the NRC. These documents are discussed in more detail in the 'Final Release Criteria' and 'Documentation' sections of this report.

Radiation monitoring instruments used during the conduct of the final radiation survey will be selected as appropriate for the physical and environmental conditions and the type of radiation being measured. The radiation surveys will be performed by properly trained individuals using calibrated survey instruments. The survey instrumentation will be controlled by specific procedures that define accuracy requirements, and calibration techniques.

Applicable portions of the facility's Quality Assurance Program (QAP) as contained in Chapter 7 of the SNEC facility Decommissioning Plan, will be implemented during the conduct of the final survey plan and periodic audits will be performed in accordance with the QAP to verify survey activities comply with established procedures and applicable aspects of the QAP.

Final Release Criteria

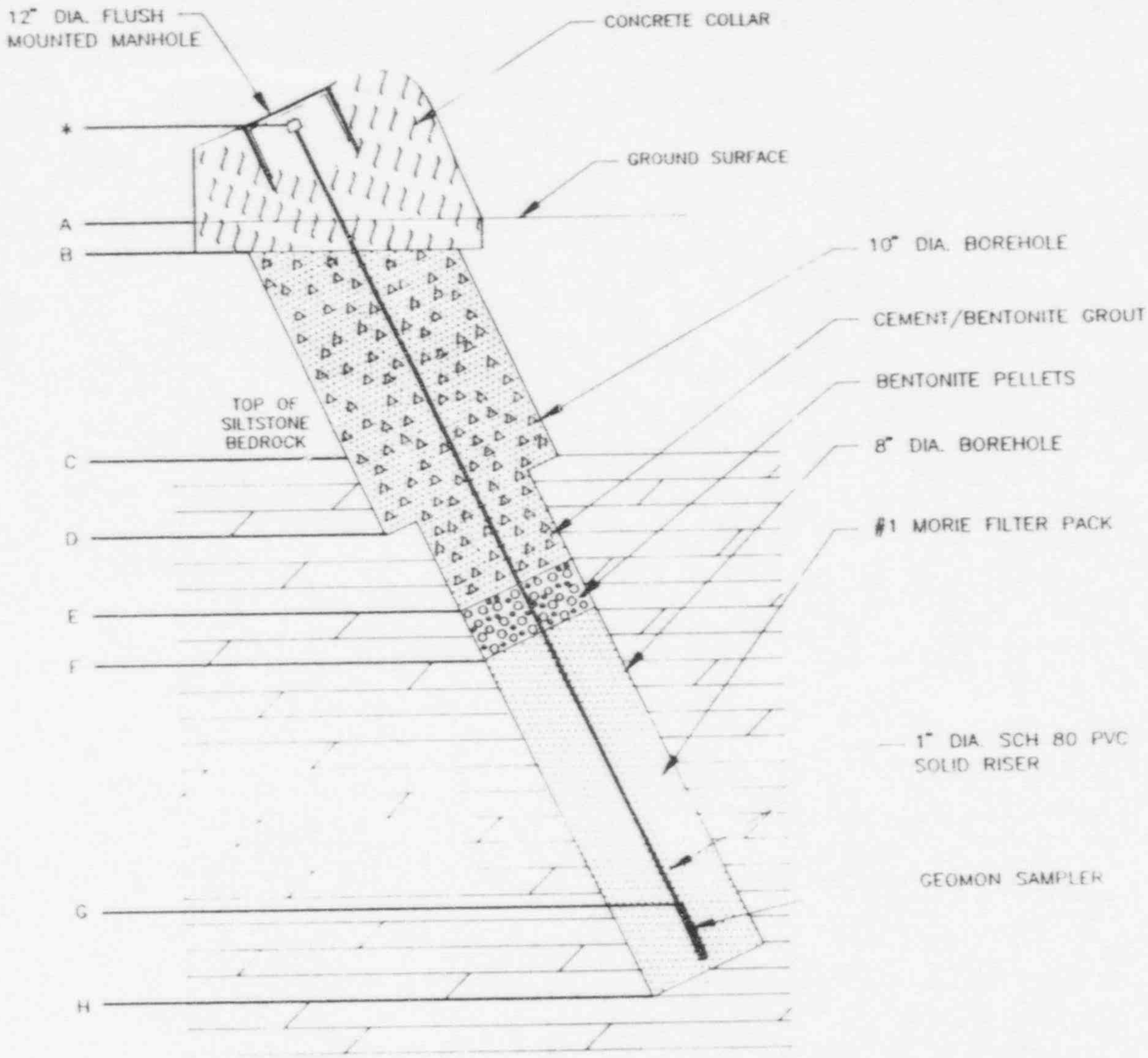
A rule covering explicit radiological criteria for decommissioning remains under development by the NRC at this time. The NRC published a proposed rule for comment in August 1994. Pending publication of the final rule, existing guidance documents, along with available draft criteria have been or will be used in the development of proposed site release criteria for the SNEC facility Decommissioning Plan. GPU Nuclear Corporation intends to meet the criteria of the proposed changes to 10 CFR 20 for site release through implementation of a survey plan incorporating guidance contained within current and proposed regulatory documents. The currently proposed change requires the residual radioactive contamination at the site attributed to licensed operations to contribute not greater than 15 millirem per year total effective dose equivalent to an average individual of the critical population group during the period of 1000 years following site release.

This plan will include a description of the technical considerations and methods to be used for design and implementation of the final survey. The methods to be described are derived from regulatory guidance contained within Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors," Draft NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination," (Reference 19), and NUREG/CR-5512, "Residual Radioactive Contamination From Decommissioning." (Reference 17). Appropriate instrumentation and modeling methods will be utilized for attainment of release limits for surface activity, exposure rate and pathway analysis requirements as specified by these guidelines. For example, rubble, debris, soil and structures remaining onsite will be analyzed using RESRAD (Reference 23) or equivalent methodology to calculate the total effective dose equivalent. Residual radiological contamination types not applicable to RESRAD methodology will be analyzed by guidance deemed appropriate at time of use. At present such guidance is given in NUREG/CR-5512 and NUREG-1500 "Working Draft Regulatory Guide on Release Criteria for Decommissioning: NRC Staff's Draft for Comment" (Reference 18).

Radiological contamination and/or migration of radioactive contamination into ground and surface waters with the potential to be used as a source of drinking water shall not exceed the National Primary Drinking Water Standards contained in 40CFR141 and/or as required in the proposed 10CFR20 decommissioning rules.

<u>Documentation</u>

GPU Nuclear Corporation will prepare a final survey plan and implementing procedures which will follow the guidance in the applicable standard at the time of the final survey. At present that guidance is contained in NUREG/CR-5849. However, additional guidance is now available, and currently under review, in preliminary draft form as NUREG-1505, "A Nonparametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys," (Reference 20), NUREG-1506, "Measurement Methods for Radiological Surveys in Support of New Decommissioning Criteria", (Reference 21), and NUREG-1507, "Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions" (Reference 22). Radiological survey results will be compiled into a report. This report will provide a complete record of the radiological status of the site and comparison to the established guidelines for termination of the license. The report will also contain sufficient information to enable an independent re-creation and evaluation of the survey and the results derived from the survey. GPU Nuclear Corporation will submit the final report to the NRC.



TYPICAL BEDROCK MONITOR WELL DETAILS

NOT TO SCALE

FILE: ANGLEWEL

DEPTH BELOW GROUND SURFACE (LINEAR FEET)		
	MW-1	MW-2
A	0	0
B	1	1
C	19	13
D	23	20
E	25	25
F	30	30
G	54	54
H	55	55

* TOP OF SOLID RISER AND MANHOLE ARE APPROXIMATELY 1 FOOT ABOVE GROUND SURFACE.

NOTE: MW-1 DRILLED AT AN APPROXIMATE ANGLE OF 25° FROM VERTICAL TO THE SOUTWEST. MW-2 DRILLED AT AN APPROXIMATE ANGLE OF 25° FROM VERTICAL TO NORTHEAST.

SAXTON NUCLEAR EXPERIMENTAL CORP.
SAXTON, PENNSYLVANIA

GPUN CORPORATION
PARSIPPANY, NEW JERSEY

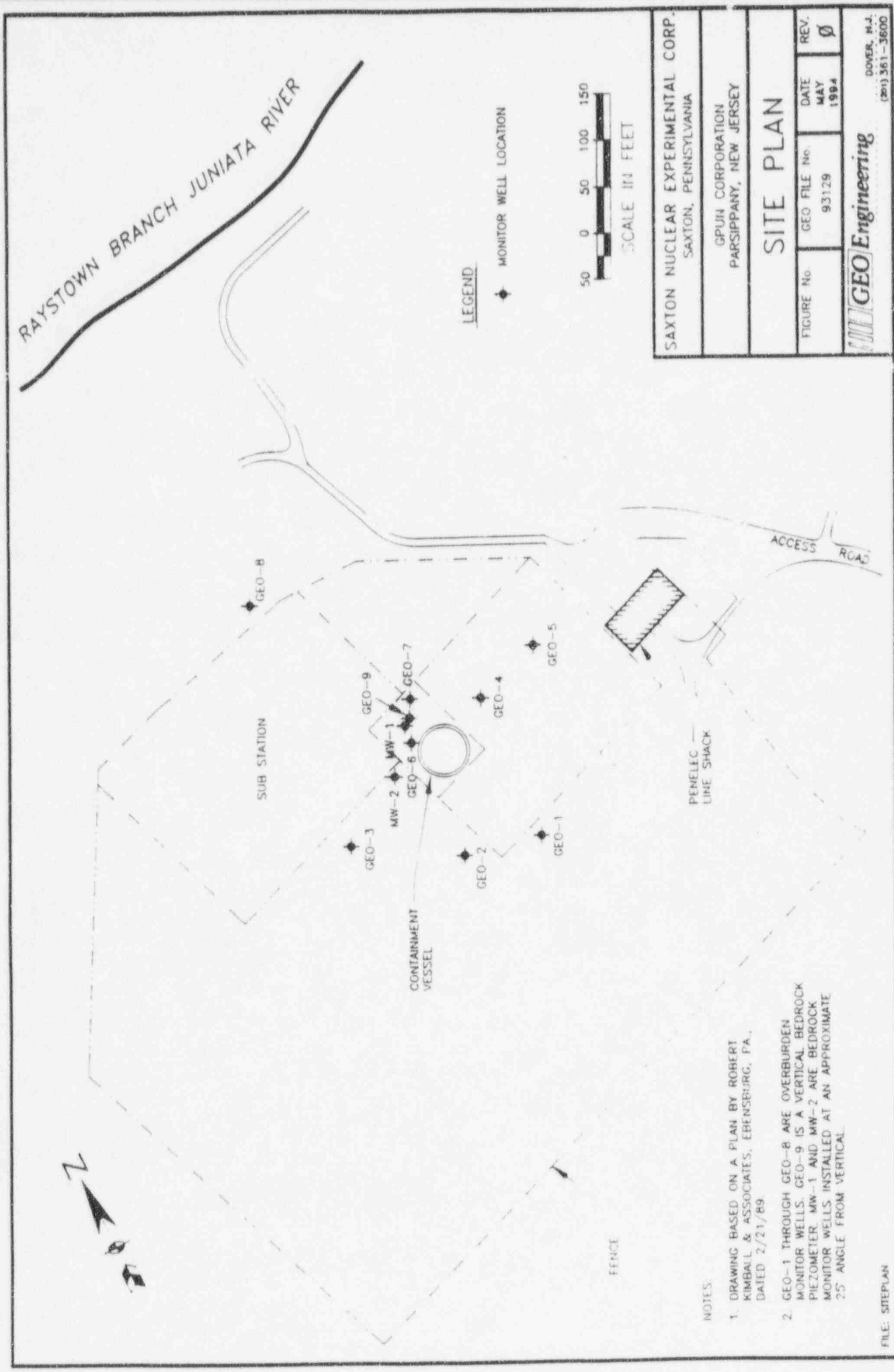
BEDROCK MONITOR WELL
CONSTRUCTION DETAILS

FIGURE No.	GEO FILE No.	DATE	REV.
	93129	MAY 1994	Ø

GEO Engineering DOVER, N.J. (201) 361-3800

Figure 7.5-1

Figure 7.5-2


RAYSTOWN BRANCH JUNIATA RIVER
LEGEND
MONITOR WELL LOCATION
50 0 50 100 150
SCALE IN FEET
SAXTON NUCLEAR EXPERIMENTAL CORP.
SAXTON, PENNSYLVANIA
GPUN CORPORATION
PARSIPPANY, NEW JERSEY
SITE PLAN
FIGURE No.
GEO FILE No. 93129
DATE MAY 1994
REV. Ø
GEO Engineering
DOVER, N.J. (201) 361-3600
ACCESS ROAD
GEO-8
GEO-9
GEO-7
GEO-5
GEO-4
MW-1
GEO-6
MW-2
GEO-3
GEO-2
GEO-1
SUB STATION
PENELEC LINE SHACK
CONTAINMENT VESSEL
FENCE
N
NOTES:
1. DRAWING BASED ON A PLAN BY ROBERT KIMBALL & ASSOCIATES, EBENSBURG, PA. DATED 2/21/89.
2. GEO-1 THROUGH GEO-8 ARE OVERBURDEN MONITOR WELLS. GEO-9 IS A VERTICAL BEDROCK PIEZOMETER. MW-1 AND MW-2 ARE BEDROCK MONITOR WELLS INSTALLED AT AN APPROXIMATE 25° ANGLE FROM VERTICAL.
FILE: SITEPLAN

8.0 ENVIRONMENTAL APPROVALS

8.1 Federal Requirements

The SNEC facility Decommissioning Plan was submitted to the NRC in February, 1996 requires review and approval by the NRC. When approved, decommissioning activities will proceed under the conditions established by the SNEC facility Decommissioning Plan.

Decommissioning activities that are subject to Federal regulations, permits, licenses, notification approvals or acknowledgments include:

- Handling, packaging and shipment of radioactive waste
- Worker radiation protection
- Worker health and safety
- Liquid effluent and stormwater releases
- Hazardous waste generation, storage, transportation and disposal
- Handling, removal and disposal of asbestos
- Handling and removal of lead paint
- Stream encroachment

The majority of radiological activities fall under Title 10 of the Code of Federal Regulation (CFR) and are administered by the Nuclear Regulatory Commission (NRC). Applicable Title 10 regulations include:

- Part 50 - decommissioning activities
- Part 20 - radiation protection
- Part 51 - environmental protection
- Part 61 - disposal of radioactive waste
- Part 71 - packaging and transportation of radioactive waste regulations in 49CFR171 to 174 also apply

Worker health and safety protection during decommissioning is subject to Occupational Safety and Health Administration (OSHA) regulations. The regulations applicable to construction are 29CFR1910 and 1926. These regulations include requirements for respiratory protection (nonradiological), hearing protection, illumination, scaffold safety, crane and rigging safety, chemical usage and release response, and clean-up operations.

The Environmental Protection Agency (EPA) regulations outlined in Title 40 of the Code of Federal Regulations apply as follows:

- Part 61 - asbestos handling and removal

- Parts 122 to 125 - National Pollutant Discharge Elimination System (NPDES)
- Part 141 - safe drinking water standards
- Part 190 - radiation protection standards for nuclear power operations
- Parts 260 to 272 - Resource Conservation & Recovery Act (RCRA)

Asbestos and lead paint handling and removal is subject to OSHA regulations 29CFR1910 and 1926, and EPA regulations 40CFR61, Subpart M. Hazardous waste generation, storage, transportation, are subject to the regulations outlined 40CFR260 through 272 of the Resource Conservation & Recovery Act (RCRA).

8.2 State And Local Requirements

Permits and approvals from or notifications to several State and local agencies are required for safety and environmental protection purposes. Many of the State and local requirements apply to activities that are also subject to Federal regulations previously identified. Decommissioning activities and related site operations that fall under State and local jurisdiction include:

- Air emissions
- Hazardous waste generation, storage, transportation and disposal
- Asbestos removal notification and disposal
- Lead paint removal and disposal
- Solid waste generation, storage, shipment and disposal
- Sanitary waste
- Liquid effluents, including stormwater
- Liquid waste shipment
- Fuel oil storage
- Building permits
- Domestic water wells
- Soil erosion and sedimentation control

Air emissions and asbestos removal for the facility are regulated under the Pennsylvania Air Pollution Control Act in addition to the Federal Clean Air Act. Permits will be obtained as necessary to accommodate decommissioning activities. Notification of asbestos removal will be prepared and submitted to the Pennsylvania Department of Environmental Protection (PaDEP), as required.

Liquid discharges from the facility are regulated by the NPDES permitting system administered by the PaDEP, Bureau of Water Quality

Management. Pennsylvania NPDES regulations are promulgated under the Clean Streams Law (35 P.S. Sections 691.1-691.701).

Generation and disposition of hazardous waste and lead paint removal and disposal are subject to regulations promulgated under Pennsylvania's Solid Waste Management Act (35 P.S. 6018.101 et. Seq.).

Shipment and disposal of solid wastes including asbestos are governed by Pennsylvania's Residual Waste regulations, also promulgated under the Solid Waste Management Act.

Diesel fuel used during decommissioning is expected to be drawn from temporary onsite above ground storage tanks. These tanks are regulated by the State Fire Marshall.

At the local level, building permits will be required for temporary waste handling and packaging or other facilities necessary to support decommissioning activities.

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20) NUREG-1505, A Nonparametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys, United States Nuclear Regulatory Commission, August 1995.

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