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BWXT

Nuclear Products Division

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February 25,2005
05-005

10-27

Director, Office of Nuclear Material
Safety & Safeguards
U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Reference: (1) Letter dated December 27, 2004, WC Gleaves (NRC) to LR Morrell (BWXT), 'Request for Additional Information on Your Environmental Report for the License Renewal Application (TAC L31836)"
(2) Letter dated January 19,2005, Gleaves (NRC) to LR Morrell (BWXT); "Request for Additional Inforrnation on Your Environmental Report for the License Renewal Application (TAC L31836)"

Subject: Response to Request for Additional Inforrnation (TAC L31836)

Gentlemen:

BWX Technologies, Inc. (BWXT) is providing its response to the December 27, 2004 request for additional information concerning BWXT's Environmental Report, which was submitted in support of the License Renewal Application. Enclosure 1 provides response to the questions concerning the Environmental Report. Enclosure II provides the revised Environmental Report.

If you have any questions or require further information in this regard, please contact me at 434-522-6570.

Sincerely

Leah R. Monell
Manager, Licensing & Safety Analysis
(Licensing Officer)

Enclosures

c: U.S. NRC, Region II
NRC Resident Inspector
William Gleaves, NRC

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Enclosure I
BWXT Response to RAI Questions

ENCLOSURE 1

1. Clarify Existence, Management, and Impacts of High-Level Radioactive Solid Waste.

With regard to high-level radioactive waste, clarify:

- wether BWX Technologies, Inc. (BWXT) produces high-level radioactive waste;
- How BWXT would manage such waste, and
- What impacts would be associated with such waste.

Table 3-13 of the March 10, 2004, Environmental Report for Renewal of License SNM-42, (ref. 1) indicates that the Lynchburg Technology Center has generated radioactive high-level waste. No mention of this high-level waste was found in the environmental report text. BWXT should; 1) confirm the existence of this high-level waste; 2) describe any impacts and the waste management system (collection,, storage, and disposal) for the waste; or 3) provide justification for the lack of such impacts and system.

BWXT RESPONSE:

Section 2.2.4 of the Environmental Report has been revised to include a description of the high level waste, its impact and the waste management system.

2. Confirm Site Size.

Clarify the size of the **BWXT** facility site: Section 2.2.1 of the environmental report (ref. 1) states that the size is 193 ha [478 acres]. In Section 3.1 of the supplemental environmental assessment for renewal of the license (ref. 4), the BWXT facility is stated to be located on 212.5 ha [525 acres]. BWXT should confirm the size of the site.

BWXT RESPONSE:

Section 2.2.1 of the Environmental Report has been revised to reflect the current site acreage.

3. Update Population Distribution Data around BWXT Site

Clarify the current population distribution in the vicinity of the BWXT facility. Since the last license renewal in 1995, population and income data from the 2000 Census (**U.S.** Census Bureau, 2004) have become available. The total population for Lynchburg and a three-county region of influence has been included in the March 10, 2004, environmental report (ref. 1). The population distribution, however, was not updated to reflect the new information. BWXT should provide updated population distribution data similar to the 1995 supplemental environmental assessment (ref. 4), Table 3.4 and Figure 3.1 or a rationale for why such an update is not necessary to assess the socioeconomic and public health impacts from the proposed action.

BWXT RESPONSE:

Section 3.10 of the Environmental Report has been revised to include updated population distribution data.

4. Provide Regional Air Quality Information

Provide information about the BWXT air quality region. The description of air quality in Sections 3.6 and 4.6 of the environmental report (ref. I) does not identify the air quality region in which the BWXT site is located or indicate whether this region is designated as a nonattainment or maintenance area for any of the six National Ambient Air Quality Standards criteria pollutants (40 CFR 81.343). The region attainment status can affect the permitted emission levels for the BWXT facility and is required to support the description of air quality.

BWXT RESPONSE:

A discussion of Regional Air Quality Information was included in Section 3.6. Section 4.6 has been revised to include a discussion on air emissions from the facility.

5. Expand **Description of Regional Historic and Cultural Resources**

Describe the regional historic and cultural resources. The description of these resources presented in Sections 3.8 and 4.8 of the environmental report (ref. 1) is limited to sites identified in the National Register of Historic Places. To enable NRC to assess compliance with requirements in Section 106 of the National Historic Preservation Act and 30 CFR Part 800, BWXT should provide the following:

- A brief history of the area including Native American settlement, European settlement, and agricultural and industrial development,
  Information from past consultations with the State Historical Preservation Officer and Tribal Historical Preservation Officer,
- A discussion on whether any Native American Tribes are affected or impacted by the BWXT site,
- Information from past cultural resource evaluations and archeological surveys conducted at the BWXT site or in surrounding areas,

- Identification of management guidelines, operating procedures, or memorandums of understanding with the State Historical Preservation Officer concerning protection or mitigation procedures in the event of archeological discoveries at the site, a,$
- An indication if BWXT facility buildings have been surveyed and evaluated for significant historic or cultural resources because of their age.

BWXT RESPONSE:

Section 3.8 of the environmental report has been revised to expand upon the regional historic and cultural resources.

Due to the sensitive nature of the operations at the Mt. Athos NPD site and customer requirements regarding communications with public agencies, BWXT will not make any additional contacts with external agencies concerning historical issues or issues related to the age of the facility buildings. BWXT has never executed a memorandum of understanding with the state historical preservation officer concerning protection or mitigation procedures in the event of archaeological discoveries at the site.

6. **Clarify Existence, Management, and Impacts of Waste Disposed Onsite**

Clarify whdther BWXT currently disposes of any waste onsite. Section 2.4 of the 1995 environmental assessment (ref. 4) indicates that some solid wastes are disposed onsite. BWXT should:

a. Identify wastes disposed of onsite;
b. Provide relevant information such as disposal location, generation rates, and volumes;
c. Identify any impacts.

BWXT RESPONSE:

Section 22.4 has been revised to include a discussion of onsite waste disposal.

7. **Update Mixed Waste Management**

Provide information describing whether BWXT ships mixed waste offsite for disposal. Section 2.4.2 of the environmental assessment (ref. 4) indicates that the sludge bottom mixed waste is stored onsite since no license commercial disposal facilities were available that could accept this waste. An update on mixed waste disposal is required. If the mixed waste is not shipped offsite, BWXT should provide information comparing the waste generation rates with the remaining storage capacity and identify any impacts.

BWXT RESPONSE:

Section 2.2.1 has been revised to include a discussion of mixed waste management.

8. Explain BWXT Incident Rates

Describe the BWXT Occupational Safety and Health Administration (OSHA) incident rate in detail: Section 3.11.2 of the environmental report (ref. 1) states that the average OSHA incident rate from 2000 to 2003 was 1.8.. BWXT should provide units for this value and compare this incident rate to industry standards.

BWXT RESPONSE:

section 3.1 1.2 of the Environmental Report has been revised to describe thk OSHA incident rate and to compare this incident rate to industry standards.

9. **Provide Nonradiological Exposure Protection** Plans

Provide information about non-radiological exposures. The public and occupational health information presented in Section 4.12 of the environmental report (ref. 1) is limited to radiological matters.. BWXT should describe the policies or programs that protect worke'rs from industrial hazards and non-radiological chemical exposures.

BWXT RESPONSE:

Section 4.12 has been revised to discuss "on-radiologicalexposures including BWXT policies and programs that protect workers from industrial hazards and non-radiological chemical exposures.

10. **Provide Radiological Occupational Dose Data**

Provide occupational radiological exposure data; Section 3.112 of the environmental report (ref. 1) states that occupational exposures are well below the limits specified in 10 CFR Part 20 and that the average exposure for occupationally exposed personnel is less than 1 mSv [100 mrem] per year (total effective dose equivalent). However, no supporting exposure data are presented. BWXT should provide data to support the calculated occupational exposures.

BWXT RESPONSE:

Section 3.11.2 of the Environmental Report has been revised to clarify occupational exposures. Table 3-13, Total Effective Dose Summary was added as supporting data.

11. Identify Any New Operations

Identify whether any new operations are associated with the BWXT license renewal request. The environmental report (ref. 1) did not address whether new operations were planned. The evaluation of environmental impacts for continued operation of the site is based on review of the impacts from past and current operations. Any planned changes from past or current operations need to be accounted for to evaluate their impacts. BWXT should clarify if plans for new operations exist and if so, identify the associated anticipated environmental impacts, such as changes in the type or quantity of effluents.

BWXT RESPONSE:

While BWXT continually explores new business opportunities, there are no new operations to be considered as part of this license renewal. In the event of future new operations, appropriate license submittals will be made with appropriate information regarding anticipated environmental impacts.

12. Identify Impacts from Removed License Conditions

Provide information concerning impacts from removed license conditions. In the letter requesting the license renewal (ref. 4), BWXT requested that several license conditions be deleted from SNM-42. BWXT should evaluate whether there would be any impacts if these license conditions were removed from the license.

BWXT RESPONSE:

BWXT considers the requested License Condition deletions to be administrative in nature and have no impact on safety or operation of the facility. Specific information for each deletion follows.

(b)(4)

Ex4

With the issuance of the revised 10 CFR 70 in September 2000, all licensees are required by regulation to perform an Integrated Safety Analysis (ISA). Therefore, all credible normal and abnormal conditions are evaluated during the extensive review process required by the ISA methodology. This condition is obsolete and its deletion has no impact.

(b)(4) Ex4

With the issuance of the revised 10 CFR 70 in September 2000, all licensees are required by regulation to perform an ISA. Therefore, all credible normal and abnormal conditions are evaluated during the extensive review process required by the ISA methodology. This condition is obsolete and its deletion has no impact.

Condition S-5:
"Notwithstanding Paragraph 1.10 of Chapter 1 of the license application, the licensee shall perform an Integrated Safety Analysis (ISA) for the facility operations, processes, and structures, to ..."

With the issuance of the revised 10 CFR 70 in September 2000, all licensees are required by regulation to perform an ISA. Therefore this condition, which pre-dated the revised regulation, is obsolete and its deletion has no impact.

Condition S-12:
"The licensee may transport..."

This condition expired on June 1, 2002. Therefore its deletion has no impact.

Condition SG-4.19:
Notwithstanding the commitment in Section 4.7.1.2 of the Fundamental Nuclear Material Control (FNMC) Plan..."

All activities associated with the receipt measurement and document distribution for the material identified in the licensee's letter of October 7, 1998 have been completed. Therefore this condition is obsolete and its deletion has no impact.

Condition SG-4.22:
Notwithstanding the commitment in Section 4.7.1.2 of the Fundamental Nuclear Material Control (FNMC) Plan..."

All activities associated with the receipt measurement and document distribution for the material identified in the licensee's letter of January 3, 2000 have been completed. Therefore this condition has expired and its deletion has no impact.

Condition **SG-5.7:**
"The licensee is authorized to conduct the MC&A activities associated with recovery of zero power scrap described in the January 3, 1990 letter from A. F. Olsen to Martha Williams."

All MC&A activities associated with the recovery of zero power scrap identified in the licensee's letter of January 3, 1990 have been completed. Therefore this condition is obsolete, and its deletion has no impact.

13. Identify **Types** and **Levels of Nonradiological Air Emissions** and Compare. Values **to Regulatory Limits**

Provide information on all regulated pollutants from the nonradiological air emission data. Information in Section 4.6 of the environmental report (ref. 1) for onsite nonradiological air emissions is limited to nitrogen oxides and hydrofluoric acid. Section 5.1.2 of the 1995 environmental assessment (ref. 4) indicates that sampling for nitrogen oxides and hydrofluoric acid occurs intermittently. The offsite or environmental air monitoring described in Section **4.6** of the environmental report (ref. 1) was limited to radiological sampling. BWXT should provide sampling frequency and emission levels for both onsite and offsite, (environmental) monitoring for, all National Ambient Air Quality Standards pollutants and all relevant National Emissions Standards for Hazardous Air Pollutants and compare these levels to regulatory limits or provide the justification for why nonradiological monitoring is limited to nitrogen oxides and hydrofluoric acid on an intermittent basis.

BWXT RESPONSE:

The paragraph concerning nonradiological air emissions was revised in Section 4.6; Table **4.7 was deleted, and** was replaced by Table **4.7.A** "Title V Annual Emissions Summary", and Table 4.7.B "Process Air Permit limits and Performance".

14. Identify Sources and Levels of Liquid effluents for All Outfalls and Compare Values to Regulatory Limits

Identify the sources, discharge levels, and regulatory limits for all outfalls. **Section 3.4.1** of the environmental report (ref. 1) is not clear on how many outfalls are permitted (i.e., 3 or 6) under Virginia Pollutant Discharge Elimination System Permit No. 00367; Also, effluent limitations presented in Table 3-2 of the environmental report (ref. 1) are for Outfall 001 only. Section 2.2.1 of the environmental report (ref. 1) identifies the source for Outfall 001 as effluent from the Waste Treatment Facility but does not indicate the source for any other outfall. BWXT should provide information indicating the source for each outfall, the nonradiological discharge levels from each outfall, and a comparison of these discharge levels to the appropriate regulatory limit for that outfall.

BWXT RESPONSE:

Section 3.4.1 was revisedto clarify the number of permitted outfalls. Table 3.2 was revised to include effluent limitations for all outfalls. Section 2.2.1 was revised to provide information concerning the source for each outfall.

15. **Compare Radiological Air Emission Levels to Regulatory Limits**

Compare radiological air emission data to regulatory limits. Radiological air emissions data for the stacks are provided in Table 4-5 and for the boundary sites in Table 4-6 of the environmental report (ref. 1). BWXT should compare these emission levels to the regulatory limits.

BWXT RESPONSE:

Section 4.6 of the Environmental Report was revised to include a comparison of the emission levels to regulatory limits and Table 4-5to include annual offsite dose..

16. **Provide Storm Water Management Program Information**

Describe the BWXT storm water management program. The environmental report (ref. 1) does not contain any information about such a program. BWXT should provide a brief description of any storm water management program, conducted onsite, including outfalls and associated regulatory limits.

BWXT RESPONSE:

Section 2.2.3 of the Environmental Report was revised to include information concerning stormwater management.

17. **Provide Information on Current Status of Water-Supply Wells**

Indicate the current status of any on-site wells as well as future plans for those wells. Section 4.4 of the environmental report (re: indicates that there is no longer any impact from water withdrawals. Beginning in 2003, BWXT began using water suppliedby the Campbell County utilities and Service Authority public water supply. This eliminated the need to withdraw water from the James River or on-site wells.

BWXT RESPONSE:

Section 4.4 was revised to clarify which wells were abandoned and which wells will remain as a result of the switch to the public water supply system,

18. **Clarify Status of All License Conditions**

Whether BWXT intends to include or remove Safety conditions S-1, S-2, and S-17 from the renewed license. In the letter requesting the license renewal (ref; 2), BWXT identifies'which'conditions are to be brought forward and which ones are to be deleted. conditions S-11, S-2, and S-17 do not appear in either list. BWXT should clarify whether they want these conditions included or removed from the license.

BWXT RESPONSE:

BWXT anticipated License conditions S-1 and S-2 would remain. Further, we anticipated these, license ,conditions would reference the most recent License Application'and Emergency Plan, respectively. This was not specifically stated in the letter since we believed NRC would take this action as a matter of license issuance.

'condition S-17 was issued after the renewal application was submitted. The license renewal request submitted on June 30, 2004, referenced Amendment 104 and several pending amendment requests. Since the renewal submittal, several amendments have been approved. BWXT is currently operating on Amendment 111. in order to eliminate paperwork confusion, BWXT had always planned to resubmit and update the renewal request letter and the attached ,Compliance Matrix prior to final approval.

Enclosure II

Revised Environmental Report

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Environmental Report

For Renewal of License SNM-42

BWXT, Nuclear Products Division

Lynchburg, Virginia

March 10, 2004

Revision 1

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1.0 INTRODUCTION

In accordance with 10CFR51.60, BWX Technologies, Nuclear Products Division (NPD) has prepared this environmental report dated March 10,2004, as a part of the license renewal effort for license SNM-42. Revision 1 of this report was submitted in response to the December 27, 2004 NRC request for additional information..

NUREG-1748, *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs* and NUREG-1520, *Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility* were used as guidance in the preparation of this report.

1.1 Purpose and Need for Proposed Action

The proposed action is the renewal of license SNM-42. SNM-42 was most recently renewed in September 1995. A supplemental Environmental Assessment was prepared by the NRC in June 1995 in support of the last license renewal. Renewal of SNM-42 will allow operations at NPD to continue.

NPD is a uranium fuel fabrication, and research facility located in Lynchburg, Virginia. NPD fabricates nuclear components for various agencies and performs recovery of scrap uranium generated (b)(4) [redacted] NPD is authorized to possess radioactive materials for the assembly and fabrication of nuclear components. The primary missions of the facility are: Ex 4

- (b)(4) [redacted] universities and research reactor facilities; Ex 4
- Fabrication of targets for irradiation in reactors;
- Performance of enrichment adjustment operations;
- Recovery of processed "scrap" uranium; Ex 4
- Examination of irradiated (b)(4) [redacted] reactor components; Ex 4
- Analytical activities such as laboratory analysis, preparation and modification of radiation sources; and
- Preparation and decontamination of reactor related hardware for inspecting, evaluating and measuring reactor components.

1.2. Proposed Action

The proposed action that is supported by this environmental report is the renewal of license SNM-42 and the continuation of operations at the NPD facilities.

2.0 DETAILED DESCRIPTION OF THE ALTERNATIVES

2.1 No Action Alternative – Cessation of Operations

The no action alternative would cause termination of licensed operations, and eventually initiation of decommissioning activities. The environmental impact from decommissioning would, in the short term, be similar to operation of the facility, with the notable exceptions of a significant increase in waste generation and an increase in unemployment in the area. Due to the important products produced by BWXT, if operations were terminated, these processes would be transferred to a new site. The new site would likely have more significant environmental impacts due to construction and start up activities.

2.2 Proposed Alternative - continued Operation

The proposed action is license renewal in support of continuing operations. Currently there are no major modifications planned to the facilities that would pose an environmental impact. The environmental impact of continued operations at NPD can be evaluated by analyzing data from current and past operations at the facility.

2.2.1 Description of current Operations

BWXT (formerly Babcock & Wilcox) is an operating company of McDermott Inc., a subsidiary of McDermott International. BWXT has conducted operations at the site, since 1955.

The NPD site is located on the James River in the northeastern corner of Campbell County in the central part of Virginia approximately 5 miles east of Lynchburg, Virginia (see Figure 2-1).

The center of the facility lies at an approximate latitude/longitude of 37° 25' north, 79° 4' west. Figure 2-2 depicts the topography of the site and surrounding areas. The site includes 497 acres, approximately 54 of which are enclosed within a security fence.

License SNM-42 details the types and quantities of radioactive material BWXT is authorized to possess. The primary type of material is uranium in varying enrichments and different chemical forms. NPD also handles lesser amounts of transuranic as well as by-product material. The possession limits are detailed in section 1.4 of license SNM-42.

NPD Operations

The main manufacturing facilities occupy the central area of the site, as shown in Figure 2-3. The NPD manufacturing facilities along with the support facilities occupy approximately 730,000 square feet. The fabrication of reactor components and uranium recovery operations are conducted in this area. The feed materials (b)(4) [redacted] Ex4 The fuel manufacturing process includes classified technology and proprietary methods unique to the facility. A more detailed description of operations can be found in the ISA Summary in Chapter 3 of SNM-42 (Docket No. 70-27).

The recovery of uranium from scrap or recycled material and other programs (b)(4) [redacted] Ex4 More detail can be found in Chapter 3 of SNM-42.

LTC Operations

The Lynchburg Technology Center (LTC) facilities are located to the west of the main NPD facilities. LTC operations are widely diverse and change frequently to meet the demands of customers. Operations involving radioactive material are mostly limited to the lab and hot cell operations areas in Building B. The analytical labs are also located in these buildings. Figure 2-4 provides a layout of LTC facilities.

A majority of LTC facilities are used for office space, or non-radiological operations. (b)(4) [redacted] Ex4 The building also houses a machine shop for work on contaminated equipment, as well as research and analytical labs.

The hot cells provide an environment for conducting destructive and non-destructive testing and examination of radioactive materials requiring significant shielding and isolation controls. Examples of materials handled in the hot cells include reactor core hardware components, irradiated fuel and sealed sources. Personnel operate the hot cells in the hot cell operations area.

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The cask handling area is a high bay area used to ship and receive containers of radioactive material. (b)(4) [redacted] Ex4 The pool water is treated using ion exchange columns.

The radiochemistry and analytical laboratories conduct measurements of samples from other facilities, including NRC and DOE facilities.

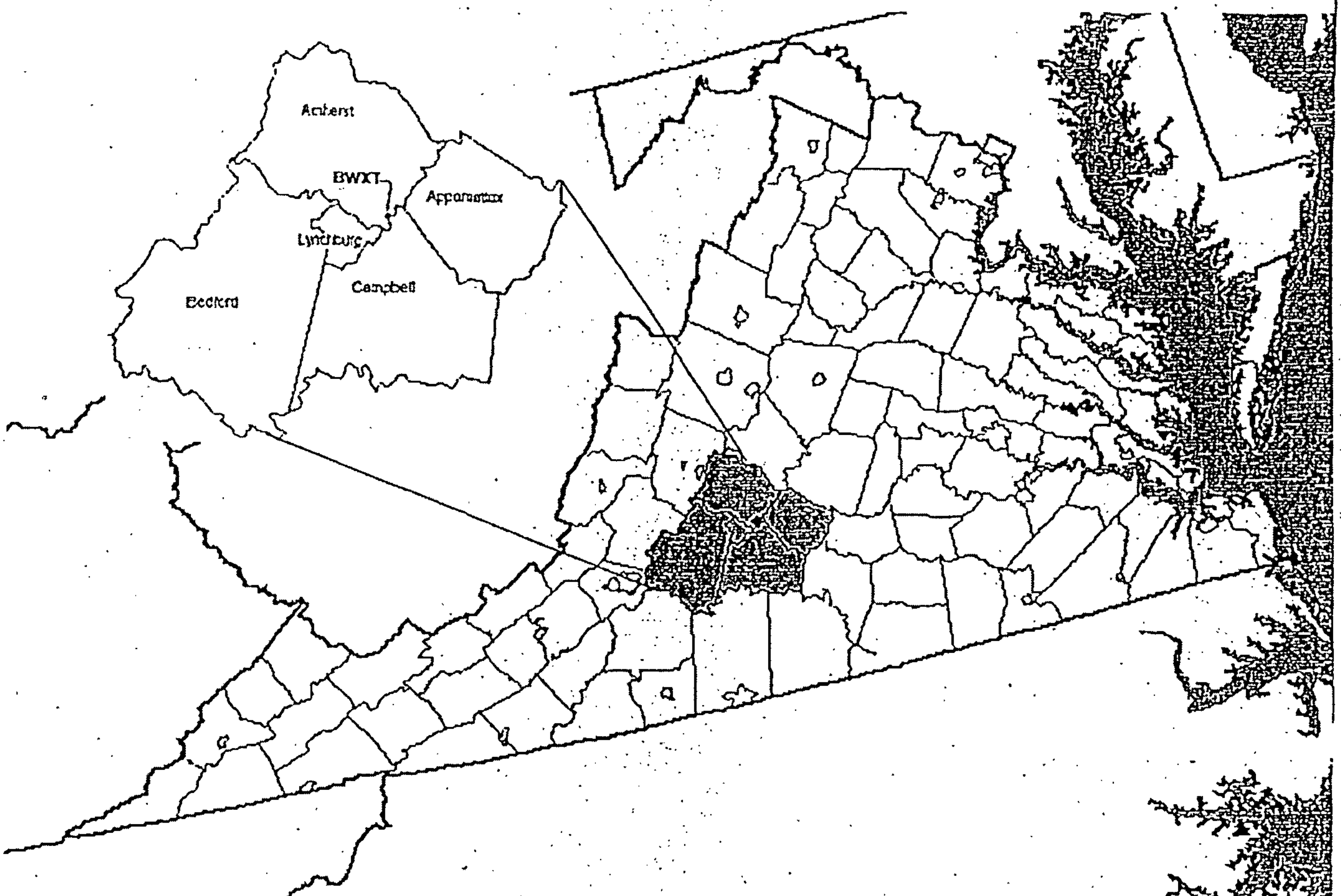
Waste Treatment Operations

The Waste Treatment Facility (WTF) is located north of the main NPD facility. The WTF includes liquid waste treatment operations, as well as decontamination operations. The facility encompasses approximately 25,000 square feet, as shown in Figure 2-5. The facility consists of equalization, neutralization and other treatment tanks, a microfiltration unit, a sludge processing system, and a final equalization pond. Wastewater flows from the retention tanks and the LTC to the Low Level Radioactive (LLR) Feed Equalization Tanks either by gravity or through the LLR Pump Station. An Equalization Tank Header with automatic valves directs the wastewater to either of two (2) 40,000-gallon equalization tanks inside the equalization tank building. The equalization tanks are mixed in order to provide homogenization of the waste stream prior to batch-processing the LLR wastewater through the treatment system. Figure 2-6 summarizes the liquid waste treatment process.

LLR wastewater is pumped from the equalization tanks to a neutralization tank. In the neutralization tank, hydrated lime slurry is added to the waste stream for removal of contaminants such as fluorides and metal ions (aluminum, chromium, cadmium, zirconium, and uranium). Following an adjustable reaction time, the lime-wastewater mixture is pumped to the Memtek system for further treatment.

Precipitation is initiated at the head of the Memtek microfiltration unit when the pH of the wastewater is elevated through addition of a solution of liquid sodium hydroxide (liquid caustic). A variety of insoluble metal hydroxides precipitate out of solution as the wastewater pH is increased to alkaline levels.

Figure 2-1 Geographical Location of BWXT Facility



National Atlas of the United States

Figure 2-2 Topographic Map of the Area.

Figure 2-3 Site Drawing

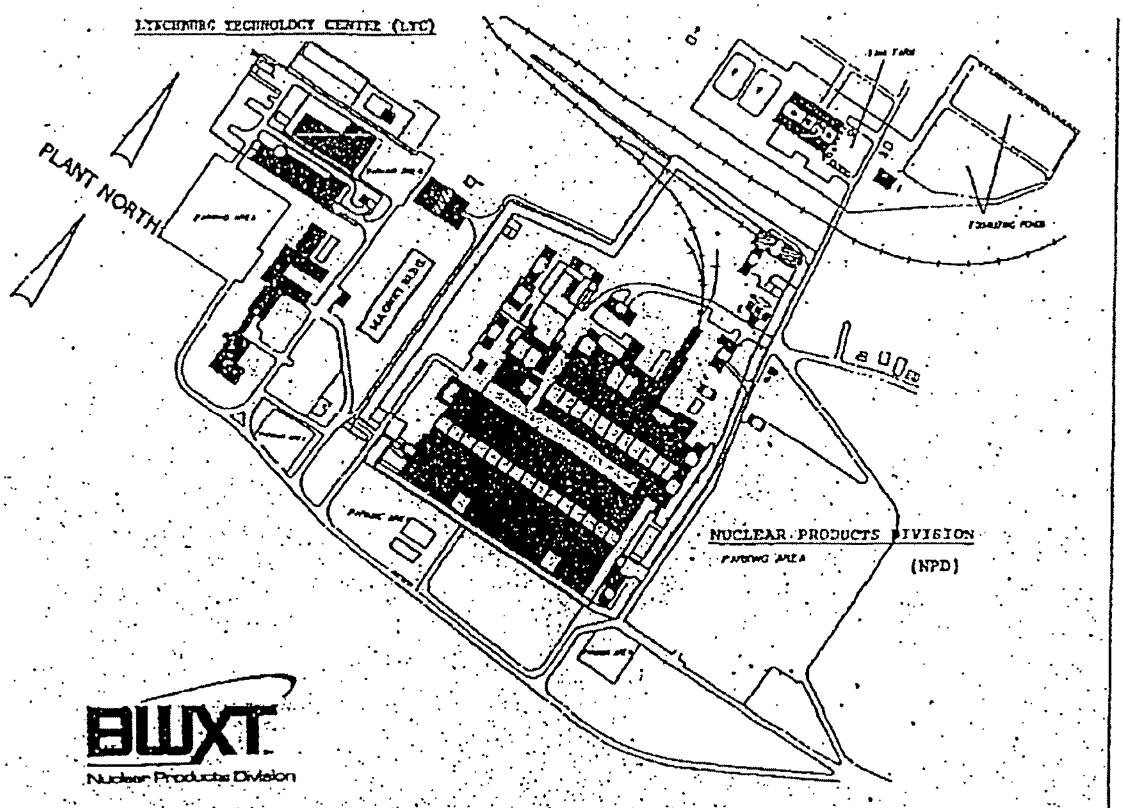
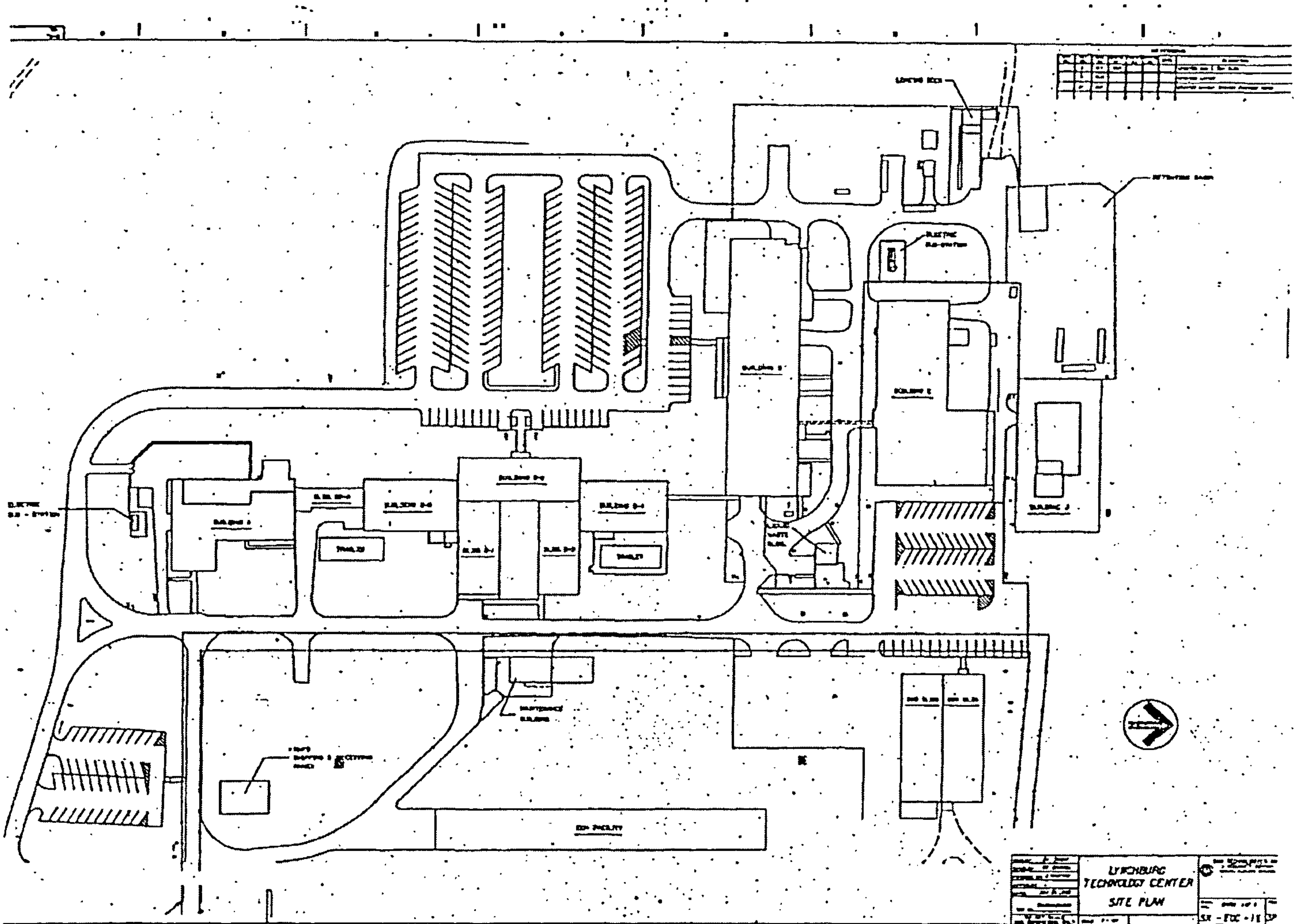


Figure 2-4, LTC Layout



The result of the combined addition of lime slurry and liquid caustic is an alkaline waste stream consisting of water and a variety of suspended solids. The wastewater is concentrated in a tank and then pumped through a series of microfilters (~0.1 micron) that separate the suspended solids from the water. Filtrate from the microfiltration system and the filter presses flows to a tank and then to either of two final effluent tanks. Sulfuric acid may be added to the final effluent tanks to adjust the pH of the combined filtrate, down to permitted discharge levels (6-8). Water from the final effluent tanks is discharged to a sump, final effluent pond #2, and, eventually to the James River.

The LLR sludge dewatering and drying system handles solids from the Memtek microfiltration system, the LLR clarifier, and/or the sanitary sludge holding tank. The solids are either pumped to a tank for thickening via polymer addition, or pumped directly to either one or both of the LLR filter presses. The filter presses utilize hydraulic pressure to force high-solids wastewater through a series of filter cloths. The water that is pressed and drained out of the solids flows by gravity to the effluent day tank and is mixed with the LLR Memtek filtrate and pumped to the final effluent tanks.

Dewatered sludge from the filter presses (called "filter cake") is dried in either of two propane gas-fired dryers at approximately 500-550° F. The dryers empty to a pug mill where mixing and size reduction occurs, then to a drum packaging station. The dried solids are packaged in 55-gallon drums for final non-destructive radiological assay and disposal. Solids generated through the LLR system are called "Treatment Process" (TP) solids. Drums of collected TP solids may be compacted in the "Supercompactor" and/ or shipped for burial, in accordance with applicable regulations for disposal of LLR waste.

The LLR final effluent tanks are located adjacent to the LLR equalization tanks inside the Equalization Tank Building. The two 15,000 gallon tanks receive flow from the LLR Memtek system and the filter presses via the effluent day tank in the WT LLR controlled area. They are used for homogenization, monitoring and final pH adjustment of wastewater prior to discharge to final equalization pond #2 and VPDES permitted Outfall 001.

There are a number of internal VPDES-permitted outfalls that do not receive LLR wastewater. Site pickling acid wastewater is treated in a Memtek™ microfiltration system identical to the system used for LLR wastewater. Effluent from this system combines with effluent from the LLR system in final effluent pond #2 (internal outfall 701). Outfall 701 also receives wastewater from the site grit blasting, processes following equalization, settling and clarification. NPD also has a small extended aeration activated sludge process for treatment of sanitary wastewater. The sanitary system discharges to internal outfall 101 and then combines with other site industrial wastewaters immediately upstream of final outfall 001. Site once-through cooling water is routed to final equalization pond #1 prior to combination with the other waste streams upstream of final outfall 001. Backwash from water treatment systems is filtered and clarified prior to discharge to final equalization pond #1 where it mixes with once-through cooling water. Effluent from final equalization pond #1 is internal outfall 601. Permit monitoring requirements and average discharge levels for all outfalls are presented in Table 3-2.

Figure 2-5, WT Facility Layout

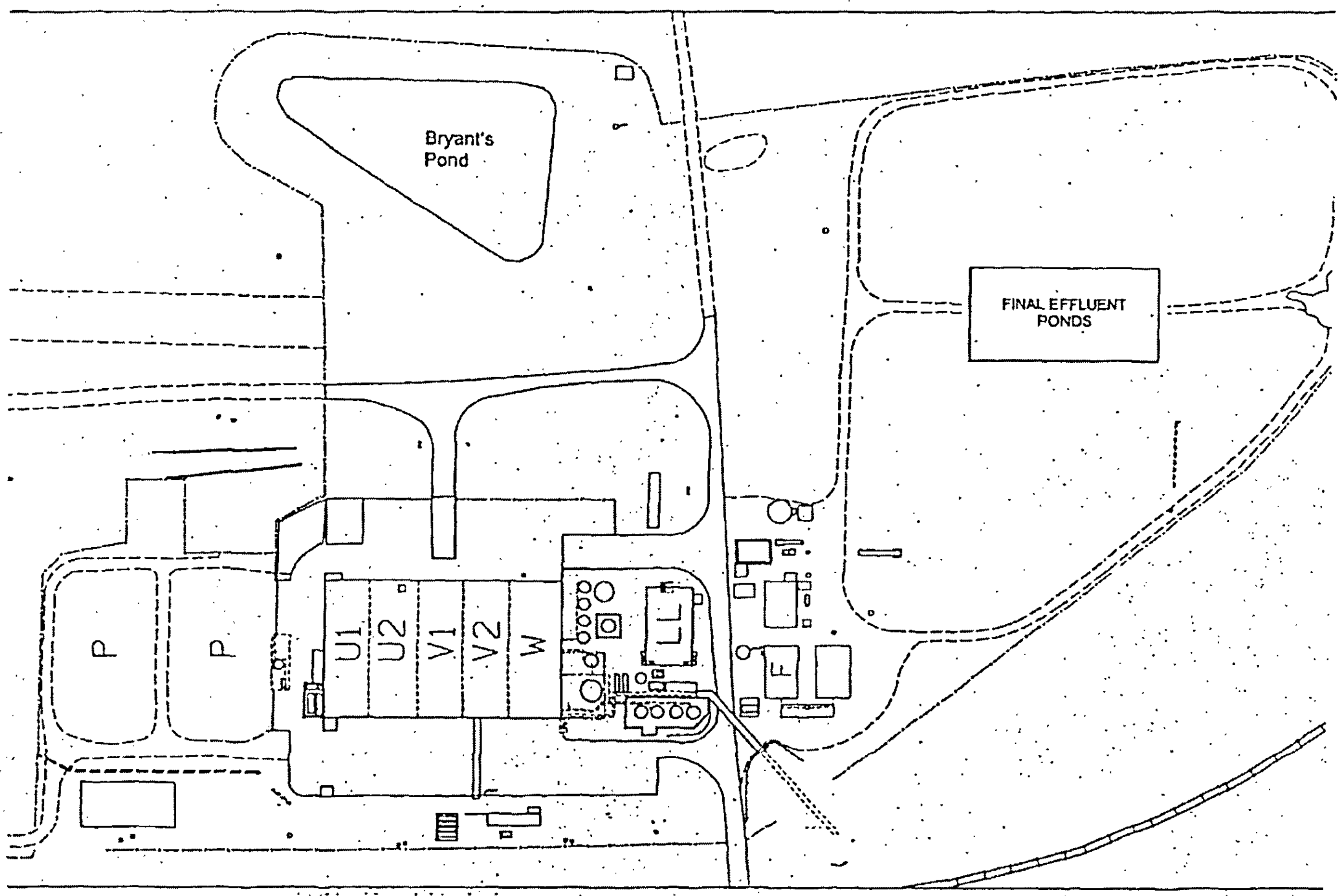
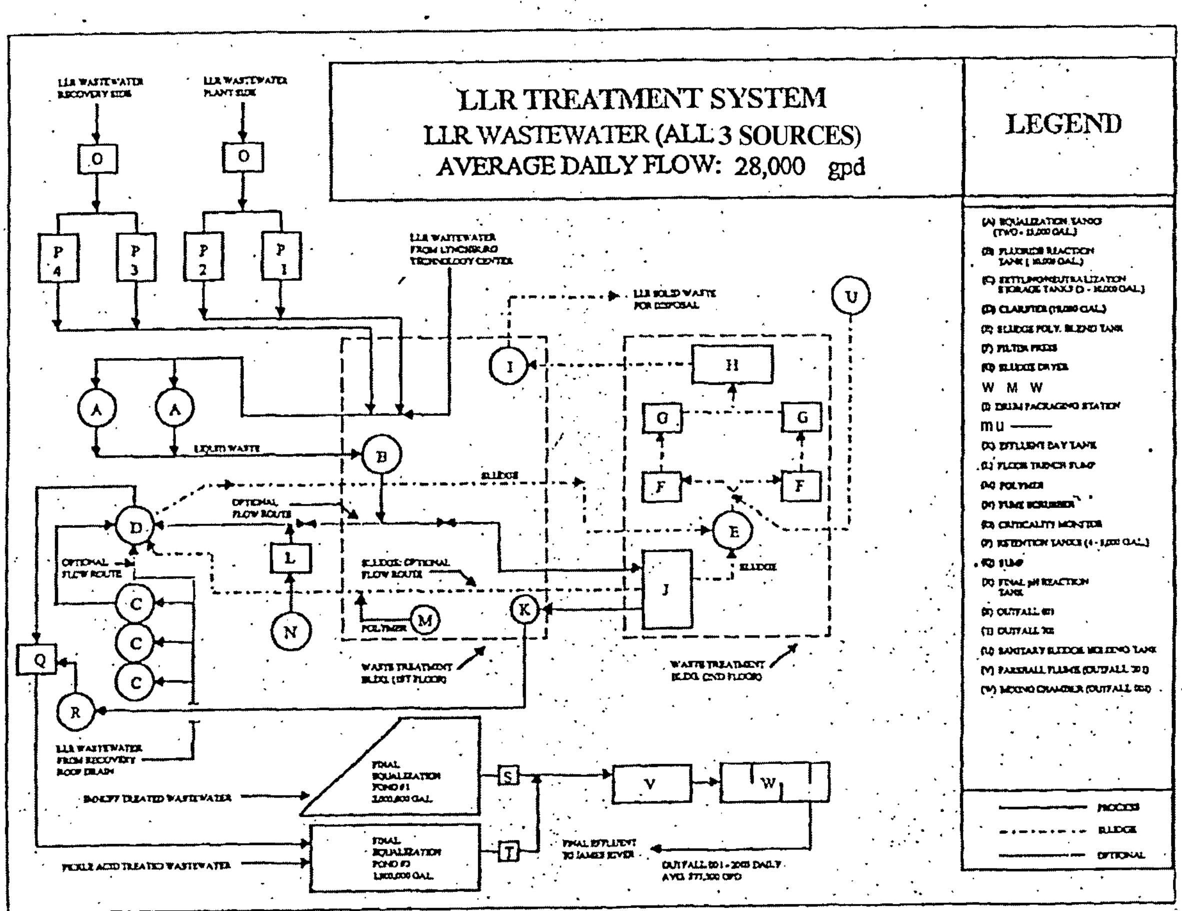


figure 2-6, WT Process Summary



In addition to treatment of wastewater, the WTF may be used to treat a variety of miscellaneous solids and liquids generated at NPD. Solids, sludge, and solutions that are compatible with the Waste Treatment Facility system may be added to the system.

These materials are introduced into the WTF via waste drums, and are staged at a ventilated hood in the controlled area. Solids and sludge may be added to the LLR pug mill or dryer(s). Liquids may be added to the bottle-processing tank. This is a small tank adjacent to the hood that transfers solutions to the Waste Treatment Facility fluoride reaction (neutralization) tank,

The Decontamination Facility, located in the western portion of the WTF, is utilized for decontamination of radiologically contaminated materials for recycling, reuse, or disposal. Materials processed in this facility include piping, ductwork, building materials, office furniture, concrete masonry units, pumps, fans, motors, etc. These materials are recycled, reused, or scrapped if they meet free release limits. If they fail to meet free release limits, they are disposed of as low level radiological waste.

The type of decontamination process that is implemented in the processing area varies according to the decontamination needs and/or the type of material. Some materials can be decontaminated by wiping them down with alcohol or cleaning solution (as described above), while others require more aggressive technique such as grinding or scabbling. All abrasive decontamination techniques utilize HEPA vacuums and ventilated hoods to minimize the amount of particulate material released to the area. With the exception of the hand wash sink in the change room, which discharges to the LLR Clarifier via the Waste Treatment floor drain system, there are no drainage connections to Waste Treatment.

The Supercompactor Facility, located within the secured fenced area, is utilized for the compaction of drums containing LLR solid wastes to reduce their volume, and thereby reducing disposal costs. LLR solid wastes processed in this facility include, but are not limited to; dry active waste, TP solids, discard solids, light metals, and construction materials.

Following assay, 55-gallon drums of LLR solid waste are transported to the drum storage area outside of the supercompactor building, and staged for processing through the supercompactor. The drums are then compacted and repackaged in 70-gallon overpack drums and shipped to an approved and licensed LLR waste disposal facility.

BWXT generates and ships a small amount of mixed waste each year, approximately 0.3m3/year, the majority of which is radioactive trichloroethylene. The waste is packaged and shipped off site for treatment and disposal within 90 days of generation. BWXT has adequate storage, treatment and, disposal options for the mixed wastes that are generated.

2.2.2 Gaseous Effluents

Gaseous effluents from radioactive material operations are treated, and sampled prior to discharge. Table 2-1 lists each of the monitored stacks at NPD, along with the pollution control system and physical parameters.

Gaseous effluents from non-radioactive operations are also listed in Table 2-1. Some of these lists each of the monitored stacks at NPD, along with the pollution control system and physical parameters.

Table 2-1 Characteristics of Current Stacks

Stack No.	Stack/Area	Rad:	Non-Rad	Pollution Control Equipment	Release Height (m)	Building Height (m)	Building Width (m)	Stack Diameter (m)	Stack Flow Rate (m^3/s)[1]
11	CRF Rotary Calciner	X	X	HEPA filter Cyclone/After Burner/Scrubber	10.4	9.5,	54.1	0.8	9.9
35	14A Maintenance	X		HEPA filter	17.0	9.5	54.1	0.6	3.1
38	13A/14A/15A Dry Finishing Furnaces	X	X	HEPA filter Scrubber	14.5	9.5	54.1	1.3	18.1
15	Recovery Scrubber	X	X	Scrubber	25.3	9.5	54.1	0.9	8.5
40	Downblend Scrubber	X	X	Scrubber	24.9	8.9	15.2	0.4	0.9
39	Waste Mgmt Center	X		HEPA filter	7.9	6.4	162.4	0.4	0.9
18	3A Stack	X		HEPA filter	7.3	6.4	162.4	0.24	0.6
19	MFP Load	X		HEPA filter	7.3	6.4	162.4	0.4	0.7
20	Reclamation	X		HEPA filter	9.5	4.9	162.4	0.3	0.4
23	2A Stack	X		HEPA filter	7.3	6.4	162.4	0.4	1.3
24	3A Pharmacy	X		HEPA filter	7.3	6.4	162.4	0.5	2.0
43	1A Maintenance	X		HEPA filter	7.9	6.4	162.4	0.7	4.4
37	12A Chem Lab Scrubber	X		Scrubber	12.1	9.5	54.1	0.9	10.3
26	Met Lab	X		HEPA filter	11.1	6.4	162.4	0.5	4.4
16	RTRT	X		HEPA filter	11.9	9.5	179.7	0.8	5.5

~~WITHHOLD~~

Stack No.	Stack/Area	Rad	Non-Rad	Pollution Control Equipment	Release Height (m)	Building Height (m)	Building Width (m)	Stack Diameter (m)	Stack Flow Rate (m³/s)[1]
42	NMC Storage	X		HEPA filter.	11	9.5	179.7	0.3	1.0
30	Laundry.	X		Filter (non-HEPA)	3.7	4.9	32.5	0.6	2.9.
32	Compactor	X		HEPA filter	3.7	4.9	32.5.	0.4	1.1
33	Decon	X		HEPA filter	6.7	5.2	52.0	0.5	2.0
36	Retention Tanks	X		HEPA filter	9.8	8.2	16.8	0.3	0.5
31	Waste Treatment Scrubber	X		Scrubber	7.3	6.4	52.0	0.4	1.9
VS-5A-1	5A Pickling		X	Scrubber	40.9	N/A	N/A	1.8	21.6
VS-9-1	9 Acid Clean Line		X	Scrubber	35.9	6.4	179.7	1.0	0.5
VS-B-1	B NPD Boilers		X	None	16.4	6.4	162.4	1.8	0.7
VS-BB-2	LTC Boiler		X	None	13.6	8	25	0.5	0.3
VS-BC-1	LTC Boiler		X	None	10.0	8	25	0.5	0.3
	50 meter Stack	X		HEPA filter	53	3	25	1.22	15.1
	AC Stack[2]	X		Scrubber	11	8	25	0.9	1.3
	RCL Stack	X		Scrubber	11	8	25	0.37	1.6

1 - flow rates based on average 2003 values;
2 – formerly the NEL Stack

Stacks emitting radioactive material are continuously sampled; Stack flow rates are measured quarterly to determine the isokinetic sampling flow rate; Samples are pulled through a pitot tube, to the sampling device. Samples are collected each normal working day, in accordance with license requirements.

2.2.3 Liquid-Effluents

Liquid wastes from the main facility are collected and discharged in an above ground drain line to the waste treatment facilities, located north of the main facility and at a lower elevation. The largest generator of radioactive liquid waste is the uranium, recovery facility.

Ex4

During this process, acidic solutions containing low-level quantities of uranium are generated. Recovery and other process areas that may potentially generate high concentrations of radioactivity are sampled and analyzed prior to discharge.

Liquid wastes from operations at the LTC are collected at the Liquid Waste Disposal Facility. Here the waste is sampled and compared to discharge limits before it is sent to the Waste Treatment Facility.

The wastewater is ultimately discharged into the James River through a diffuser. This discharge outfall is monitored for radioactivity and in accordance with the VPDES permit. A volume weighted composite is taken continuously each day.

Storm water management at BWXT is governed by site environmental procedure EPM-03-02, "Stormwater Runoff." The procedure requires submission of a Safety Evaluation Request (SER) for projects that will involve changes to site drainage or chemical storage with potential for contact with storm water. This requirement allows Environmental Engineering to evaluate projects so as to determine when additional permitting may be required and to limit the potential for contamination of storm water runoff through application of best management practices. Additionally, the procedure disallows storage of chemicals such that they may contaminate storm water, requires notification of Environmental Protection for any land disturbing activities, requires maintenance of good housekeeping activities in all outside storage areas, and requires proper preventive maintenance on equipment to limit the potential for leaks.

In addition to a site procedure, BWXT's stormwater discharges are regulated through the site VPDES Permit. Outfalls 002 and 003, which together account for the majority of site stormwater discharges from industrial areas, both have permitted discharge monitoring requirements (see table 3.2). The VPDES Permit also requires the site to maintain an approved Storm Water Pollution Prevention Plan (SWPPP). The plan is required by the facility's VPDES permit and covers industrial activity throughout the site. The SWPPP identifies a pollution prevention team that is responsible for compliance with the plan, details industrial activities within each outfall, describes proper housekeeping practices, identifies current and/or proposed runoff management measures, and requires periodic site-wide inspections of all industrial areas. The pollution prevention team performs a comprehensive sitewide SWPPP compliance audit a minimum of once per year.

2.2.4 Solid Waste

The generation of radioactive and mixed waste arises from the following general types of operations at NPD:

- Radiological area process and decontamination trash including gloves, paper, Carious empty fuel containers, etc.;

- Replacement of off-gas filters and systems;
- Solidification of various radioactive and mixed wastes;
- Building debris and soil from renovation and decommissioning;
- Solids generated from treating the facility's LLR liquid waste.

Waste specific to LTC includes:

Low Level Radioactive Waste

- Laboratory use and decontamination trash including gloves, wipes, blotter paper, glassware, etc.;
- Filter and ion exchange resin replacement for water purification systems;
- Solidification of liquid wastes; and
- Miscellaneous materials (e.g., , activated reactor components, power plant components that BWXT has contracted to dispose of upon completion of examination, etc.).

Waste is generally packaged in the area of generation, and dispositioned after assay using a drum counter for measurement. Most low specific activity waste is compacted to reduce the volume.

Low level radioactive waste disposal sites used by BWXT include the Barnwell Site in South Carolina and the Envirocare Site In Utah;

High Level Radioactive Waste (HLW)

LTC generates High Level Radioactive Waste (HLW)(greater than Class C Waste) during projects involving various destructive tests and post irradiation examinations on [redacted] The Hot Cells are utilized for this work. HLW are generated as a result of Hot Cell cleanups after completion of the project. The wastes are packaged in the Hot Cells in stainless steel drums then transferred [redacted]

Ex4

The Virginia Solid Waste Management Regulations (SWMR) conditionally exempt generators of certain inert solid wastes (i.e. rocks, brick, block, dirt, broken concrete and road pavement and which contains no paper, yard, or wood wastes) from the SWMR provided the disposal areas are not classifiable as open dumps (9 VAC 20-80-60E). Accordingly, BWXT NPD occasionally disposes of this class of solid waste as fill material at various locations throughout the facility. A conservative estimate of the amount of inert solid waste generated and disposed on site is no greater than 40 cubic yards per year. Locations of disposal are limited to those areas where construction activities necessitate their use as fill material. Because only non-contaminated inert material (primarily broken concrete) is managed in this manner, no environmental impacts result from these activities.

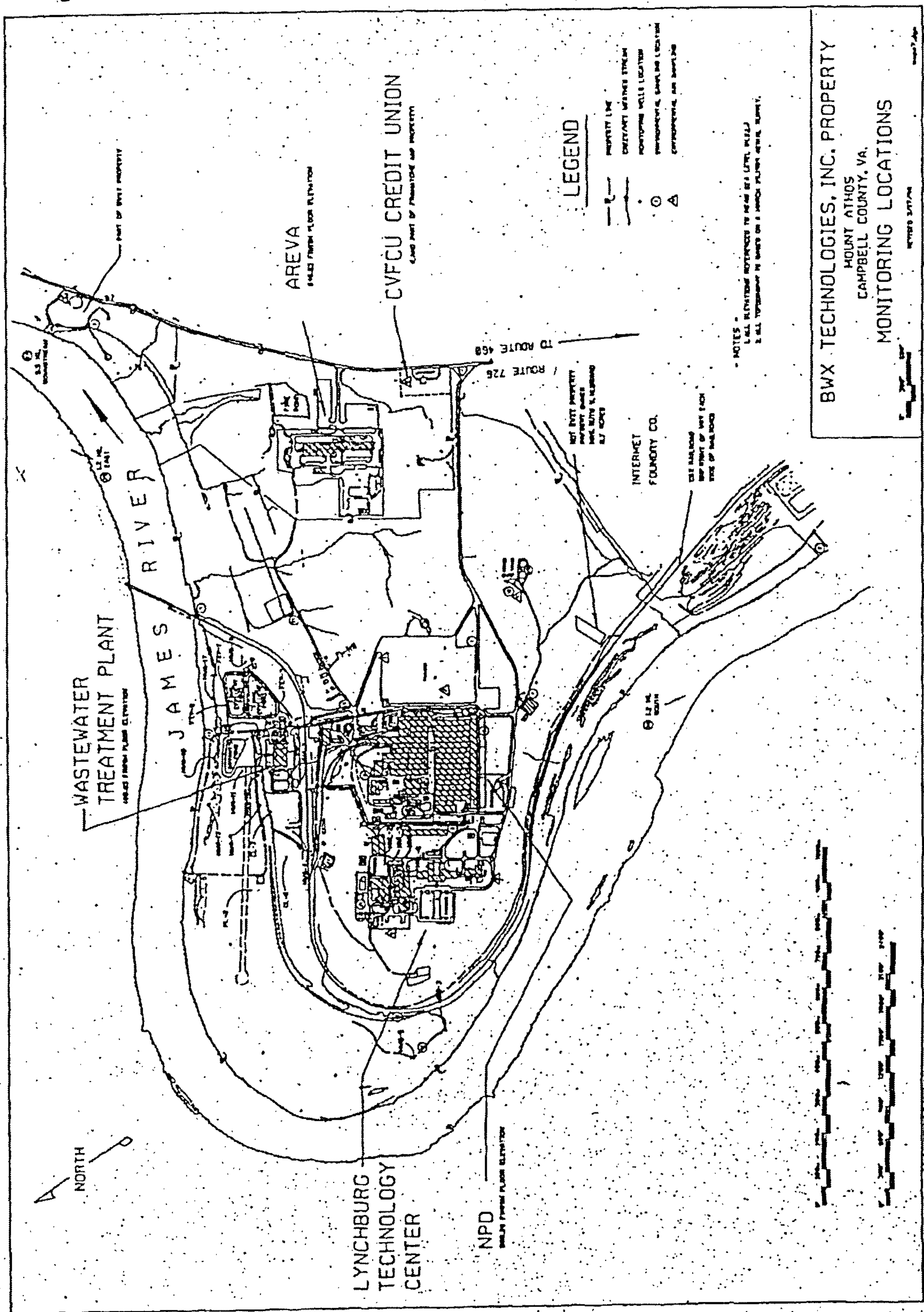
2.2.5 Environmental Monitoring

The environmental monitoring program at BWXT consists of boundary air samples to confirm that gaseous effluents are not effecting the off-site conditions and of sampling and analyzing soil, sediment, vegetation and water to detect any environmental accumulation of radioactive material. Boundary air sampling locations and other environmental sampling locations are presented in Figure 2-7.

2.3 Alternatives - Cessation of Operations

The alternative of not renewing license SNM-42 would lead to decontamination and decommissioning of NPD facilities, and license termination. The environmental impact from decommissioning would, in the short term, be similar to operation of the facility, with the exception of a significant increase in waste generation and an increase in unemployment in the area. Due to the important products produced by BWXT, if operations were terminated, these processes would be transferred to a new site. The new site would likely have more significant environmental impacts due to construction and start up activities.

Figure 2-7 Environmental Monitoring Locations



3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Land Use

3.1.1 Site Land Use

The BWXT facility is located on approximately 497 acres on a peninsula of land inside a bend of the James River. Ground surface elevations range from approximately 460 feet above sea level at the river, to approximately 700 feet above sea level.

The site is bordered by an oxbow of the James River on the western, northern, and northeastern sides. The nominal elevation of the James River is 458 feet above mean sea level. The highest point in the vicinity of the site is Mt. Athos, to the southeast, which rises to an elevation of 890 feet above mean sea level. The WTF was built at an elevation of 488 feet above mean sea level. The main manufacturing facility is 568 feet above mean sea level.

There are three primary industrial areas of the site. The NPD facility and LTC facility are located in the central part of the site. The Waste Treatment Facility is north of the NPD facility nearer to the river. There are also effluent ponds located around the waste treatment area. In addition there are two former industrial landfills located to the west of waste treatment. The status of these areas is documented in correspondence between BWXT and the NRC (docket 70-27).

3.1.2 Use of areas surrounding the site

The primary uses of land adjacent to the facility include industrial, agricultural and unused woodlands. The areas utilized for industrial purposes are to the east and south. To the southeast is the Framatome ANP Facility (an Areva company), an NRC licensed facility, which supports commercial nuclear fuel fabrication and reactor operations. To the south is the Archer Creek iron foundry, a facility of the Intermet Company. The foundry manufactures cast-metal automotive components.

To the west through the north are rolling hills which include woodlands and farmlands. One recreational area near the facility is northeast at Joshua Falls, where a small park and area for access to the James River are situated.

Residential areas are located directly to the east, south, southwest and west. The closest residence to the facility is approximately 4,500 feet directly east. The nearest potential off-site receptor would be occupational workers at Framatome, approximately 3,000 feet east of the main NPD facility. The closest farming area is approximately 3,000 feet to the northeast. The nearest hospital or school is the Central Virginia Training Center in Lynchburg, which is approximately 2.9 miles west. Figure 3-1 depicts land use near the site.

3.2 Transportation

The site can be reached from State Route 726, which connects with State Route 460. Route 460 is a divided, four-lane highway, which is the main thoroughfare between Lynchburg, Appomattox and Richmond. Route 726 is the primary access road to the facility.

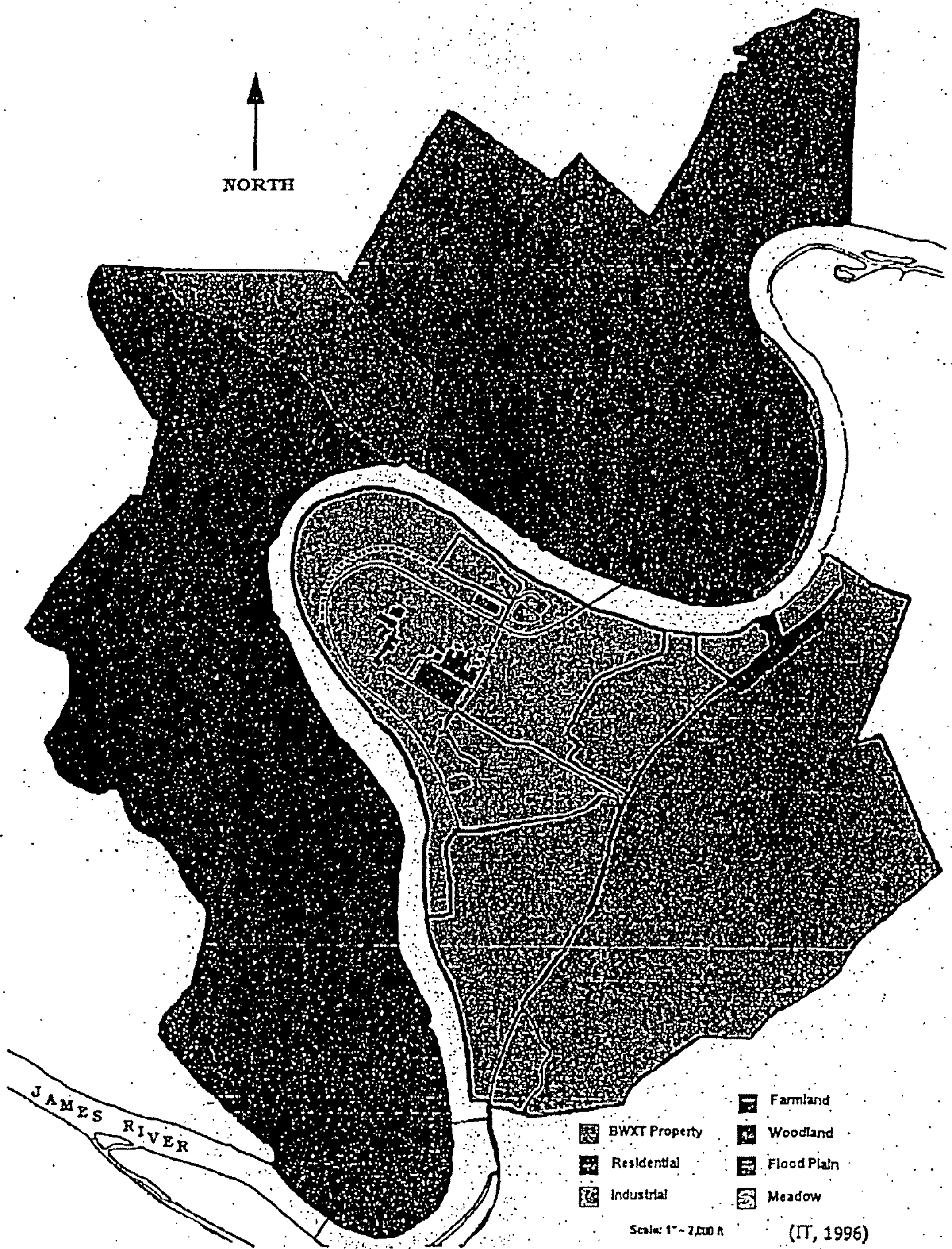
The site is also serviced by a spur of the CSX Transportation Railroad, which runs through BWXT property. The railroad maintains a right of way consisting of the railway and 50 feet from each side of the railway. The railway is depicted on Figure 2-3.

3.3 Geology & Soils

The site is located near the western limit of the Piedmont physiographic province. The bedrock consists of lower Paleozoic metamorphic rocks of the Evington Group, specifically a micaceous schist and phyllite member of the Chandler Formation and a graphite schist member of the Archer Creek Formation.

The surficial deposits are composed principally of young Quaternary-age alluvium below the 500-foot elevation contour, and older (Quaternary or Pliocene) terrace gravel at higher elevations. The alluvial deposits, which make up the overburden aquifer, vary from 10 to 35 feet in thickness across the facility. The deposits consist of various mixtures of sand, silt, and clay with increasing amounts of pebbles, cobbles, and boulders at depth (Shaw, 2003).

Figure 3-1 Land Use Surrounding BWXT



(IT, 1996)

The soil found at the site has been identified as Cullen-Wilkins. It is generally characterized as deep and moderately deep, well drained, gently sloping to steep soils that have a dominantly clay subsoil and are found primarily in upland areas (NRC, 1995).

Seismic activity in the Central Virginia region is classified as moderate. The site falls within the western part of the Central Virginia cluster region, which is classified as a Zone 2, moderate region on the Seismic Risk Map of the United States. Since 1774, there have been 18 earthquakes reported as having an Intensity VI or higher. An intensity of VI on the Modified Mercalli Scale is defined as "Felt by all, many frightened and run outdoors, falling plaster and chimneys, damage small". It is comparable to 4.5 on the Richter Scale. Table 3-1 lists earthquake events of magnitude VI or higher in the Virginia region.

Table 3-1 Earthquakes in the Virginia Area

Date	Maximum Intensity	Area Felt (Sq Miles)	Locality
02/21/1774	VI	58,000	Petersburg
08/27/1833	VI	52,000	Goochland County
04/29/1852	VI	174,500	Grayson County
11/02/1852	VI	32,000	Buckingham County
12/23/1875	VII	50,000	Buckingham County
10/10/1885	VI	25,000	Nelson County
05/03/1897	VII	89,500	Giles County
05/31/1897	VIII	280,000	Giles County
02/05/1898	VI	34,000	Wytheville
02/11/1907	VI	5,600	Arvonia
04/10/1918	VI	65,000	Luray
09/06/1919	VI	-	Warren County
12/26/1929	VI	1,000	Albemarle County
01/02/1954	VI	0	Bell County, KY/Lee County, VA
04/23/1959	VI	2,050	Giles County
11/20/1969	VI	100,000	Elgood, WV/Rich Creek, VA
11/11/1975	VI	-	Giles County
09/13/1976	VI	9,000	Carroll County

(VDMR, 1994)

3.4 Water Resources

3.4.1 Surface Water

The James River borders three sides of the BWXT site. It flows generally east-southeast from the Blue Ridge Mountains to the Atlantic Ocean. The river is formed at the point where the Cowpasture and Jackson rivers merge, north west of Lynchburg. Based on data from U.S. Geological Survey gauging stations, the average annual flow rate of the James River at the site is estimated to be 3,900 cubic feet per second. Water quality of the river is currently classified as a Class II surface water body, not designated for drinking water use.

Until late in 2003, BWXT withdrew water from the James River for industrial purposes. In July-August of 2003, BWXT changed the source of water to the Campbell County Utilities Service Authority (CCUSA).

There are no natural ponds or lakes on the site. There are several man-made impoundments used in storm water management or as a part of the waste treatment process. The two final effluent ponds, and Bryant's pond are depicted on Figure 2-5. Most surface flow is drainage from the facilities during rain events. Three outfalls for surface water run-off exist. Each is a permitted outfall, regulated by the Commonwealth of Virginia Department of Environmental Quality.

BWXT's wastewater discharge permit, VPDES Permit No. 00367, is issued by the Commonwealth. The permit limits discharges at 3 internal outfalls and 3 external outfalls. The three external outfalls eventually discharge to the James River. The three internal outfalls discharge to one of the external outfalls, Outfall 001. A description of each Outfall, the associated VPDES effluent limitations, and the facility's historical treatment performance are shown in Table 3-2.

Table 3-2 Outfall Descriptions, Permit Limitations, and Treatment Performance

EFFLUENT CHARACTERISTIC	MONTHLY AVERAGE LIMIT	MIN LIMIT	MAX LIMIT	MONITORING REQUIREMENTS		Average Discharge Value (Current Permit Term)
				FREQUENCY	SAMPLE TYPE	
Outfall 001 (Final Industrial Wastewater Discharge to James River – Receives Outfalls 101, 601 & 701)						
Flow (MGD)	NL	NA	NL	Continuous	Recorded	.551 MGD
pH (standard units)	NA	6	9	Continuous	Recorded	No exceedances
pH excursion time, individual	NA	NA	60 minutes	Continuous	Recorded	NA
pH excursion, total	NA	NA	446 minutes	Continuous	Recorded	NA
BOD_5	NL mg/l 18.1 kg/d	NA	NL mg/l 27.2 kg/d	1/Month	24 HC	6.64 kg/d
Total Suspended Solids	NL mg/l 47.8 kg/d	NA	NL mg/l 97.1 kg/d	1/Month	24 HC	20.27 kg/d
Fluoride	NL mg/l 15 kg/d	NA	NL mg/l 30 kg/d	1/Month	24 HC	8.45 kg/d
Total Recoverable Chromium	NL mg/l 0.1 kg/d	NA	NL mg/l 0.2 kg/d	1/Month	24 HC	0.001 kg/d
Total Recoverable Copper.	NL mg/l 1.0 kg/d	NA	NL mg/l 1.5 kg/d	1/Month	24 HC	0.17 kg/d
Oil & Grease	NL mg/l 9.1 kg/d	NA	NL mg/l 14 kg/d	1/Month	Grab	Below QL (<5.0 mg/l)
Temperature	NA	NA	32 °C	1/Month	Immersion Stabilization	No exceedances
Ammonia as N	5.7 mg/l	NA	8.3 mg/l	1/Month		1.1 mg/l
Nitrates	NL mg/l	NA	NL mg/l	1/Quarter	Grab	176.87 mg/l
Nitrites	NL mg/l	NA	NL mg/l	1/Quarter	Grab	0.66 mg/l
002 (Stormwater Discharge to Unnamed Ditch That Flows to James River)						
Flow (MGD)	NL	NA	NL	1/year	Estimate	.009 MGD
PH (standard units)	NA	6	9	1/year	Grab	No exceedances
Temperature	NA	NA	32 °C	1/year	Immersion Stabilization	No exceedances
Dissolved Lead	NA	NA	NL mg/l	1/year	Grab	< 0.005 mg/l
Dissolved Copper (µg/l as CU)	NA	NA	NL mg/l	1/year	Grab	0.02 mg/l
Dissolved Zinc (µg/l as ZN)	NA	NA	NL mg/l	1/year	Grab	0.08 mg/l
003 (Stormwater Discharge to Unnamed Ditch That Flows to James River)						
Flow (MGD)	NL	NA	NL	1/year	Estimate	.034 MGD
PH (standard units)	NA	6	9	1/year	Grab	No exceedances
Temperature	NA	NA	32 °C	1/year	Immersion Stabilization	No exceedances
Dissolved Lead	NA	NA	NL mg/l	1/year	Grab	<0.005 mg/l
Dissolved Copper (µg/l as CU)	NA	NA	NL mg/l	1/year	Grab	0.01 mg/l
Dissolved Zinc (µg/l as ZN)	NA	NA	NL mg/l	1/year	Grab	0.05 mg/l
Dissolved Silver (µg/l as AG)	NA	NA	NL mg/l	1/year	Grab	0.002 mg/l
101 (Internal Sanitary Discharge to Outfall 001)						
Flow (MGD)	0.160	NA	NL	Continuous	Recorded	.041 MGD
PH (standard units)	NA	6	9	1/day	Grab	No exceedances
BOD_5	30.0 mg/l 18.1 kg/d	NA	45.0 mg/l 27.2 kg/d	1/week	24 HC	0.27 mg/l 0.03 kg/d
TSS	30.0 mg/l 18.1 kg/d	NA	45.0 mg/l 27.2 kg/d	1/week	24 HC	3.35 mg/l 0.53 kg/d
Fecal Coliform	200 N/CML NL kg/d	NA	400 N/CML NL kg/d	3/week	Grab	2.33 N/CML
601 (Internal Industrial Discharge to Outfall 001)						
Flow (MGD)	0.160	NA	NL	1/month	Estimate	.345 MGD

Effluent Characteristic	Monthly Average Limit	Min Limit	Max Limit	Monitoring Requirements		Average Discharge Value (Current Permit Term)
				Frequency	Sample Type	
PH (standard units)	NA	6	9	1/month	Grab	No exceedances
TSS	30.0 mg/l NL kg/d	NA	60.0 mg/l NL kg/d	1/month	Grab	7.81 mg/l
701 (Internal Industrial Discharge to Outfall 001)						
Flow (MGD)	0.160	NA	NL	Continuous	Recorded	.166 MGD
PH (standard units)	NA	6	9	1/day	Grab	No exceedances
pH excursion time, individual	NA	NA	60 minutes	Continuous	Recorded	NA
pH excursion, total	NA	NA	446 minutes	Continuous	Recorded	NA
TSS	31.0 mg/l NL kg/d	NA	60.0 mg/l NL kg/d	1/month	24 HC	0.098 mg/l
Total Chromium (as CR)	1.71 mg/l NL kg/d	NA	2.77 mg/l NL kg/d	1/month	24 HC	0.01 mg/l
Total Cyanide (as CN)	0.65 mg/l NL kg/d	NA	1.2 mg/l NL kg/d	1/month	Grab	0.0006 mg/l
Total Copper (as CU)	2.07 mg/l NL kg/d	NA	3.38 mg/l NL kg/d	1/month	24 HC	0.26 mg/l
Total Zinc (as ZN)	1.48 mg/l NL kg/d	NA	2.61 mg/l NL kg/d	1/month	24 HC	0.04 mg/l
Total Nickel (as NI)	2.38 mg/l NL kg/d	NA	3.98 mg/l NL kg/d	1/month	24 HC	0.13 mg/l
Total Lead (as PB)	0.43 mg/l NL kg/d	NA	0.69 mg/l NL kg/d	1/month	24 HC	0.002 mg/l
Total Silver (as AG)	0.24 mg/l NL kg/d	NA	0.43 mg/l NL kd/d	1/month	24 HC	0.003 mg/l
Total Cadmium (as CD)	0.26 mg/l NL kg/d	NA	0.69 mg/l NL kg/d	1/month	24 HC	0.00 mg/l
Total Toxic Organics	NL mg/l NL kg/d	NA	2.13 mg/l NL kg/d	NA	NA	NA – not currently required to monitor
Oil & Grease	26 mg/l NL kg/d	NA	52 mg/l NL kg/d	1/month	Grab	0.16 mg/l

NA - Not Applicable
NL - No Limitation, monitoring is required
24 HC = 24-hour composite
QL – Quantification Limit

Flooding of the James river occurs infrequently. There have been 11 significant flood events recorded along the James River since 1771. Each of the events is summarized in Table 3-3.

Table 3-3 Recorded Floods of the James River Since 1771 (units of feet)

Month-Year	River Elevation	Distance Above Normal	Estimated Distance Below WTF
May 1771	489	31	(1)
May 1795	494	36	(6)
September 1870	488	30	0
November 1877	487	29	1
March 1913	483	25	5
March 1936	484	26	4
March 1969	486	28	2
June 1972	485	27	3
June 1982	482	24	6
November 1985	493	35	(5)
January 1996	482	24	6

(NRC, 1991); (NOAA, 2003)

3.4.2 Subsurface Water

Groundwater in the Piedmont Province occurs in crystalline bedrock, consisting of slates, schists, and gneisses, and in the overlying unconsolidated sediment, which are of local extent. Reliable well yields for domestic supply are obtained on a wide spread basis from weathered or fractured zones in gneiss and schist. However, yields are generally low to moderate, typically ranging from 1 to 25 gallons per minute, and rarely exceeding 50 to 100 gallons per minute (IT, 1996).

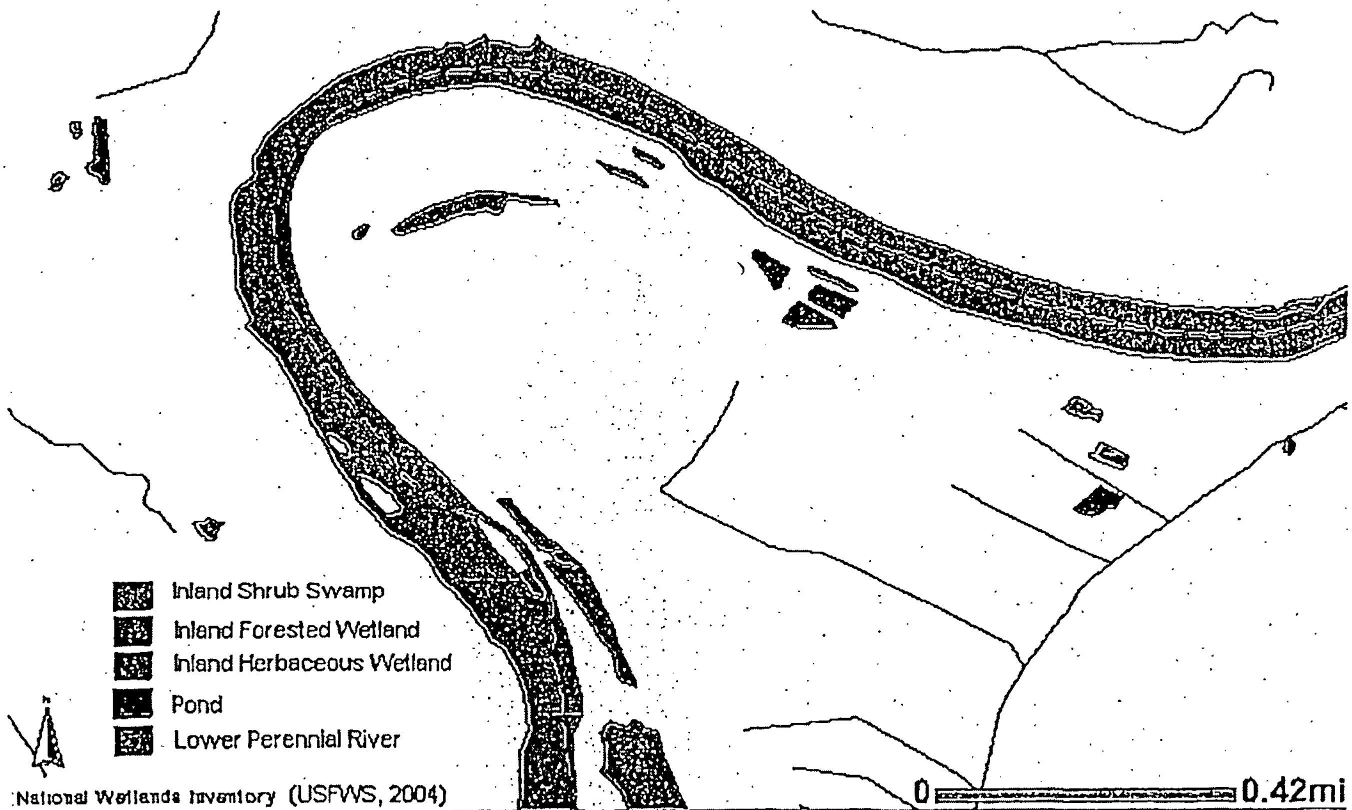
Groundwater flows radially from the high elevations located along the southwestern margin of the meander bend to the James River. Because the highest local elevations are to the southwest of NPD, all shallow groundwater in the vicinity of the facility is acted on by a northeasterly horizontal gradient. Slug tests in shallow zone and bedrock wells were used to estimate the mean hydraulic conductivity for the shallow zone of 3.7×10^{-4} cm per second. On average the shallow zone is approximately one order of magnitude more conductive than the bedrock zone, which has mean conductivity of 4.7×10^{-5} cm per second (IT, 1996).

Until 2003, BWXT withdrew ground water for use as de-ionized and potable water using several of seven wells on site. In July-August of 2003, BWXT stopped the use of these wells and began using water supplied by CCUSA.

3.4.3 Wetlands

The BWXT site contains several small isolated wetland areas. These areas are shown in Figure 3-2. The wetlands are primarily located in the flood plain, in low lying areas of meadowland. Areas designated as wetlands by the US Fish and Wildlife Service also include the effluent ponds, although these areas do not meet the wetlands delineation criteria defined by the US Army Corp of Engineers.

Figure 3-2 Wetland Areas at the Mt. Athos Site



3.5 Ecological Resources

3.5.1 Terrestrial Resources

Natural climax vegetation in the region is classified as oak-hickory-pine (Quercus-Carya-Pinus) forest. Areas of the site that remain undeveloped consist primarily of second-growth forests and grasslands (NRC, 1991).

The Lynchburg/Campbell County area has approximately 350 different species of animals that are expected to reside in the area. There are more than 50 species of mammals, 33 species of reptiles, 53 types of invertebrates and 165 species of birds thought to inhabit the area. Species of importance in the area include game animals such as white-tailed deer, furbearers like the beaver and fox, and game birds and waterfowl including a variety of ducks. Threatened and endangered species are discussed in 3.5.3.

3.5.2 Aquatic Resources

The aquatic biota of the James River in the vicinity of NPD is generally characteristic of that of a moderately polluted flowing river. The benthic community of the James River near the facility is characteristic of areas with both flowing and backwater areas (NRC, 1984).

There are approximately 25 different species of fish. Fish common to the vicinity of the facility include large mouth bass, bluegill and a variety of shiner.

3.5.3 Threatened and endangered species

The state of Virginia has forty eight (48) species of animals listed as threatened or endangered by the federal government. These animals are listed in Table 3-5. There are also fifteen (15) species of plant in the state listed as threatened or endangered. A complete list is provided in Table 3-6.

According to the Virginia Department of Game and Inland Fisheries, there are no endangered species in the vicinity of the site. The only threatened species that may be present in the vicinity of the site is the Bald Eagle (Haliaeetus leucocephalus).

Table 3-5 Threatened and Endangered Animal Species in Virginia

Common Name	Scientific Name	Status	Vert/Invert
Appalachian monkeyface (pearlymussel)	Quadrula sparsa	E	Invertebrate
Birdwing pearlymussel	Conradilla caelata	E	Invertebrate
Cracking pearlymussel	Hemistena lata	E	Invertebrate
Cumberland monkeyface (pearlymussel)	Quadrula intermedia	E	Invertebrate
Cumberlandian combshell	Epioblasma brevidens	E	Invertebrate
Dromedary pearlymussel	Dromus dromas	E	Invertebrate
Dwarf wedgemussel	Alasmidonta heterodon	E	Invertebrate
Fanshell	Cyprogenia stegaria	E	Invertebrate
Finerayed pigtoe	Fusconaia cuneolus	E	Invertebrate
Green blossom (pearlymussel)	Epioblasma torulosa gubernaculum	E	Invertebrate
James spinymussel	Pleurobema collina	E	Invertebrate
Lee County cave isopod	Lirceus usdagalun	E	Invertebrate
Littlewing pearlymussel	Pegias fabula	E	Invertebrate
Madison Cave Isopod	Antrolana lira	T	Invertebrate
Northeastern beach tiger beetle	Cicindela dorsalis dorsalis	T	Invertebrate
Oyster mussel	Epioblasma capsaeformis	E	Invertebrate
Pink mucket (pearlymussel)	Lampsilis abrupta	E	Invertebrate
Purple bean	Villosa perpurpurea	E	Invertebrate
Rough pigtoe	Pleurobema plenum	E	Invertebrate
Rough rabbitsfoot	Quadrula cylindrica strigillata	E	Invertebrate
Shiny pigtoe	Fusconaia cor	E	Invertebrate
Tan riffleshell	Epioblasma florentina walkeri	E	Invertebrate
Virginia fringed mountain snail	Polygyriscus virginianus	E	Invertebrate
Bald eagle	Haliaeetus leucocephalus	T	Vertebrate
Delmarva Peninsula fox squirrel	Sciurus niger cinereus	E	Vertebrate
Duskytail darter	Etheostoma percnurum	E	Vertebrate
Eastern puma (=cougar)	Puma (=Felis) concolor couguar	E	Vertebrate
Finback whale	Balaenoptera physalus	E	Vertebrate
Gray bat	Myotis grisescens	E	Vertebrate
Green sea turtle	Chelonia mydas	E	Vertebrate
Hawksbill sea turtle	Eretmochelys imbricata	E	Vertebrate
Humpback whale	Megaptera novaeangliae	E	Vertebrate
Indiana bat	Myotis sodalis	E	Vertebrate
Kemp's ridley sea turtle	Lepidochelys kempii	E	Vertebrate
Leatherback sea turtle	Dermochelys coriacea	E	Vertebrate
Loggerhead sea turtle	Caretta caretta	T	Vertebrate
Piping Plover	Charadrius melodus	E	Vertebrate
Red-cockaded woodpecker	Picoides borealis	E	Vertebrate
Right whale	Balaena glacialis (incl. australis)	E	Vertebrate
Roanoke logperch	Percina rex	E	Vertebrate
Roseate tern	Sterna dougallii dougallii	E	Vertebrate
Shenandoah salamander	Plethodon shenandoah	E	Vertebrate
Shortnose sturgeon	Acipenser brevirostrum	E	Vertebrate
Slender chub	Erimystax cahni	T	Vertebrate
Spotfin chub	Cyprinella monacha	T	Vertebrate
Virginia big-eared bat	Corynorhinus (=Plecotus) townsendii virginianus	E	Vertebrate
Virginia northern flying squirrel	Glaucomys sabrinus fuscus	E	Vertebrate
Yellowfin madtom	Noturus flavipinnis	T	Vertebrate

E – Endangered, T – Threatened (USFWS, 2004)

Table 3-6 Threatened and Endangered Plants in Virginia

COMMON NAME	SCIENTIFIC NAME	STATUS
Eastern prairie fringed orchid	Platanthera leucophaea	T
Harperella	Ptilimnium nodosum	E
Michaux's sumac	Rhus michauxii	E
Northeastern bulrush	Scirpus ancistrochaetus	E
Peter's Mountain mallow	Iliamna corei	E
Seabeach amaranth	Amaranthus pumilus	T
Sensitive joint-vetch	Aeschynomene virginica	T
Shale barren rock-cress	Arabis serotina	E
Small whorled pogonia	Isotria medeoloides	T
Small-anthered bittercress	Cardamine micranthera	E
Smooth coneflower	Echinacea laevigata	E
Swamp pink	Helonias bullata	T
Virginia round-leaf birch	Betula uber	T
Virginia sneezeweed	Helenium virginicum	T
Virginia spiraea	Spiraea virginiana	T

(USFWS, 2004)

3.6 Meteorology, Climatology and Regional Air Quality

The climate in Central Virginia is moderate. The average annual temperature is approximately 55°F (13 °C). During the summer months, July is historically the month with the highest temperatures. The normal high being 86°F (30°C). Conversely, January is typically the coldest month with normal low temperatures averaging 24°F (-4°C). More detailed data is provided in Table 3-7. The meteorological data in Table 3-7 was measured at the Lynchburg Municipal Airport.

Annual precipitation amounts are expected to average 43 inches. The average rainfall for the month of July is more than 4 inches. Thunderstorms are common but not limited to the summer months.

Winds are generally out of the southwest. During the winter months they shift from the north. Average wind speeds range from 6 to 9 mph.

TABLE 3-7 Climate Summary for Lynchburg, Virginia

AVERAGE WIND SPEED (1930-1996)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
Direction	SW	W	SW	SW	SW	SW	SW	SW	SW	N	NE	SW	SW
Avg Speed (mph)	8	8	8	9	7	7	6	6	6	7	7	7	7
Peak Gust*	48	46	56	53	59	74	64	46	46	48	64	47	
TEMPERATURE NORMALS (1971-2000)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
Max	44.5	48.6	57.6	68.0	75.5	82.5	86.4	85.1	78.3	68.4	58.0	48.4	66.8
Mean	34.5	37.8	46.0	55.3	63.4	71.0	75.1	73.8	67.1	56.1	46.6	38.2	55.4
Min	24.5	26.9	34.4	42.6	51.2	59.5	63.7	62.4	55.9	43.7	35.2	27.9	44.0
PRECIPITATION NORMALS (1971-2000)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Precip (in)	3.54	3.1	3.83	3.46	4.11	3.79	4.39	3.41	3.88	3.39	3.18	3.23	43.31
* - peak gust calculated from the minimum time during which one mile of wind passed the station													

(NOAA, 2002); (SRCC, 2004)

Tornadoes are not common to central Virginia. Figure 3-3 depicts tornado probabilities for the US. The relative probability for the Lynchburg area is low.

The Lynchburg area has been impacted by tropical storms. The most common form of severe weather in the Central Virginia area are thunderstorms.

An examination of Subpart C of 40 CFR 81 "Section 101 Attainment Status Designations" shows that Campbell County, VA is in attainment with the National Ambient Air Quality Standards (NAAQS) for criteria pollutants codified at 40 CFR 81.347 including the new 8 hour ozone standard. Note that although not codified, it is likely that Campbell County will also be in attainment for the new PM2.5 standard (particulate matter with an aerodynamic diameter of 2.5 microns or less) based on initial indications from EPA.

3.7 Noise

Sources of noise related to site operations are limited. Most activities are conducted indoors. Of the potential sources of noise in the environment from site operations the most significant is likely from automobiles or building ventilation systems. Because of the size of the site and distance of facilities to the site boundary, there should be no measurable impact off site.

Figure 3-3 Tornado Probabilities

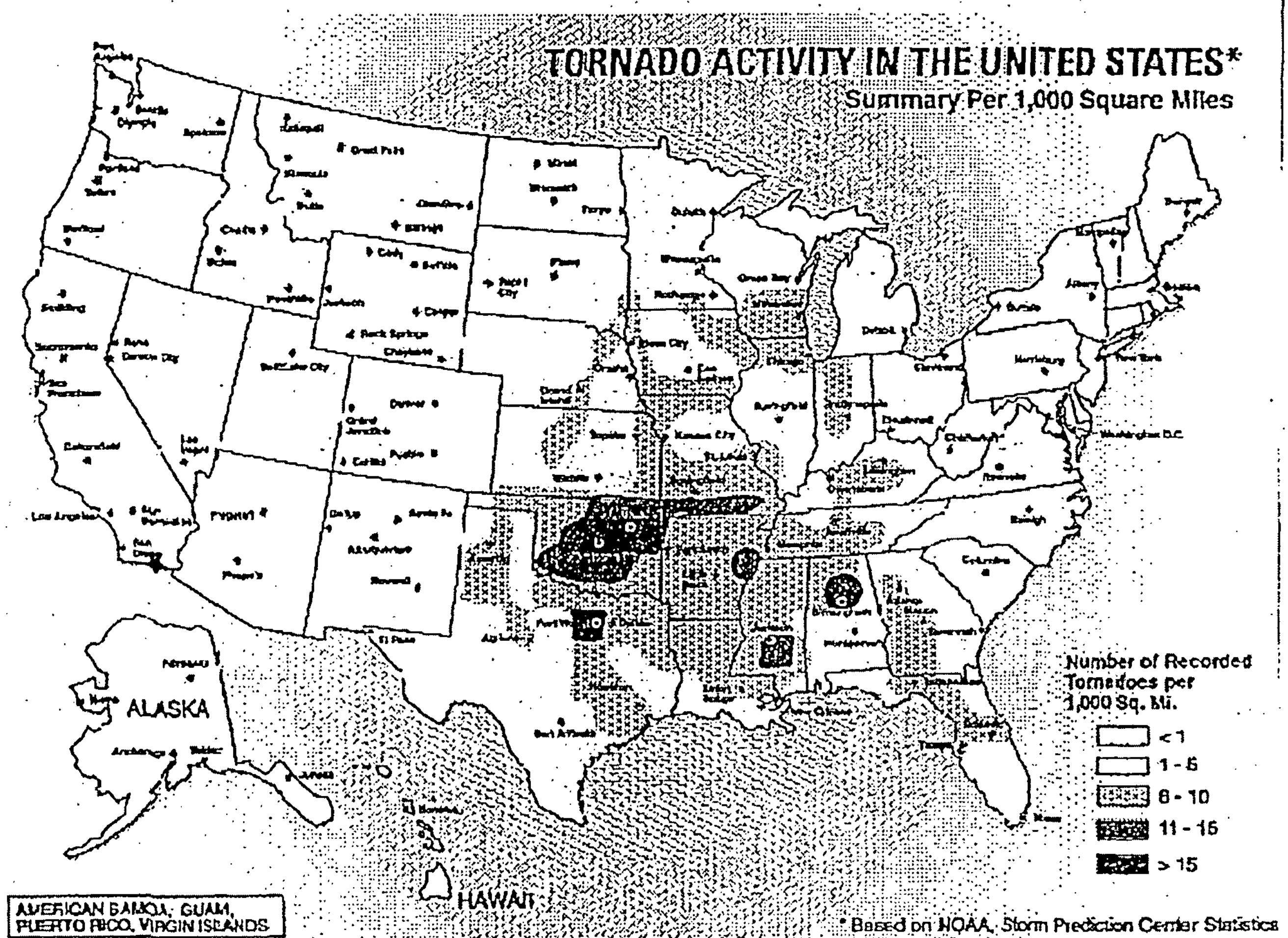


Figure I.1 The number of tornadoes recorded per 1,000 square miles

3.8 Historical & Cultural Resources

A review of the National Registry of historical places generated a list of 74 registered historical sites within the four county area. These sites are listed in Table 3-8. There are only 2 sites within 3 miles of the facility. The Mt. Athos Plantation and the Norfolk Southern 6 Mile Bridge, Number 58. Neither historical site is expected to attract visitors.

Table 3-8 Sites Listed in Federal Registry of Historical Places

COUNTY	SITE NAME	LOCATION	LISTED
Amherst	Bear Mtn Indian Mission School	Amherst Jct VA 463 & 780	2/21/97
	Fort Riverview	Madison Heights Address Restricted	11/16/89
	Geddes	Clifford St Rte 700	2/24/83
	Hite Store	Lowesville S of Jct VA 778 & 666	6/6/97
	Mountain View Farm	Clifford Jct of Cty Rte 3 & US 29	9/3/97
	Red Hill Farm	W of Pedlar Mills VA 647	6/9/80
	Sweet Briar College Historic Dist	Amherst Sweet Briar W of US 29	3/30/95
	Sweet Briar House	Amherst SW of Jct US 29 & VA 624	8/15/70
	Winton	Clifford W of VA 151	5/2/74
Appomattox	Appomattox Court House National Park	Appomattox NE on VA 24	10/15/66
	Appomattox Historic District	Appomattox VA 131	5/16/02
	Pamplin Pipe Factory	Pamplin Address Restricted	11/25/80
Bedford*	Brook Hill Farm	US 221 & VA 643	6/6/97
	Eldridge Bowling House	Lynchburg 1651 Fox Hill Rd	8/12/93
	Elk Hill	NW of Forest on VA 663	4/2/73
	Hope Dawn	NW of Lynchburg VA 761	10/9/74
	New London Academy	VA 297 & VA 211	4/13/72
	Poplar Forest	Lynchburg Rts 661 and 460	11/12/69
	Rothsay	US 221 & VA 881	10/30/92
	St. Stephen's Episcopal Church	VA 663	11/7/85
	Woodbourne	NE of Forest on VA 609	7/2/73
Campbell	Avoca	Altavista N on US 29	9/16/82
	Blenheim	Spring Mills 2.4 mi SW	5/31/79
	Campbell County Courthouse	Rustburg US 501	10/29/81
	Cat Rock Sluice of Roanoke Navigation	Brookneal	3/25/80
	Federal Hill	Forest S VA 623	9/9/82
	Green Hill	Long Island SW Jct Rts 663 & 728	11/12/69
	Mansion Truss Bridge	Mansion VA 640 over Staunton Rvr	4/15/78
	Mount Athos	Kelly Address restricted	7/24/75
	Norfolk Southern 6 Mile Bridge No. 58	Over James River W of VA 726	10/12/95
	Oak Grove	Altavista 7378 Gladys Rd	5/16/02
	Shady Grove	Gladys E on VA 650	8/26/82
	Walnut Hill	Lynchburg Rte 2	1/27/00
City of Lynchburg	Academy of Music	522-566 Main St	6/11/69
	Allied Art Building	725 Church St	12/19/85
	Aviary	402 Grove St	7/30/80
	Bragassa Toy Store	323-325 Twelfth St	1/11/91
	Centerview	1900 Memorial Ave	12/1/00
	Courthouse Hill - Downtown	Church, Clay, Court, Main Sts	8/16/02
	Court Street Baptist Church	6th and Court Sts	7/8/82
	Daniel's Hill Historic District	Cabell, Norwood, Hancock, Stonewall	2/24/83
	Diamond Hill Historic District	Dunbar, Main, Jackson, Arch Sts	10/1/79
	Federal Hill Historic District	8th, 12th, Harrison, Polk Sts	9/17/80
	First Baptist Church	1100 Court St	9/9/82
	Fort Early and Jubal Early Monument	3511 Memorial Ave	1/24/02
	Garland Hill Historic District	5th, Federal, Norfolk & West RR	9/7/72
	Glass, Carter House	605 Clay St	12/8/76
	Johnson, Dr. Walker House	1422 Pierce St	1/24/02

	Jones Memorial Library	434 Rivermont Ave	10/30/80
COUNTY	SITE NAME	LOCATION	LISTED
City of Lynchburg	Kentucky Hotel	900 5th St	12/11/86
	Locust Grove	US 501, VA 644	12/17/92
	Lower Basin Historic District	Jefferson, Commerce, Main Sts	4/24/87
	Lynch's Brickyard House	700 Jackson St	3/13/02
	Lynchburg Courthouse	Court & Church Sts	5/19/72
	Lynchburg Hospital	Hollins Mill Rd	12/9/99
	Main Hall, Randolph-Macons Women's Coll.	2500 Rivermont Ave	6/19/79
	Miller, Samuel House	1433 Nelson Dr	11/12/92
	Miller-Claytor House	Treasure Island Rd	5/6/76
	Montview	VA 670 and US 29	6/5/87
	Old City Cemetery	4th, Monroe, 1st Sts	4/2/73
	Phaup, William House	911 Sixth St	3/13/02
	Point of Honor	112 Cabell St	2/26/70
	Rivermont	205 F St	5/11/00
	Rivermont Historic District	Rivermont Ave	4/11/03
	Rosedale	Old Graves Mill Rd	7/7/83
	St. Paul's Vestry House	308 7th St	2/21/97
	Sandusky House	757 Sandusky Dr	7/26/82
	South River Friends Meetinghouse	5810 Fort Ave	8/28/75
	Spencer, Anne House	1313 Pierce St	12/6/76
	St. Paul's Church	605 Clay St	9/9/82
	Virginia Episcopal School	400 Virginia Episcopal School Rd	10/28/92
	Warwick, John Marshall House	720 Court St	12/6/96
	Western Hotel	5th and Madison Sts	7/22/74
	Wood, JW Building	23-27 Ninth St	2/17/83

* - Lynchburg and Forest areas of Bedford County (DNR, 2004)

The BWXT facility is located in Campbell County, which is primarily a rural area. The closest city to the BWXT facility is Lynchburg, Virginia approximately 5 miles west of the site. According to a "History of Lynchburg, Virginia" found on the website www.LynchburgOnLine.com, Lynchburg was founded on the banks of the James River in the late 1700's by John Lynch, son of landowner Charles Lynch and Quaker Sara Clark Lynch. The town grew slowly until the turn of the century. By the early 1800's, tobacco was the city's major economy. The early 1900's saw Lynchburg evolving from a tobacco-based economy into one driven by manufacturing. A large number of factories opened, some of which remained cornerstones of the economy for years. Since the 1950's, Lynchburg has evolved from a small, tightly-knit manufacturing city to one with a diverse economy with most residents now living in surrounding suburbs. The trend of growth has continued through to the present with continued development of numerous industries including communications, nuclear energy, castings, paper, machinery and many more.

According to the Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement, Volume 1, dated June 1996 and published by the Department of Energy, Native Americans have lived in the Piedmont area and along the James River for thousands of years. In the early 17th century, a number of tribes, including the Manahoacs, Monacans, Occaneechis, and Saponis, lived in the Piedmont region. These groups participated in a loose confederacy and can be referred to generally as Monacans. Five Monacan villages were identified on a 1607 map drawn by Captain John Smith. One of these villages was located near present-day Wingina, on the James River, approximately 34.8 miles northeast of the BWXT site. Although most of these people were either removed, died, or left the area in the 18th and 19th centuries, the descendents of those who remained still live in the area. In 1833, Piedmont Indians purchased 400 acres of land on Bear Mountain in Amherst County, approximately 15.5 miles north of the BWXT site. The Monacan Indian Tribe in Amherst County is officially recognized by the State of Virginia, and most Monacans live in Amherst County and in Lynchburg. No Native American resources have been identified within the BWXT site.

The Impact Statement goes on to say that no NRHP historic archaeological sites are located at the BWXT site. Two nearby sites, the Mansion Truss Bridge (Six Mile Bridge), which crosses the James River to the north of the site, and Mt. Athos which is located east of the site on Mt. Athos, are on the NRHP. The Mt. Athos site includes the ruins of the manor house of Buffalo Lick Plantation (Mt. Athos Plantation). The house was built in 1796 by Colonel William J. Lewis. The plantation area includes gravesites, a tobacco barn and stone cisterns. The mansion itself was destroyed by fire in 1876. Remains of the Kanawha Canal still exist on the property and are located north of the railroad tracks and the facility structures. The canal was constructed during the early 19th century and played a role in the rural economy, transporting agricultural goods such as tobacco and wheat. During the Civil War, the canal was used by the Confederacy to transport war materials. Approximately six additional historic sites that date to the 19th century have been identified on the property. The historic component of the site previously described indicates remains of a circa 18th century visit or occupation by European-Americans.

3.9 Visual/Scenic Resources

The viewscape of the BWXT facilities has not changed significantly in the past 10 years. Due to the size and geography of the site, the viewscape should not impact any local interested parties. The only changes made recently were upgrades to visibility for security purposes. These were on-site changes, which should not impact any off-site parties.

3.10 Socioeconomic

The BWXT facility is located in Campbell County, Virginia, near the city of Lynchburg. Campbell County is a primarily rural county. Populations of Campbell County and surrounding counties are presented in Table 3-9. A representation, derived from the 2000 census data, of the population distribution within a 80km (50 mile) radius of the site is presented in Table 3-10 and Figure 3-4. The total population over the past decade has increased approximately 7.5% from 512,000 to 550,347.

Table 3-9 Regional Populations

County	Total Population			
	2000	1990	1980	1970
Amherst	31,894	28,578	29,122	26,072
Appomattox	13,705	12,298	11,971	9,784
Campbell	51,078	47,572	45,424	43,319
Lynchburg	65,269	66,049	66,743	54,083
Area Total	161,946	154,497	153,260	133,258

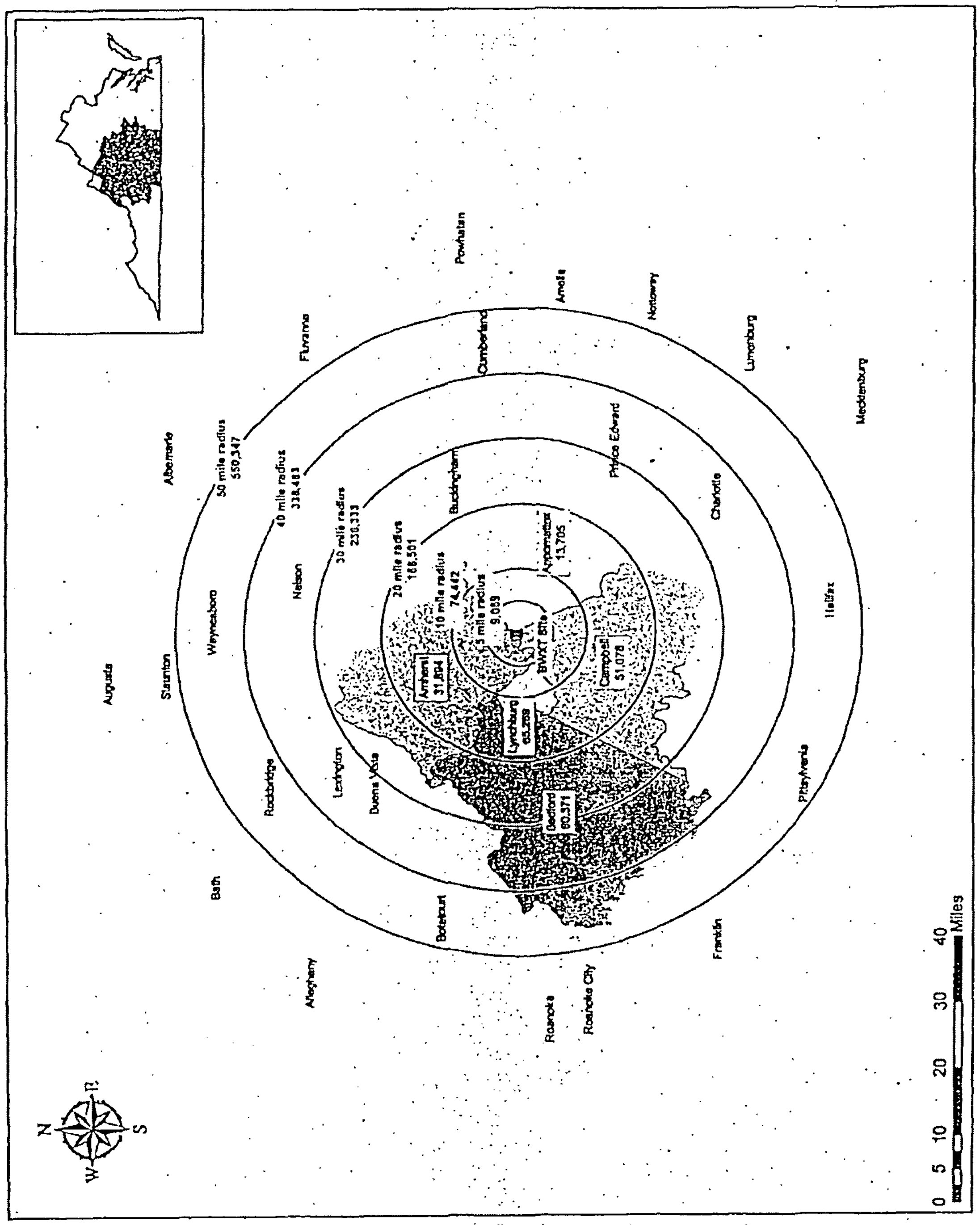
(USCB, 2004)

Table 3-10 Population Distribution (based on 2000 Census) within 50 Miles of Lynchburg, Virginia BWXT Site

Distance (miles) Direction	0 - 5	5 - 10	10 - 20	20 - 30	30 - 40	40 - 50	Total	Cum Total
N	512	519	4,380	2,314	7,058	46,386	61,169	61,169
NNE	420	462	1,804	3,253	4,987	16,319	27,245	88,414
NE	198	471	1,083	1,770	4,314	14,115	21,951	110,365
ENE	177	426	1,047	2,124	6,379	5,751	15,904	126,269
E	179	511	1,613	1,743	4,583	5,522	14,151	140,420
ESE	183	832	4,080	3,872	11,596	6,612	27,175	167,595
SE	224	784	2,364	2,378	4,359	4,615	14,724	182,319
SSE	502	914	1,923	2,403	2,692	6,090	14,524	196,843
S	512	1,070	2,730	4,118	4,212	14,449	27,091	223,934
SSW	533	1,415	3,608	5,277	6,006	8,528	25,367	249,301
SW	613	2,217	8,252	8,759	5,708	6,771	32,320	281,621
WSW	696	15,163	35,154	8,645	9,849	25,316	94,823	376,444
W	840	27,689	17,128	7,869	7,666	40,082	101,274	477,718
WNW	1,668	6,351	3,729	3,347	3,546	3,270	21,911	499,629
NW	1,261	4,370	2,182	8,622	13,663	3,378	33,476	533,105
NNW	551	2,179	2,982	1,338	5,532	4,660	17,242	550,347
Total	9,069	65,373	94,059	67,832	102,150	211,864	550,347	
Cum Total	9,069	74,442	168,501	236,333	338,483	550,347		

(Shaw using USCB)

Figure 3-4 Demographic Distribution within 50 miles of the BWXT Site



(Shaw using USCB)

BWXT is an important employer in the region. The company employs approximately 2,400 people. Employment data for the Lynchburg Region are presented in Table 3-10. BWXT is also a major contributor to local charitable organizations, and plays an important role in the Central Virginia Community.

Table 3-10 Lynchburg Employment Statistics

Lynchburg, VA Metropolitan Statistical Area as of December 2003	
Industry Type	**Dec-03**
Natural Resources & Construction	6,600
Manufacturing	17,800
Trade, Transportation, Utilities	19,300
Information	900
Financial Activities	3,700
Professional & Business	8,800
Education & Health	17,800
Leisure & Hospitality	7,000
Other Services	5,000
Government	13,400
Total (Non-farm)	100,000

(VEC, 2004)

3.11 Public & Occupational Health

3.11.1 Background Radiation

Background radiation exposures from natural sources are comparable to the national average of 360 mrem/year. Table 3-11 summarizes the sources of exposure.

Table 3-11 Background Radiation Exposure

Source	Estimated Annual Exposure (mrem)
Radon & decay products	200
Cosmic	27
Cosmogenic	1
Terrestrial	28
Present in the Body	39
Medical Diagnostic Tests	50
Consumer Products	10
Total	355

Source: Background Radiation Exposure in US (NCRP 93)

Measurements of natural uranium activity in soils on site were performed in 1995. The results indicate an average uranium concentration of 2.12 pCi/g. The isotopic data is presented in Table 3-12.

Table 3-12 Uranium Activity in On-site Soils

Isotope	Average (pCi/g)	Standard Deviation (pCi/g)
U-234	1.09	0.39
U-235	0.06	0.02
U-238	0.98	0.27
Total	2.12	0.67

3.11.2 Occupational Exposures

Radiological Occupational exposures at BWXT are maintained ALARA, well below limits specified in 10CFR20. The collective and maximum exposure data (Total Effective Dose Equivalent) for individuals requiring monitoring (IRM) are listed in Table 3-13.

Table 3-13 TOTAL EFFECTIVE DOSE EQUIVALENT SUMMARY
1999 - 2003

	PERSON – REM				
Category/Year	2003	2002	2001(1)	2000	1999
NPD CEDE (Internal Dose)	34.992	38.894	51.094	178.202	165.940
LTC CEDE (Internal Dose)	0.000	0.006	0.064	0.077	0.018
TOTAL CEDE (Internal Dose)	34.992	38.900	51.158	178.279	165.958
Number of IRM's for Internal Dose	250	279	314	292	270
TOTAL CEDE Attributed to IRM's	28.088	33.933	45.525	154.067	141.728
NPD DDE (External Dose)	4.932	13.657	16.707	13.085	3.85
LTC DDE (External Dose)	8.337	8.995	17.650	13.563	9.270
TOTAL DDE (External Dose)	13.269	22.652	34.357	26.648	13.120
Number of IRM's for External Dose	55	60	70	53	54
TOTAL DDE Attributed to IRM's	8.450	11.482	19.973	12.576	8.300
TEDE (Internal plus External)	48.301	61.552	85.515	204.927	179.060
Number of IRM's	305	339	384	345	324
TEDE Attributed to IRM's	36.538	45.415	65.498	166.643	150.028
NPD: Maximum Individual TEDE	0.572	0.696	1.355	2.007	1.960
LTC: Maximum Individual TEDE	1.430	1.239	1.971	2.231	1.426

(1) CEDE calculated in 2001 and later is based on ICRP 68 methodologies. Prior to 2001, CEDE calculated based on ICRP 26 & 30 methods using 10 CFR 20 DAC/ALI.

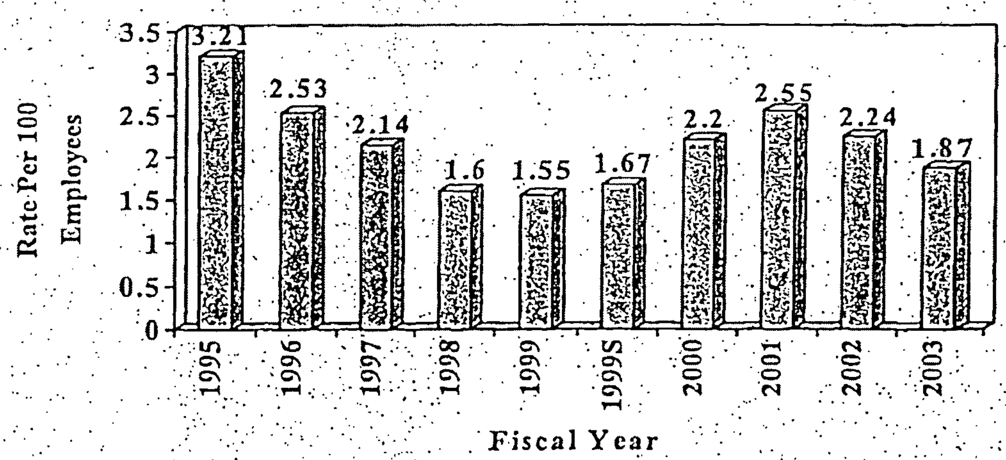
BWXT has an established Industrial Hygiene Program for monitoring industrial exposures to non-radiological chemicals. This program is monitored through the Industrial Health & Safety Unit, which currently utilizes the expertise of a full-time Certified Industrial Hygienist (IH). To ensure proper oversight of the program, the IH works in conjunction with an Industrial Hygiene Technician and the Facility Occupational Nursing staff. Existing operations have been monitored for potential exposures and new chemicals and/or operations are identified and monitored through the facility Change Management Program. Exposure monitoring records are maintained within the Industrial Health & Safety Units records system.

The graph in Figure 3-5 below depicts the NPD OSHA Rate for previous years. The OSHA rate is a standard measuring tool that takes into account the number of OSHA Recordable Injuries (i.e. Lost Time, Restricted, and Medical Treatment incidents) as well as the total number of Man-hours worked.

The OSHA rate is used by the US DOL and the National Safety Council and has become the recognized statistical rate for measuring and comparing work injuries, illnesses, and accidents within and between Industries. The base for reporting injuries and illnesses is equivalent to that of a year's work for 100 full time employees.

The average NPD OSHA rate from FY 2000 through FY 2003 is 2.20 (This results in 2.20 cases per 100 equivalent full-time workers). Beginning with the 2003 reference year, the Survey of Occupational Injuries and Illnesses began using the 2002 North American Industry Classification System (NAICS). Prior to 2003, the survey used the Standard Industrial Classification (SIC). NPD falls under SIC code 3443 – Fabricated Plate Work which currently corresponds to the new NAICS, 332410 – Power Boiler and Heat Exchanger Manufacturing. According to the Bureau of Labor Statistics - 2003, the average rate for this industry class is 7.3.

Figure 3-5 NPD OSHA Rate



3.12 Waste Management

3.12.1 Liquid Wastes

Liquid waste is treated and measured prior to release to the James River. Section 2.2.3 describes the process.

3.12.2 Solid Wastes

Solid wastes from operations are typically packaged in the area of generation. Section 2.2.4 describes the generation of solid waste.

Solid wastes are shipped independently from LTC and NPD. Quantities of waste generated since 1994 are provided in Table 3-14.

TABLE 3-14 Quantities of Waste Generated (ft^3)

NPD	LLW	2003	2002	2001	2000	FY99S	FY99	FY98	FY97	FY96	FY95	FY94
		23,419	24,332	20,271	40,135	26,742	13,594	12,947	7,499	7,242	6,777	7,010
LTC	Year	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994	
	LLW	2,725	1,437	1,414	2,864	1,649	1,588	1,759	2,248	668	1734	
	HLW	0	0	57	63	0	0	0	124	484	68	

FY99S - reporting went from fiscal year to calendar year, FY99S represents a shortened year (3 quarters)

3.12.3 Hazardous and Mixed Wastes

NPD manufacturing operations use various types solvents, acids, and other chemicals which may generate hazardous wastes.. A biennial hazardous waste generators report which lists all waste streams and their method of disposal is submitted to the Virginia Department of Environmental Quality in accordance with state regulations.

In general, non-radioactive hazardous wastes are generated and collected at satellite accumulation areas within the facility. The waste is transferred to the NPD Hazardous Waste Building where it is inventoried, documented and prepared for off-site shipment. Shipping is performed in accordance with applicable regulations.

Wastes that meet the definition of mixed waste are stored in the Mixed Waste Storage Area (in the Hazardous Waste Building). Materials that are typically stored in the area include trichloroethylene-contaminated solutions and sludges, x-ray film wastes (silver), mercury-contaminated wastes, and Freon still bottoms. In addition to mixed wastes, various radioactive liquids, including waste oil and chemical solutions, are stored in the Hazardous Waste Building.

The Hazardous Waste Building is inspected regularly for leaks and to ensure compliance with storage requirements.

4.0 ENVIRONMENTAL IMPACTS OF PROPOSED ACTION AND ALTERNATIVE

4.1 Land Use

Land use at the facility is not expected to change. Expansion within areas that are currently within the industrial area of the site is likely. However, there are no current plans for expansion in non-industrial parts of the site. License renewal will not impact land use at the site.

The alternative to license renewal would impact land use at the site during the short-term. If license renewal was not granted, and decommissioning commenced, many areas of the site would be impacted for staging of equipment, waste, as well as characterization and potentially decontamination.

4.2 Transportation

Transportation of radioactive material to and from the facility will continue. There are not any anticipated changes to the quantities or types of shipments. There is no impact anticipated on transportation routes to the facility.

The alternative would result in a significant increase in the number of shipments of radioactive material from the site, until decommissioning activities were completed.

4. 3 Geology & Soils

Renewal of license SNM-42 will not impact the geology or seismology of the BWXT site. Soils will not be negatively impacted, as no major changes of land use are anticipated. Erosion of the site is controlled by the vegetation present and maintenance of the facilities, parking lots and roadways.

Not renewing license SNM-42 may have short term impacts on the site surficial geography, however, no long term affects would be anticipated.

4.4 Water Resources

Potential impacts on water resources (surface, sub-surface, and wetlands) associated with license renewal would be negatively impacting the water quality from leakage or spills into the James River. The likelihood of these impacts is mitigated by both engineering and administrative controls. NPD applies berms to tanks and drain lines are inspected routinely. The site Emergency Plan address scenarios that could initiate spills.

There is no longer any impact from water withdrawals. Beginning in the later part of 2003, BWXT began using water supplied by CCUSA. This eliminated the need to withdraw water from the James River or on-site wells. Consequently, as of 12/17/04, Wells # 8, 10, & 11 were officially abandoned by removing the pumps, disinfecting the wells, filling the wells with gravel and bentonite, and capping the wells with concrete. Table 4-1 details water usage at the site for the past 10 years.

Table 4-1, NPD Water Usage (data is in units of millions of gallons)

DISCHARGES	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994
Treated Discharge to River, Outfall 001	210.8	196.4	194.1	175.3	182.3	227.6	185.3	136.2	50.2	54.1
Cooling Tower Overflow, Outfall, 002	2.6	0.9	0.9	0.8	1.2	1.8	2.4	2.2	1.4	2.1
Bryant's Pond Flow, Outfall 003	18.0	6.8	7.5	6.3	12.5	34.4	40.2	85.1	167.5	168.3
CONSUMPTION										
Water pumped from James River	93.4	143.3	149.3	144.9	170.5	191.0	195.1	198.2	193.2	191.0
Water from CCUSA (Service/ACF)	49.6	NR	NR	NR	NR	NR	NR	NR	NR	NR
DI Water Total (Wells 6, 7, 9)	8.9	13.0	15.7	15.2	15.2	13.8	13.4	11.4	11.0	11.0
DI Water from CCUSA	4.4	NR	NR	NR	NR	NR	NR	NR	NR	NR
Potable Water (wells 3, 8, 10, 11)	19.2	32.7	33.3	33.0	26.8	36.6	35.7	43.9	32.6	32.8
Potable Water from CCUSA	8.2	NR	NR	NR	NR	NR	NR	NR	NR	NR
RECIRCULATED										
Recirc. Service/Process	240.7	285.7	295.6	274.5	228.6	213.8	271.7	381.5	412.0	316.9
WASTE GENERATION										
LLR Liquid Waste (PLANT)	5.3	2.8	3.3	3.0	3.3	2.9	2.6	3.8	3.6	3.7
LLR Liquid Waste (RECOVERY)	5.0	3.7	3.9	3.4	3.2	2.7	3.2	2.9	5.7	5.2
PA Waste water (non-rad)	4.3	3.9	4.6	4.4	4.3	3.0	3.6	5.6	5.6	3.6

NR – Not reported

Impacts on the water quality of the James River is minimized by the limits placed on discharges by the VPDES permit issued to BWXT by the state of Virginia (Table 3-2) and adherence to the limits set forth in 10CFR20. Liquid effluent releases for the past 10 years are summarized in Table 4-2.

Table 4-2, Liquid Effluent Discharge Summary

Parameter	Units	Nuclide	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994
Avg Concentration	$1x10^{-8}$ µCi/ml	Uranium	3.84	2.04	1.81	1.61	1.06	0.77	3.18	4.17	7.91	7.53
		Gross Beta	1.13	1.44	1.51	1.30	0.82	0.59	0.92	2.61	12.00	NR
		Sr-90	0.04	0.15	< MDC	0.02	0.82	NR	NR	NR	NR	NR
		Tc-99	< MDC	0.11	0.32	0.38	0.56	NR	NR	NR	NR	NR
		Cs-137	0.12	0.14	0.39	< MDC	< MDC	NR	NR	NR	NR	NR
Total Quantity Released	µCi	Uranium	38,086	15,142	13,298	10,674	7,316	6,633	25,847	21,344	14,966	16,481
		Gross Beta	8,968	10,686	11,125	8,602	5,674	3,636	7,297	11,070	22,761	NR
		Sr-90	349	1,085	< MDC	111	5,674	NR	NR	NR	NR	NR
		Tc-99	< MDC	841	2,352	2,507	3,885	NR	NR	NR	NR	NR
		Cs-137	989	1,005	2,851	< MDC	< MDC	NR	NR	NR	NR	NR
% 10CFR20 Table II, column 2	%	Total	13.1%	7.4%	6.8%	5.4%	5.2%	3.7%	12.4%	19.1%	50.4%	25.1%
Volume Discharged	$1x10^{6}$ liters	Total	7.97	7.43	7.35	6.63	6.9	8.58	7.9	5.12	1.89	2.19

NR - not reported (Prior to 1995 license SNM-42 did not require beta activity to be reported)

Ground water has been impacted from past operations. In 1986, BWXT identified volatile organic compounds (VOCs) in a groundwater monitoring well at the site. The primary VOC found was trichloroethylene (TCE). After regulatory notifications, a period of monitoring began.

In 1991, BWXT executed an Administrative Consent Order with the EPA to perform corrective action in accordance with the Resource Conservation and Recovery Act (RCRA). A RCRA facility investigation was performed to define the nature and extent of any releases of past products or wastes. The RFI was completed in 1996. The RFI identified three separate groundwater plumes that are contaminated with TCE, tetrachloroethylene (PCE) and related degradation constituents above concentrations considered safe for drinking water.

The next phase of the order was the corrective measures study (CMS). Pilot tests were conducted from 1993 to 1995. In 1998 an ecological survey of the James River shoreline was conducted. The study, a Rapid Bioassessment Protocol III, concluded that the natural flow of groundwater into the James River for the site does not pose an ecological risk to the river. The levels for the constituents of concern were below the Federal Water Quality Criteria for a surface water body not designated as a source of drinking water.

Currently there are two corrective actions being performed. A soil vapor extraction system and a groundwater collection and treatment system are in operation to reduce the levels of VOCs in groundwater at the site. The EPA and BWXT agreed to a long-term alternative screening study of these two technologies. The Corrective Action Phase will continue to ensure that site contamination continues to pose no risk to human health or the ecology of the James River. BWXT submits monitoring reports to EPA Region III annually. (EPA, 2003). Therefore, all wells associated with the EPA Administrative Consent Order will remain in place for monitoring purposes.

Radiological ground water monitoring data presented in Tables 4-3 and 4-4 indicate no significant impact from radiological constituents from past operations at the site.

Table 4-3 Ground Water Monitoring, NPD (units of pCi/l)

Location #		2003	2002	2001	2000	1999	1998	1997	1996	1995	1994
MWB-3	Alpha	0.35	0.69	1.59	2.14	1.54	1.53	1.29	1.35	0.43	0.27
	Beta	-0.36	4.38	2.71	3.69	2.99	2.82	4.07	3.34	2.10	NR
MWB-5	Alpha	0.10	4.23	8.61	2.19	1.60	1.47	1.66	2.65	1.01	0.74
	Beta	0.96	7.07	17.72	2.46	5.52	3.45	3.43	5.04	1.17	NR
MWA-4	Alpha	0.62	8.37	2.28	0.29	0.29	1.43	1.46	1.85	1.31	0.26
	Beta	0.83	12.86	3.69	1.94	0.94	3.44	3.33	2.75	-1.70	NR
MWA-7	Alpha	0.74	6.74	0.84	1.09	0.24	1.39	1.28	1.56	1.31	0.74
	Beta	2.74	7.34	-1.00	1.48	2.38	3.00	2.98	2.85	4.14	NR
MWA-9	Alpha	0.01	7.01	0.91	0.84	-0.25	1.14	1.49	1.56	0.70	0.37
	Beta	1.18	10.57	3.98	1.51	1.81	2.83	3.42	3.29	1.61	NR
MWA-10	Alpha	0.45	6.32	3.32	0.78	-0.03	1.28	3.56	1.53	1.65	0.39
	Beta	3.13	8.74	3.87	1.60	1.42	3.20	3.47	2.93	5.52	NR
MWA-11	Alpha	5.65	12.59	5.88	4.00	4.42	4.80	4.51	5.45	2.65	3.37
	Beta	4.26	12.99	4.45	0.32	3.40	2.81	4.67	5.06	5.00	NR
MWA-12	Alpha	-1.43	2.43	1.07	0.95	0.50	1.46	2.25	2.74	0.85	0.95
	Beta	3.84	4.61	3.12	2.92	3.74	5.05	5.60	6.10	6.39	NR
MWA-15	Alpha	3.63	6.04	2.32	1.56	0.99	2.08	1.86	1.36	0.64	0.51
	Beta	2.58	3.00	5.94	1.26	-3.48	2.77	3.79	4.91	2.78	NR
MWA-17	Alpha	-0.08	1.69	0.99	0.11	0.00	1.24	1.57	1.38	0.01	0.42
	Beta	1.94	1.87	2.52	6.70	2.19	3.20	5.14	3.53	4.50	NR
MWA-18	Alpha	0.82	1.24	2.07	1.11	0.01	1.53	1.41	1.29	0.57	0.84
	Beta	1.16	0.76	0.37	0.63	1.67	2.77	3.21	3.18	0.73	NR
FEP-1	Alpha	12.17	0.26	0.51	0.26	0.34	3.23	2.00	2.91	-0.50	-0.23
	Beta	-2.28	7.13	8.64	3.95	-6.28	3.01	11.01	7.42	1.26	NR

Table 4-3 Ground Water Monitoring, NPD (continued)

Location #		2003	2002	2001	2000	1999	1998	1997	1996	1995	1994
FEP-2	Alpha	7.78	1.36	1.34	0.15	0.41	1.46	1.48	1.56	0.34	-0.24
	Beta	-8.58	9.31	5.71	16.34	-0.35	3.44	7.77	2.93	4.07	NR
FEP-3	Alpha	0.14	1.12	1.17	2.33	2.08	1.25	1.89	2.02	1.03	2.42
	Beta	3.50	0.87	-0.90	5.37	3.54	3.15	2.98	3.39	5.18	NR
CL-2	Alpha	2.22	1.80	1.33	0.89	0.21	1.49	1.82	3.78	0.81	NR
	Beta	2.56	1.67	3.29	1.77	3.67	3.50	3.28	3.46	0.94	NR
CL-5	Alpha	0.64	3.29	4.41	-0.69	1.28	1.95	7.09	1.95	0.23	NR
	Beta	0.40	6.60	5.82	-1.74	3.31	3.01	10.60	4.11	4.56	NR
FL-2	Alpha	-0.08	1.36	1.02	2.84	1.14	1.13	8.89	1.80	0.13	NR
	Beta	0.49	3.93	1.46	3.46	1.16	2.82	13.71	3.98	0.61	NR

NR – Not reported;
1 – 2002 data for wells MWA-4, 7, 9, 10, 11, 12 and 15 was elevated. Investigation attributed activity to cross contamination during either sampling or analysis.

Table 4-4, Groundwater Monitoring Results for LTC (units of pCi/l)

LTC Wells:		2003	2002	2001	2000	1999	1998	1997	1996	1995	1994
MWL-1	Alpha	1.6	0.00	1.30	0.60	-0.30	0.40	1.40	0.33	0.83	0.25
	Beta	0.6	-0.40	2.10	6.30	2.30	1.18	3.00	1.26	3.11	4.3
MWL-2	Alpha	5.5	1.70	0.70	2.40	3.30	1.80	1.70	3.67	2.55	2.23
	Beta	2.5	-0.10	1.00	5.50	5.20	4.09	4.00	6.38	7.30	3.75
MWL-3	Alpha	2.0	0.20	-0.80	1.30	1.10	0.36	-0.10	1.54	0.80	-0.13
	Beta	3.1	-0.10	-6.10	3.50	4.70	-0.26	-0.10	1.41	4.69	1.5
MWL-4	Alpha	0.8	0.20	-1.80	0.70	0.30	2.07	0.20	2.01	0.55	1.0
	Beta	0.6	-0.60	-4.20	-0.40	1.60	5.41	-1.20	2.14	2.12	3.23
MWL-5	Alpha	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
	Beta	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
MWL-6	Alpha	6.3	-0.30	-0.20	0.40	0.90	0.82	-0.20	1.40	0.68	-0.18
	Beta	5.0	-2.00	-1.30	3.00	0.70	1.35	-0.60	2.79	3.00	0.88
MWL-7[1]	Alpha	5.9	13.30	5.70	7.90	28.70	72.20	32.20	14.55	4.87	2.0
	Beta	4.4	7.50	1.60	11.50	30.50	118.0	73.10	28.80	18.90	10.35
MWL-8	Alpha	6.6	7.90	9.90	NR	NR	NR	NR	NR	NR	NR
	Beta	17.8	23.80	30.00	NR	NR	NR	NR	NR	NR	NR
MWL-9	Alpha	0.6	-0.10	-0.40	NR	NR	NR	NR	NR	NR	NR
	Beta	0.7	-0.70	-1.60	NR	NR	NR	NR	NR	NR	NR
MWL-10	Alpha	DRY	DRY	DRY	NR	NR	NR	NR	NR	NR	NR
	Beta	DRY	DRY	DRY	NR	NR	NR	NR	NR	NR	NR
MWL-11	Alpha	0.1	-0.50	-0.40	NR	NR	NR	NR	NR	NR	NR
	Beta	1.5	-2.20	-1.00	NR	NR	NR	NR	NR	NR	NR
MWL-12	Alpha	0.2	-0.10	0.30	NR	NR	NR	NR	NR	NR	NR
	Beta	1.3	1.00	1.30	NR	NR	NR	NR	NR	NR	NR

1 – An investigation conducted in 1996 and 1998 concluded the activity seen in well MWL-7 was from naturally occurring radionuclides. NR – Not reported

4.5 Ecology

Site ecology will not be impacted by license renewal. NPD maintains all effluent releases within regulatory parameters. The environmental impact on the site ecology.

The alternative to license renewal would also not be likely to impact site ecology.

4.6 Air Quality

The impact of continued operations on air quality at the site should not change. NPD currently maintains radiological airborne discharges and chemical releases within applicable regulatory limits. Table 4-5 summarizes radiological effluent releases for the past 10 years. The COMPLY computer code is used to calculate offsite exposures. These exposures are then compared to the 10CFR20.1101 (d) Constraint Level of 10 mrem. The maximum calculated annual exposure, 0.18 mrem, is only 1.8 % of the ALARA Constraint level. Site boundary air sampling data is presented in Table 4-6. Excluding the 2002 Front Gate sample results, which were determined to be a laboratory analysis error, the maximum concentration was 2.5% of the 10CRF20, Appendix B, Table 2, Column 1, U-234 Class Y limit.

Table 4-5 Summary of Gaseous Effluent Releases (units of uCi)

#	Stack	Nuclide	2003	2002	2001	2000	1999	1998	1997	1996	1995
11	CRF	Uranium	6.6	20.7	12.1	11.4	11.3	10.1	9.3	7.8	10.1
35	14A Maintenance	Uranium	1.1	2.2	2.1	2.6	0.5	NR	NR	NR	NR
38	13A/14A/15A Dry[1]	Uranium	4.9	14.7	14	34.1	233.9[2]	56.7	6.1	10.4	11.5
15	Recovery Scrubber[3]	Uranium	895	1208	2397	2088	1070	811	761.6	585	1102
		Gross β	115	176.3	320.7	414.6	52.1	69.2	158	151.8	89.6
40	Downblend Scrubber	Uranium	110	48.84	NR	NR	NR	NR	NR	NR	NR
		Gross β	23	15.7	NR	NR	NR	NR	NR	NR	NR
18	3A Stack	Uranium	0.0	0.2	0.1	0.3	0.1	0.1	0.1	0.1	0.2
19	MFP Load	Uranium	0.1	0.6	0.5	0.7	0.7	0.6	1.9	0.2	0.1
20	Reclamation	Uranium	0.1	0.7	0.3	0.5	0.3	0.2	0.6	0.3	0.2
Term	1A/2A Stack	Uranium	0.0	0.3	0.2	0.3	0.2	0.1	0.1	0.1	0.3
23	2A Stack	Uranium	0.6	1.8	1.4	0.1	0.1	0	0	0.2	0.3
24	3A Pharmacy	Uranium	0.8	2.7	1	1.3	2.5	2.1	1.4	1.4	0.9
39	Waste Mgmt Center	Uranium	0.1	0.2	0.2	0.2	0.2	1.9	0.1	0.2	0.3
43	1A Stack	Uranium	0.0	0.9	1	4	2.2	1	1.3	2.5	2.3
37	12A Chem Lab Scrubber	Uranium	17.6	26.5	29.2	23	28.5	27.4	2.8	NR	NR
26	Met Lab	Uranium	0.3	2.1	1.6	1.6	1.2	0.7	0.9	NR	NR
16	RTRT	Uranium	1.2	3.4	4.7	3	2.5	2	2.4	2.7	1.6
42	NMC Storage	Uranium	0.3	0.1	NR	NR	NR	NR	NR	NR	NR
30	Laundry	Uranium	1.9	6	3.3	2.2	2.9	3	2.6	2.8	8.9
32	Compactor	Uranium	0.2	0.7	0.5	0.7	0.4	0.5	0.3	0.4	0.3
	BeWSPS Area	Uranium	NR	0.5	1.1	1	0.4	0	NR	0.1	NR
33	Decon	Uranium	0.8	1.1	0.9	0.7	0.7	0.2	0.2	0.1	NR
36	Retention Tanks	Uranium	0.2	0.4	0.2	0.3	0.5	0.5	0.2	1.1	NR
31	WT Scrubber	Uranium	7.4	7.4	7.6	4.1	4.6	2.7	3.1	3.4	2.8
		Gross β	5.7	7.2	6.4	3.6	6.2	3.4	3.3	4.5	1.6
	50 meter Stack	Gross α	5.6	3.1	0.8	0.7	0.8	0.7	0.6	0.5	0.5
		Gross β	21.3	12.5	10.8	8.6	9.4	7.9	7	7.9	6.4
	AC Stack (NEL prior to 2003)	Gross α	1.2	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1
		Gross β	3.3	1.8	1.5	1.5	1.5	1.5	1.5	2	1.8
	RCL Stack	Gross α	1.6	0.2	NR	NR	NR	NR	NR	NR	NR
		Gross β	9.0	1.6	NR	NR	NR	NR	NR	NR	NR
	TOTAL	Uranium	1051.4	1350.6	2479	2180.1	1363.9	921.4	812.1	648.9	1163.3
		Gross α	8.4	3.5	0.9	0.9	1	0.9	0.7	0.6	0.6
		Gross β	177.3	215.1	339.4	428.3	69.2	82	169.8	166.2	99.4
Offsite dose from all stacks (mrem)			0.04	0.07	0.07	0.07	0.18	0.07	0.11	0.04	0.05

NR – Not reported, not in service

1- Stack reconfigured from 2 previous stacks in 1999; data from prior years is combined discharge of the 2 stacks.

2- Increase in 1999 due to degraded HEPA filter discovered and corrected 12/99.

3- Downblending began Jan. 2000; operation re-routed to new Downblend Stack in July 2002.

Table 4-6, Environmental, Boundary Air Samples (results are in units of 1x10-16 uCi/ml).

Year		River N	Magnet Bldg N	Ponds NE	Zirc Recov. NE	Ballfield E	Parking Lot (N) E	Front Gate E	Credit Union SE	Tanks S	Power Station SW	Assembly Area SW	LTC River W	LTC Fence NW
2003	Avg	4.90	2.25	2.70	2.55	2.60	2.10	2.40	3.55	2.85	2.45	2.50	2.65	2.45
	Max	12.50	2.80	3.40	2.90	3.10	2.35	3.10	4.70	3.30	3.20	2.80	3.00	2.75
2002	Avg	0.65	-2.35	0.80	7.25	0.55	1.80	51.2(1)	1.45	2.00	1.35	1.15	-0.45	0.35
	Max	4.65	6.05	2.80	12.50	3.70	4.30	200(1)	2.20	5.40	2.65	5.70	2.80	2.30
2001	Avg	0.95	1.55	2.35	2.50	0.25	2.00	2.60	1.25	-0.20	1.15	2.10	0.95	3.30
	Max	2.40	2.40	5.45	3.35	0.95	3.25	4.60	2.65	1.00	2.25	3.40	1.55	12.00
2000	Avg	0.80	1.55	6.30	3.05	0.50	2.35	2.90	1.10	-0.30	1.05	2.70	2.35	0.95
	Max	1.90	2.10	17.30	4.10	1.70	4.50	4.60	2.65	1.90	2.25	3.40	4.00	2.25
1999	Avg	1.00	1.45	2.20	3.65	0.35	3.40	2.25	1.20	1.95	1.60	2.35	1.80	0.60
	Max	3.50	2.20	4.10	9.35	1.95	8.40	5.05	3.70	5.00	3.60	5.85	4.60	1.80
1998	Avg	2.50	4.20	2.75	1.80	1.00	0.65	0.50	2.00	1.60	0.90	0.75	2.05	1.25
	Max	5.45	12.00	4.90	2.80	2.00	2.15	1.20	2.40	4.65	1.85	1.45	3.20	2.10
1997	Avg	4.35	5.30	5.85	4.75	3.70	4.05	4.60	4.75	4.30	3.50	4.35	3.00	3.85
	Max	9.35	10.50	11.70	9.05	11.30	7.85	9.05	11.90	8.40	9.35	8.30	6.60	10.10
1996	Avg	3.95	2.80	3.20	3.45	2.20	1.60	1.70	2.35	2.45	2.80	2.35	1.95	2.95
	Max	8.10	5.45	5.85	4.50	2.75	3.10	2.85	3.75	5.20	6.25	3.70	2.80	5.70
1995	Avg	2.55	2.05	2.35	2.30	0.70	2.40	1.80	1.25	2.05	1.20	1.75	2.80	1.35
	Max	5.15	5.80	5.50	3.15	1.35	6.65	4.75	3.50	3.20	3.25	3.45	7.75	3.80
1994	Avg	5.35	3.80	5.30	5.00	3.75	4.90	3.40	3.60	4.50	3.70	2.90	4.70	3.60
	Max	8.40	4.75	8.00	7.50	4.65	6.40	4.35	5.85	5.45	5.85	4.60	6.95	5.50

(1) – Front gate sample, 2002 was elevated, investigation concluded lab analysis was in error.

Non-radiological emissions are reported annually as required by the Facility's Title V Operating Permit (effective 2/16/02). Also, a visible emissions observation is made on each stack on a weekly basis. If visible emissions are observed, an official opacity determination is made and the results compared to the limits in the permit. There has been no opacity exceedance since the effective date of the Title V Permit. The Title V Permit does not require facility stacks to be physically sampled for analysis. Instead, all air emissions are estimated based on process throughputs and engineering knowledge. Table 4-7.A summarizes the emissions reported to the DEQ from BWXT operations. Table 4-7.B lists the permit limits for the permitted processes, and the performance of each process relative to its respective limits. Most processes at this facility have no limits other than opacity. Instead, they have only monitoring requirements.

Table 4.7.A Title V Annual Emissions Summary

Pollutant	Emissions (tons/yr)	
	2002	2003
VOCs	11.21	18.07
NO_X	37.91	49.10
SO_2	0.13	0.23
PM_{10}	0.30	0.31
$PM_{2.5}$	0.30	0.30
Pb	00.0	0.00
CO	3.23	3.38
NH_3	0.12	0.13
HCL	0.14	0.13
HF	0.93	1.21

Note: Although emissions have been reported for previous years, the reporting format and range of processes and related pollutants were changed in the 9/16/02 Title V Permit. Therefore, 2002 and 2003 represent the most current and accurate data. The 2004 annual emissions report is not yet available.

Table 4.7.B Process Air Permit Limits and Performance

Process	Air Permit Limit	2000	2001	2002	2003
Acid Bake-off Tank	44,300 gallons Throughput	11,280	10,159	8,370	9,442
U-Metal Dissolvers	7.5 tons/yr NO_X Emissions	Not operating	Not operating	0.89	1.23
Calciner	232 tons/yr Scrap Throughput	40.7	21.3	42.6	8.3
Finishing Furnace	489 kg/yr Fuel Throughput	0.0	0.0	0.0	54.5

4.7 Noise

License renewal would allow operations to continue as they are currently conducted. No additional sources of noise are planned. The majority of the potential sources of noise are located within the facility. By not allowing license renewal, and requiring D&D of the facilities, the impact of noise would be increased when buildings are razed.

4.8 Historical & Cultural Resources

Renewal of license SNM-42 will not impact local historical or cultural resources described in 3.8. The alternative action would also not impact historical or cultural resources.

4.9 Visual/Scenic Resources

The BWXT site has been in operation since 1955. There will be no impact on visual or scenic resources from allowing license renewal. The alternative action would impact these resources in the short-term.

4.10 Socioeconomic

There will be a continued positive socioeconomic impact from license renewal. As a major employer in the Lynchburg area, and a valuable member of the community, BWXT will continue to create jobs, and provide opportunities for local residents.

Failure to renew license SNM-42 would have a negative socioeconomic impact on the local community.

4.11 Environmental Justice

The BWXT facility has been in operation since 1955. The area immediately surrounding the facility is sparsely populated. This population is considered during environmental assessments. Since it is the position of BWXT that the environmental impact from facility operation is not significant, there will be no environmental justice issues associated with license renewal.

4.12 Public & Occupational Health Impacts

4.12.1 Radiological Impacts

The radiological environmental impact of continued operations at NPD can be evaluated by analyzing data from current and past operations at the facility. Semi-annually BWXT prepares a report documenting releases to the environment. This includes an exposure assessment calculated by incorporating very conservative assumptions. Exposures from gaseous effluent releases are determined using the EPA-Comply code. The EPA-Comply code assumes a residential scenario, using conservative assumptions. It is primarily used as a screening tool.

Doses from liquid effluents are calculated using a resident scenario which includes drinking water & fish consumption pathways. Guidance from Regulatory Guide 1.109 is used. Dose conversion factors are taken from Federal Guidance Report Number 11. The results of the exposures from effluents are summarized in Table 4-8.

License renewal would ensure releases continue to meet NRC limits for exposure to the public, therefore the impact of license renewal is minimal.

Exposures from credible accident scenarios have been postulated and are documented in the ISA Summary in Chapter 3 of SNM-42 (docket 70-27).

Table 4-8, Radiological Exposures from Effluent Releases (mrem/yr)

Exposure Pathway	2003	2002	2001	2000	1999	1998
Airborne	0.04	0.07	0.07	0.07	0.18	0.07
Liquid	0.4	0.3	0.58	0.11	0.13	0.09
Total	0.44	0.37	0.65	0.18	0.31	0.16

4.12.2 Non-radiological Impacts

The non-radiological environmental impact of continued operations at NPD can also be evaluated by analyzing data from current and past operations at the facility.

BWXT has an established Industrial Hygiene Program for monitoring industrial exposures to non-radiological chemicals. This program is monitored through the Industrial Health & Safety Unit, which currently utilizes the expertise of a full-time Certified Industrial Hygienist (IH). To ensure proper oversight of the program, the IH works in conjunction with an Industrial Hygiene Technician and the Facility Occupational Nursing staff. Existing operations have been monitored for potential exposures and new chemicals and/or operations are identified and monitored through the facility Change Management Program. Exposure monitoring records are maintained within the Industrial Health & Safety Units records system.

BWXT reports air emissions to the environment on an annual basis as required by the Title V Operating Permit. These emissions are summarized in Table 4.7.A. The Air Permit under which BWXT operates is structured such that the public and the environment are not exposed to harmful concentrations of pollutants at the property line. The Permit requires air pollution control devices and/or throughput restrictions or monitoring to ensure only acceptable levels of air pollutants are emitted from the facility. These levels were established by regulatory agencies based on very conservative exposure scenarios and/or environmental effects. Since it is expected that BWXT will continue to operate in accordance with the requirements outlined in the Air Permit, there should be no impact from non-radiological air emissions from this facility.

BWXT reports wastewater discharges to the environment on a monthly basis in the VPDES Permit Discharge Monitoring Reports. These data are summarized in Table 3.2. The VPDES Permit discharge limits are structured to meet State Water Quality Standards for the James River. The Water Quality Standards have been established by the State to protect human health and the environment under very conservative exposure scenarios. Therefore, as long BWXT continues to achieve the VPDES Permit limits, both human health and ecological health will be protected. BWXT no longer consumes water from the James River; therefore, there are no occupational exposure scenarios for the consumption of surface waters at BWXT.

BWXT is currently managing three contaminated groundwater plumes under RCRA Corrective Action Consent Order RCRA-III-050-CA. These plumes are currently being monitored through monthly and annual groundwater and surface water sampling and analysis. The analyses results are reported to the EPA on an annual basis. This monitoring has shown that the plumes are not expanding significantly, and there is no significant impact to the James River. Furthermore, the monitoring reports have shown that the EPA Environmental Indicators ("Current Human Exposures Under Control" and "Migration of Contaminated Groundwater Under Control") are being met. In addition to the two stabilization systems currently in place at BWXT (Soil Vapor Extraction and Pump &

Treat), BWXT is planning to pilot additional systems in the near future. There are no drinking water wells in the vicinity of the groundwater plumes; therefore there are no occupational or public exposure scenarios for the consumption of groundwater at or near BWXT. As long as BWXT continues to monitor and evaluate groundwater and surface water at the facility, and the stabilization systems continue to operate, there should be no impact from the groundwater from this facility.

4.13 Waste Management

The impact of license renewal on waste management issues would be minimal. No significant changes to waste management methodologies are anticipated.

The alternative to license renewal would likely, for the short term, increase the impact of waste management issues. D&D of the facility would cause a significant increase in waste generation during the lifetime of the project.

5.0 MITIGATION MEASURES

Mitigation measures begin at the source for each process at the facility. Unencapsulated radioactive material is processed in ventilated enclosures in radiologically controlled areas. These areas maintain control of contamination using ventilation and other engineered controls such as gloveboxes and hoods.

All ventilation systems which exhaust to the environment have a pollution control device, except for the laundry facility. HEPA filtration is the primary method of pollution control. In many cases more than one stage of filtration is present. Some operations cannot be treated using HEPA filters due to excess vapors, moisture or heat. These processes are treated using a fume scrubber. Table 2-1 lists the pollution control device for each stack.

Liquid effluents are also controlled at the source. Process areas which have the potential to generate high concentrations of radioactivity are monitored prior to discharge. The waste is processed at the Waste Treatment Facility as described in section 2.2.1.

5.1 ALARA Program

BWXT has committed to a formal ALARA Program. It is the policy of BWXT to ensure exposures and effluents are maintained As Low As Reasonably Achievable, taking into account the current state of technology, and the economics of improvements in relation to benefits to the public health and safety. The goal of the program is to keep internal and external exposures, effluents from the facility and radiological conditions in the facilities, ALARA. The ALARA Program is implemented through procedure and ensures that it's considerations are included in the design of site systems, processes and facilities.

Annually an ALARA Report is prepared by Radiation Protection. The reports reviews data on personnel exposures, in-plant radiological conditions, effluent monitoring, and environmental monitoring. The data is tracked and trended to determine:

- If trends are developing in personnel exposures;
- If trends are developing in the conditions of different parts of the facilities;
- If trends are developing in effluent releases or environmental conditions on or off site;

- If personnel exposures or releases of radioactive material to the environment might be lowered in accordance with the concept of ALARA; and
- If trends are developing in the results of audits or inspections.

5.2 Change Control

BWXT has a formalized change control system. Any facility change must be evaluated. Any change which may have an impact on exposures to personnel or releases to the environment must be evaluated by the appropriate safety discipline.

6.0 ENVIRONMENTAL MEASUREMENTS AND MONITORING PROGRAMS

BWXT has a comprehensive Environmental Monitoring Program. Requirements for the program are maintained in the license, and are implemented by procedure RP-08, Environment and Effluent Monitoring and Controls. Samples are taken a minimum of annually from the locations identified on Figure 2-7.

A summary of environmental monitoring data for the past 10 years can be found in Table 6-1. Table 4-6 summarized the environmental air sampling data. Table 4-3 and Table 4-4 contain the ground water monitoring data which is also an important part of the Environmental Monitoring Program.

Table 6-1 Environmental Monitoring Data

Loc #	Location Description	Type	Analysis	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994
1	Bank in south corner of main NNFD parking lot	Soil	Iso Uranium	2.43	1.86	1.90	1.52	1.63	1.80	1.66	2.84	2.18	2.44
			Gross Beta	12.25	12.79	13.85	10.32	11.22	9.91	12.53	18.20	ND	ND
2	River Bank at six mile bridge	Soil	Iso Uranium	1.2	1.27	1.49	1.13	1.14	1.07	1.16	1.39	1.20	1.50
			Gross Beta	12.89	9.80	15.39	10.63	10.85	9.39	5.51	12.65	ND	ND
		Sed	Iso Uranium	1.05	0.88	0.96	0.76	0.96	1.04	1.37	1.56	1.07	0.97
			Gross Beta	4.47	6.15	7.33	7.19	9.04	8.42	7.45	22.41	14.20	ND
		S. Water	Gross Alpha (1)	1.06	2.97	-0.36	0.79	-0.10	0.85	3.13	0.25	0.32	0.34
			Gross Beta	3.32	6.89	3.18	3.80	3.20	2.80	5.73	6.74	13.60	ND
		Veg	Iso Uranium	0.11	0.45	0.16	0.23	-0.85	0.13	0.25	0.39	1.15	0.62
			G. Beta - K40	-7.98	-5.94	-0.22	1.56	-10.0	-6.49	-3.98	-0.28	ND	ND
3	In field SE of main parking lot beside big tree	Soil	Iso Uranium	2.63	2.51	2.49	2.41	2.04	2.25	2.02	7.41	2.73	4.32
			Gross Beta	7.83	7.99	14.32	10.90	8.78	8.92	12.94	18.80	ND	ND
		Veg	Iso Uranium	1.61	0.26	0.56	0.04	0.42	0.27	0.42	0.19	0.20	3.33
			G. Beta - K40	0.33	-4.93	2.51	4.26	-1.98	2.15	1.89	6.93	ND	ND
4	NE of the Compactor Building (2)	Soil	Iso Uranium	4.87	3.10	7.56	25.60	2.36	2.19	1.83	2.83	7.67	49.85
			Gross Beta	12.73	7.62	9.83	16.03	2.94	5.16	3.67	22.85	ND	ND
		Veg	Iso Uranium	1.23	0.27	0.67	0.32	1.76	2.60	0.46	0.56	2.93	66.45
			G. Beta - K40	-6.63	-0.16	1.45	1.69	7.68	-3.36	-4.43	3.36	ND	ND
5	Between NPD and LTC near shipping and receiving	Soil	Iso Uranium	2.69	2.55	2.41	2.30	2.57	2.21	1.95	3.71	2.72	2.31
			Gross Beta	13.14	10.88	10.18	9.01	6.18	6.38	3.30	22.25	ND	ND
		Veg	Iso Uranium	0.21	1.98	0.19	0.52	0.01	0.20	1.62	2.18	2.49	1.01
			G. Beta - K40	-3.03	-2.46	-1.46	2.90	0.37	-6.13	-7.86	2.60	ND	ND
6	Beside fire hydrant across road from main entrance	Soil	Iso Uranium	2.79	2.75	2.52	2.57	1.89	2.22	2.08	2.70	2.74	2.72
			Gross Beta	7.57	9.71	13.50	7.22	7.73	8.04	14.00	21.30	ND	ND
		Veg	Iso Uranium	2.15	0.34	0.11	0.40	0.52	0.39	0.93	ND	ND	ND
			Gross Beta	7.03	-0.93	-0.78	3.78	8.07	3.63	1.15	ND	ND	ND
7	Beside telephone pole just past the electrical substation	Soil	Iso Uranium	2.84	2.48	2.35	2.36	2.58	1.76	1.41	2.61	2.25	2.65
			Gross Beta	11.01	10.75	10.49	12.93	2.38	4.55	3.40	18.05	ND	ND
		Veg	Iso Uranium	0.15	0.15	0.08	-0.27	-0.12	0.28	0.85	0.45	0.83	0.46
			G. Beta - K40	24.60	-5.06	-1.87	3.95	0.51	-3.12	-3.88	-0.44	ND	ND
8	Brook near eastern property line beside access road	Soil	Iso Uranium	4.90	2.90	2.34	1.91	2.91	2.99	3.18	3.35	2.83	3.26
			Gross Beta	20.95	11.49	15.17	10.14	14.22	14.35	18.90	19.10	ND	ND
		Sed	Iso Uranium	3.16	2.05	1.99	2.10	2.39	2.62	3.03	2.26	3.16	3.34
			Gross Beta	16.13	12.99	19.04	14.94	13.65	14.10	13.90	13.70	ND	ND
		S. Water	Gross Alpha (1)	2.71	ND	1.05	2.59	-0.34	2.35	0.99	0.26	2.20	0.24
			Gross Beta	6.32	ND	6.79	2.48	-0.19	5.13	1.62	3.75	ND	ND
		Veg	Iso Uranium	0.20	0.82	0.19	0.17	0.13	0.27	0.39	0.22	0.14	0.68
			G. Beta - K40	-2.08	-2.06	-0.76	5.55	4.98	0.81	-1.39	5.40	ND	ND

Loc #	Location Description	Type	Analysis	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994
9	Near the trestle at Nine Mile Bridge	S. Water	Gross Alpha (1)	0.66	1.32	0.28	1.39	0.58	0.82	1.60	0.60	1.13	0.59
			Gross Beta	3.58	5.27	4.71	3.45	2.54	2.98	3.40	5.78	13.03	18.51
		Sed	Iso Uranium	1.37	1.31	1.67	1.48	0.89	1.03	1.02	0.91	0.97	1.21
			Gross Beta	12.71	9.34	16.10	13.87	8.09	12.86	6.57	15.97	6.53	2.72
10	Drainage ditch between fence and railroad track south of contaminated material burial site	Soil	Iso Uranium	2.85	1.92	2.61	3.56	1.61	2.61	1.94	2.41	1.75	1.78
			Gross Beta	10.99	16.47	14.68	11.80	7.57	11.95	12.46	27.10	ND	ND
		Veg	Iso Uranium	1.38	0.08	0.20	-0.13	0.30	0.42	0.17	0.80	0.22	0.36
			G. Beta - K40	2.38	-0.72	-1.51	5.23	2.12	0.86	1.22	5.20	ND	ND
11	Near contaminated material burial site	Soil	Iso Uranium	1.72	1.69	1.98	1.62	1.35	1.27	1.30	1.71	1.52	1.02
			Gross Beta	13.25	9.98	16.45	15.20	7.01	11.00	8.53	25.50	ND	ND
		Veg	Iso Uranium	0.17	0.10	0.07	-0.15	0.02	0.36	1.15	0.77	0.28	0.23
			G. Beta - K40	-8.93	1.23	2.27	3.91	8.00	-1.27	-10.28	0.79	ND	ND
12	On southern side of smaller water tanks	Soil	Iso Uranium	2.13	2.01	2.02	1.86	1.62	1.63	1.13	3.03	2.61	2.77
			Gross Beta	18.24	11.04	13.99	13.88	9.57	9.00	9.14	36.6 (3)	ND	ND
		Veg	Iso Uranium	0.29	0.22	0.19	0.08	-0.12	0.22	0.79	0.71	0.15	81.0 (4)
			G. Beta - K40	-3.44	-6.51	2.78	-1.77	1.66	5.16	-0.72	4.28	ND	ND
13	East of WTF on river bank upstream of plant outfall	S. Water	Gross Alpha (1)	0.35	1.07	0.62	0.77	-0.16	0.64	1.64	0.51	0.29	0.41
			Gross Beta	2.75	3.34	6.19	4.26	3.18	4.26	5.36	7.43	ND	ND
		Sed	Iso Uranium	1.66	1.13	1.07	1.32	0.83	0.91	0.97	1.37	1.34	1.30
			Gross Beta	12.75	12.72	12.86	12.01	9.07	11.40	11.10	14.20	ND	ND
14	Outfall from Bryant's Pond	Soil	Iso Uranium	2.29	2.27	2.10	2.01	1.63	1.59	1.75	2.27	2.10	3.52
			Gross Beta	14.82	17.47	18.57	19.26	11.26	9.52	13.16	22.43	ND	ND
		Veg	Iso Uranium	0.75	0.72	0.25	0.05	0.02	0.42	2.01	0.38	1.03	0.43
			G. Beta - K40	-4.78	-0.89	2.00	-0.88	3.81	-0.32	0.08	0.89	ND	ND
		S. Water	Gross Alpha (1)	ND	ND	ND	ND	5.85	2.47	3.37	2.04	4.79	1.27
			Gross Beta	ND	ND	ND	ND	3.41	2.39	1.98	2.27	ND	ND
		Sed	Iso Uranium	3.60	3.18	2.36	2.85	1.65	3.77	1.49	3.16	5.41	2.32
			Gross Beta	13.51	16.89	19.90	14.48	12.96	12.54	8.59	20.33	ND	ND
15	River bank at eastern property line	Soil	Iso Uranium	1.52	1.85	2.10	1.89	4.84	1.63	1.20	1.55	1.75	2.58
			Gross Beta	11.47	10.09	19.31	15.10	7.09	12.65	2.29	18.80	ND	ND
		Sed	Iso Uranium	2.08	1.56	1.70	1.28	0.79	1.03	1.30	1.30	1.05	0.81
			Gross Beta	11.5	12.62	15.14	13.73	7.91	9.28	10.40	18.69	9.64	ND
		S. Water	Gross Alpha (1)	0.24	0.36	0.63	0.60	0.34	0.24	2.10	0.18	0.30	0.28
			Gross Beta	2.48	5.07	4.27	3.18	3.73	4.34	4.66	5.43	15.16	21.15
		Veg	Iso Uranium	0.14	0.13	0.03	-0.87	0.05	0.27	1.85	1.25	3.14	0.21
			G. Beta - K40	-4.78	-6.34	-0.15	-2.45	2.68	-1.21	-4.81	0.27	ND	ND
16	Final Effluent Pond closest to the river (5)	Sed	Iso Uranium	1,502	1,522	759.8	552.8	250.8	1,049	696.1	745.8	1,070	607.2
			Gross Beta	89.37	71.37	46.93	37.14	21.98	44.50	42.18	72.82	15.21	10.08
17	Next to potable well # 2	Soil	Iso Uranium	2.05	1.80	1.80	2.37	1.71	2.57	1.92	2.67	2.38	2.79
			Gross Beta	10.48	8.43	13.41	12.17	6.95	12.10	6.96	14.95	ND	ND
		Veg	Iso Uranium	0.19	0.12	0.06	0.17	0.13	0.27	1.30	0.52	0.18	0.30
			G. Beta - K40	-9.46	0.23	-1.87	3.09	7.12	-1.20	0.03	1.49	ND	ND
18	Near cooling tower outfall	Soil	Iso Uranium	3.47	4.88	10.60	12.06	2.72	23.06	10.10	6.35	6.52	8.57
			Gross Beta	11.74	11.82	13.97	11.23	8.39	8.44	7.22	16.72	ND	ND
		Sed	Iso Uranium	12.95	24.88	53.37	15.46	2.83	4.27	23.08	68.01	37.11	34.82
			Gross Beta	6.21	11.16	10.03	9.91	6.68	7.41	7.46	19.47	ND	ND
		S. Water	Gross Alpha (1)	ND	ND	ND	ND	3.02	2.26	2.57	2.57	3.73	2.30
			Gross Beta	ND	ND	ND	ND	2.29	2.89	2.12	2.96	ND	ND
		Veg	Iso Uranium	0.86	8.63	0.42	0.12	0.24	0.59	12.52	0.28	2.98	19.63
			G. Beta - K40	-1.62	-3.86	-1.00	4.48	2.44	-3.66	-1.17	4.31	ND	ND
19	End of drainage ditch next to road behind WTF pads (6)	Soil	Iso Uranium	10.49	7.18	4.96	3.74	5.10	2.86	3.88	2.49	7.88	123.30
			Gross Beta	13.09	9.19	17.25	12.58	10.02	5.73	8.84	15.44	ND	ND
		Sed	Iso Uranium	19.22	19.51	15.56	20.70	9.22	27.69	13.21	22.60	82.33	17.77
			Gross Beta	10.76	15.36	12.18	23.02	7.05	9.19	9.32	19.85	ND	ND
		S. Water	Gross Alpha (1)	4.46	5.23	10.20	8.84	11.69	5.45	14.97	8.43	11.78	14.52
			Gross Beta	4.90	3.90	5.16	4.68	3.00	3.35	5.44	6.28	ND	ND
		Veg	Iso Uranium	0.84	0.70	0.60	0.49	0.59	0.42	2.01	0.64	0.23	1.64
			G. Beta - K40	-6.05	-4.33	-1.69	2.55	1.31	-3.83	0.88	3.23	ND	ND

Loc #	Location Description	Type	Analysis	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994
20	Near the overflow out-fall from the million gallon storage tanks[7]	Soil	Iso Uranium	3.09	2.70	2.28	2.25	1.65	5.97	76.91	417.3	132.70	299.52
			Gross Beta	14.48	16.77	18.22	13.65	9.37	12.65	19.90	48.25	ND	ND
		Veg	Iso Uranium	0.68	1.63	0.33	0.60	0.90	47.52	2.34	0.76	0.43	22.98
			G. Beta - K40	-1.82	-2.83	-0.46	2.03	0.19	2.03	-0.09	5.34	ND	ND
25	1.2 miles east of site	Soil	Iso Uranium	1.58	1.88	1.37	1.93	1.90	1.48	1.37	ND	ND	ND
			G. Beta – K40	11.77	12.13	28.41	12.53	6.29	6.70	5.23	ND	ND	ND
		Veg	Iso Uranium	0.10	0.10	0.86	-0.03	0.13	0.35	0.44	0.16	-1.53	1.90
			G. Beta – K40	-6.40	0.89	-0.54	2.67	2.30	2.53	0.44	3.55	0.57	1.05
26	1.2 miles west of site	Soil	Iso Uranium	1.86	1.86	2.33	1.94	1.16	1.37	1.67	ND	ND	ND
			G. Beta – K40	7.53	8.04	12.72	13.08	4.72	8.82	7.78	ND	ND	ND
		Veg	Iso Uranium	0.07	0.19	0.08	-0.13	0.55	0.16	0.93	0.14	-0.93	1.30
			G. Beta – K40	-7.54	-6.06	-0.49	1.59	2.12	-4.72	-5.97	1.53	2.80	5.33
27	5.5 miles downstream	Sed	Iso Uranium	1.27	1.60	1.03	1.26	1.01	0.82	1.03	1.17	2.39	1.00
			Gross Beta	7.12	9.55	11.18	10.19	7.94	6.78	8.13	16.69	1.53	-1.30

Notes on Table 6-1:

ND – No Data (samples not taken or not analyzed)

(1) – Beginning in 1996 surface water samples were analyzed by gross alpha/beta analysis. Prior to 1996 samples were analyzed by isotopic.

(2) – Variability in activity attributed to variation in location. Location monitors run-off from old drum storage area. Elevated activity anticipated.

(3) – Investigation concluded large portion of beta activity was due to K-40.

(4) – Elevated activity was the result of one quarter with an elevated result. Subsequent samples have shown no elevated activity.

(5) – Final effluent pond known to be contaminated.

(6) – Location known to have elevated activity due to recycle water contamination and field storage run-off.

(7) – Area known to have been contaminated. Remediation performed in 1998.

Procedural action levels have been established for each type of sampling media. Past reviews of the Environmental Monitoring Program by regulatory agencies has found the program to provide adequate protection of public health and safety.

7.0 COST BENEFIT ANALYSIS

10CFR51.45 (c) states in part,

> *"Environmental Reports prepared at the license renewal stage pursuant to 51.53(c) need not discuss the economic or technical benefits and costs of either the proposed or alternatives except insofar as such benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation."*

Since there is only one proposed alternative no cost benefit analysis is necessary. BWXT utilizes the ALARA Program discussed in section 5.0 which may include cost benefit analyses for determining when additional controls or mitigation is necessary.

8.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

BWXT continues to operate the Mt. Athos Facility in a manner that will have a minimal impact on the surrounding environment. All effluent releases and potential exposures to the public are maintained below regulatory limits and in accordance with the ALARA philosophy.

Impacts from past sources of contamination are being monitored by BWXT and the EPA. To date, no significant health impacts have been identified. BWXT continues to improve the conditions of the site in accordance with the Consent Order Agreement.

9.0 LIST OF REFERENCES

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