

**ENVIRONMENTAL BASELINE SURVEY**  
**FOR THE**  
**BNL HOUSING RECONSTRUCTION PROJECT**

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### Executive Summary

The Brookhaven National Laboratory (BNL) is pursuing third party construction of new housing units. The terms of the proposed contract include a twenty-six year lease of 12.5 acres of Federal property to a developer for construction of approximately 80,000 square feet of housing and a 12,000 square foot recreation center. The housing and recreation center will be leased back from the developer for housing of visiting scientists, long-term staff and students. At the end of the lease, the property is returned to BNL.

Based upon the current and historical use, the results from a Preliminary Assessment/Site Investigation, review of monitoring data, and review of facility documentation, there are no significant environmental issues that would preclude this site from being developed for the purpose intended (i.e., new housing). The only concern involves removal of old sanitary piping and manholes. If construction will require the removal rerouting of sanitary lines, the removed lines and adjacent soils should be segregated from other spoils for further evaluation and disposal determination.

The site of proposed construction is located within the existing residential area. Figure 2 (Drawing 2001-M1 – Housing Reconstruction Project) is a site plan of the area. The area currently consists of landscaped lawn with access drives that previously lead to buildings. Adjacent structures are old army era buildings that have been refurbished and are currently used as housing for visiting scientists, long-term scientific staff and students. The area was originally developed by the War Department and in 1947 consisted of approximately 25 structures connected by covered walkways that were formerly used during World War II as a recuperative center and hospital. From 1947 to 1971 portions of the facilities were used by the BNL Medical Department. In 1957 the new Medical building was built and from 1959 to 1971 most of the old facilities were demolished or relocated.

The site is located at the southwest corner of the BNL site. There are neither floodplains nor wetlands located on the subject parcel. Since the area had been previously cleared and maintained as a landscaped area, there are no critical natural resources that would be affected as a result of development of this parcel. There are no existing structures located on the site, so it is not culturally significant. Cultural resource reviews of the adjacent buildings have determine that, *while they are over fifty years old, most are not culturally significant.* It is anticipated that many of these structures will be demolished upon completion of the new housing facility.

BNL was listed on the National Priorities List (NPL) in 1989 for contamination of soils and groundwater with chemicals (primarily solvents) and radionuclides (e.g., cesium-137 and strontium-90). While the entire BNL site has been identified in the NPL, the subject parcel is only implicated due to the general concern for contaminants in groundwater beneath the BNL site. Based upon current monitoring data, there are no known groundwater contaminants beneath the proposed construction area.

Environmental incidents associated with historical use of the area as a hospital during the war effort were not documented and are unknown. Historical review of the former Medical Department operations indicates that radiological materials and chemicals were used at the site. The details of these activities are included in the BNL Review of Potential Environmental Release Points for the "Old Medical Dept." which is included as Attachment I. Storage of radiological waste, over flow of chemical waste storage, releases of mercury, and the potential for electrical substations to contain PCBs are the most significant issues raised in this report. To investigate these issues, a Preliminary Assessment/Site Investigation was conducted in 1998, which included the collection of soil and groundwater samples and the excavation of an area formerly containing underground storage tanks. During this activity, abandoned sections of piping were unearthed and removed which contained trace levels of cesium 137. Samples of sediment collected from active and inactive sanitary sewer manholes were found to contain elevated levels of mercury and other metallic contaminants. These sediments were removed and disposed. Collection of soil samples showed no evidence of PCBs or radionuclides in soil; consequently there was no need for further evaluation. An excerpt from the Preliminary Assessment/Site Investigation Report for the subject site is included as Attachment II. As documented in this report there were no issues that required further evaluation.

## **1.0 Property Description and Existing Use**

The site for proposed construction of new housing is located at the southwest corner of the BNL property. Figure 1 is a key map of the BNL site and Figure 2 shows a detail of the area of proposed construction. The area for the proposed construction is approximately 12.5 acres. The contour of the site slopes to the northwest with site elevations between 86' and 110' ft above mean sea level. Groundwater underlies the site at an approximate elevation of 39 feet above mean sea level.

Currently, the site consists of landscaped lawn with a few scattered trees. There are no visible structures existing on the proposed site, though there may be subsurface footings, foundations and floor slabs remaining from former uses of the area.

## **2.0 Property Chronology**

The BNL site was originally acquired by the War Department in 1917 as an induction and training camp for World War I (WW I), Camp Upton. During the Army occupancy, the area was used as a hospital. *After WWI, the Army structures were either sold at auction or demolished.* Between WW I and WW II the BNL site was used by the Civilian Conservation Corps and was reforested with white pine trees.

From 1941 – 1943 the War Department reconstructed Camp Upton as an induction center but in 1944 converted it to a recuperative center and hospital for GIs returning from war. The hospital area consisted of numerous barracks-style housing units interconnected by covered walkways. A coal-fired central heating plant was also located on the hospital grounds site. In 1947, the BNL site was transferred to the Atomic Energy Commission and the former hospital area was used as a medical research complex. Figure 3 is a photo of the medical research complex as it appeared in 1950. Medical research was moved to Bldg. 490 in 1957. From

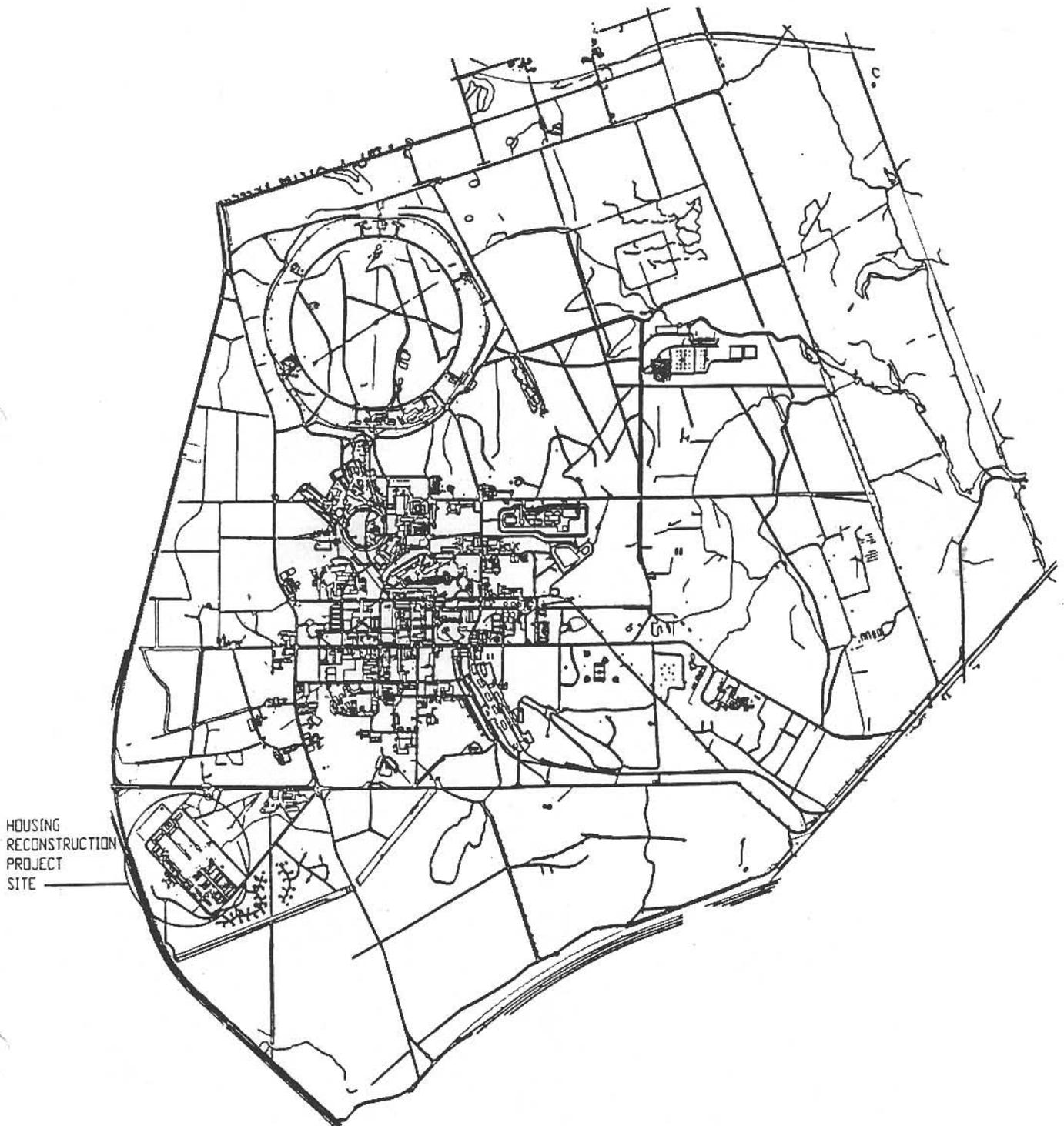
1959 through 1971, many of the former medical research/hospital facilities were demolished or relocated. It is unknown whether the foundations and concrete floor slabs were removed during facility demolition. Walkover surveys show some evidence of remaining concrete sub-structures.

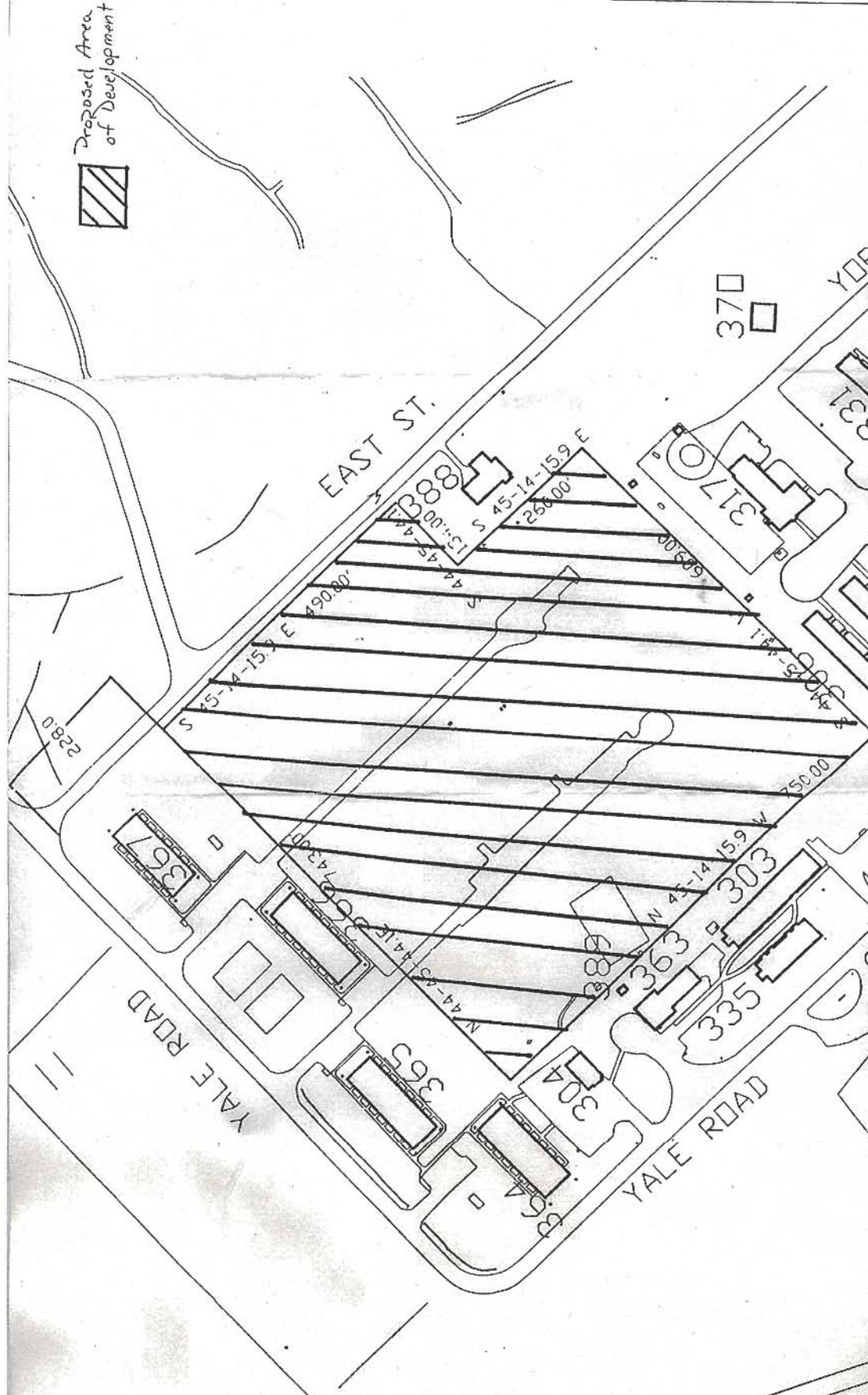
### **3.0 Proposed Use**

A sanitary sewer, domestic water and electrical utilities serve the site of construction. Adjacent areas are currently used for housing. World War II era structures (primarily former barracks) have been remodeled as efficiency apartments. There is also a day care center, small schoolhouse, and a coin-operated laundry for the residents located in the vicinity of the proposed construction site.

BNL will lease the subject site to a developer for the construction of approximately 80,000 square feet of residential housing and an additional 12,000 square feet to be used as a recreational building. Approximately, 97 townhouse style homes ranging from single to four bedroom units will be constructed. The utilization of the area for housing is consistent with current usage. The proposed terms of the lease will extend for twenty-six years at which time the property is returned to BNL.

Figure 1  
BNL Housing Reconstruction Key Map





Proposed Area  
of Development



<b>BROOKHAVEN</b> NATIONAL LABORATORY <small>UNDER CONTRACT WITH          UNITED STATES DEPARTMENT OF ENERGY          PLANT &amp; ENGINEERING DIVISION          UPTON, NEW YORK 11973</small>	JOB TITLE	HOUSING RECONSTRUCTION PROJECT	DATE	8/7/02	ACCT. NO.		SHEET	1	OF
	DWG. TITLE	EXHIBIT B SITE PLAN	OWN. BY	REYD BY	JAS	JOB NO.	10478	DWG. NO.	Fig. 2.
			ESHQ RISK LEVEL	APP'D. BY		BLDG. NO.	SITE		2001-M1
			PATH	J./PROPHOUSING/10478/PROPLINES					



Figure 3 – BNL Housing Reconstruction Former Medical Complex Photo

#### **4.0 Impacts to Floodplains/Wetlands**

The proposed site contains no evidence of standing surface water and is located at a considerable distance from designated wetlands; consequently there are no issues related to floodplains or wetlands. Additionally, the site is located outside the Peconic River Wild, Scenic Recreational Rivers Act corridor.

#### **5.0 Impacts to Cultural and Natural Resources**

A wide variety of vegetation, birds, reptiles, amphibians, and mammals reside at BNL. The only New York State endangered species known to inhabit BNL property is the tiger salamander (*Ambystoma t. tigrinum*). Three New York State threatened species have been positively identified on site at BNL and a fourth species is considered likely. The banded sunfish (*Enneacanthus obesus*), the swamp darter (*Etheostoma fusiforme*), and the stiff goldenrod plant (*Solidago rigida*) have been previously reported in wildlife inventories. A fourth species, the frosted elfin butterfly (*Callophrys irus*) has been identified as possibly being at BNL, based on historic documentation and the presence of its preferred habitat and host plant (wild lupine). In addition, several species that inhabit the BNL site or visit during migration are listed as “rare,” “species of special concern,” or “exploitably vulnerable” by New York State. None of these species have been identified as inhabiting the proposed construction site; consequently there are no impacts to natural resources from the development of the site. The only known mammal inhabitants of the site include groundhogs. Several burrows are evident on the site. There is ample space available for these animals to relocate. Deer are also known to graze on clover and other groundcover located in this area. Loss of habitat will not have a detrimental impact on the survival of these species.

With regard to cultural resources, the proposed construction site contains no structures; hence there are no cultural resource impacts directly associated with the development of the site. An indirect consequence to the development would be the eventual demolition of the existing housing units. These structures are over 50 years old and all but four have been determined not to be eligible for inclusion in the National Registry of Historical Places. The units have been significantly altered by the addition of vinyl siding, and installation of replacement windows. Prior to any building demolition, an evaluation in accordance with the National Historic Preservation Act would be completed, as necessary, as well as an assessment under the National Environmental Policy Act.

#### **6.0 Socioeconomic Impacts**

There are no negative socioeconomic impacts associated with the proposed development of the subject site. Positive impacts include better living conditions for visiting scientists and long-term BNL residents, and increased on-site residency capacity.

## 7.0 Hazardous Substances, Hazardous Wastes and Petroleum Products

In 1989, the entire BNL site was listed under the National Priorities List for hazardous waste disposal sites. Historical chemical and radiological handling practices are primarily responsible for impacts to surface and subsurface soils, the Peconic River, and groundwater. The BNL site was broken up into seven Operable Units for further investigation into the types of releases and determination of environmental impacts. The proposed construction area is located in Operable Unit III (OU III). The area was implicated in OU III due to the general concern for subsurface groundwater contamination. There were no specific occurrences or activities for former facilities located on the subject site identified in the designation of OU III that would have lead to surface or subsurface soil contamination. Review of groundwater data shows that this area lays outside the delineated plumes associated with BNL activities (see Figure 4).

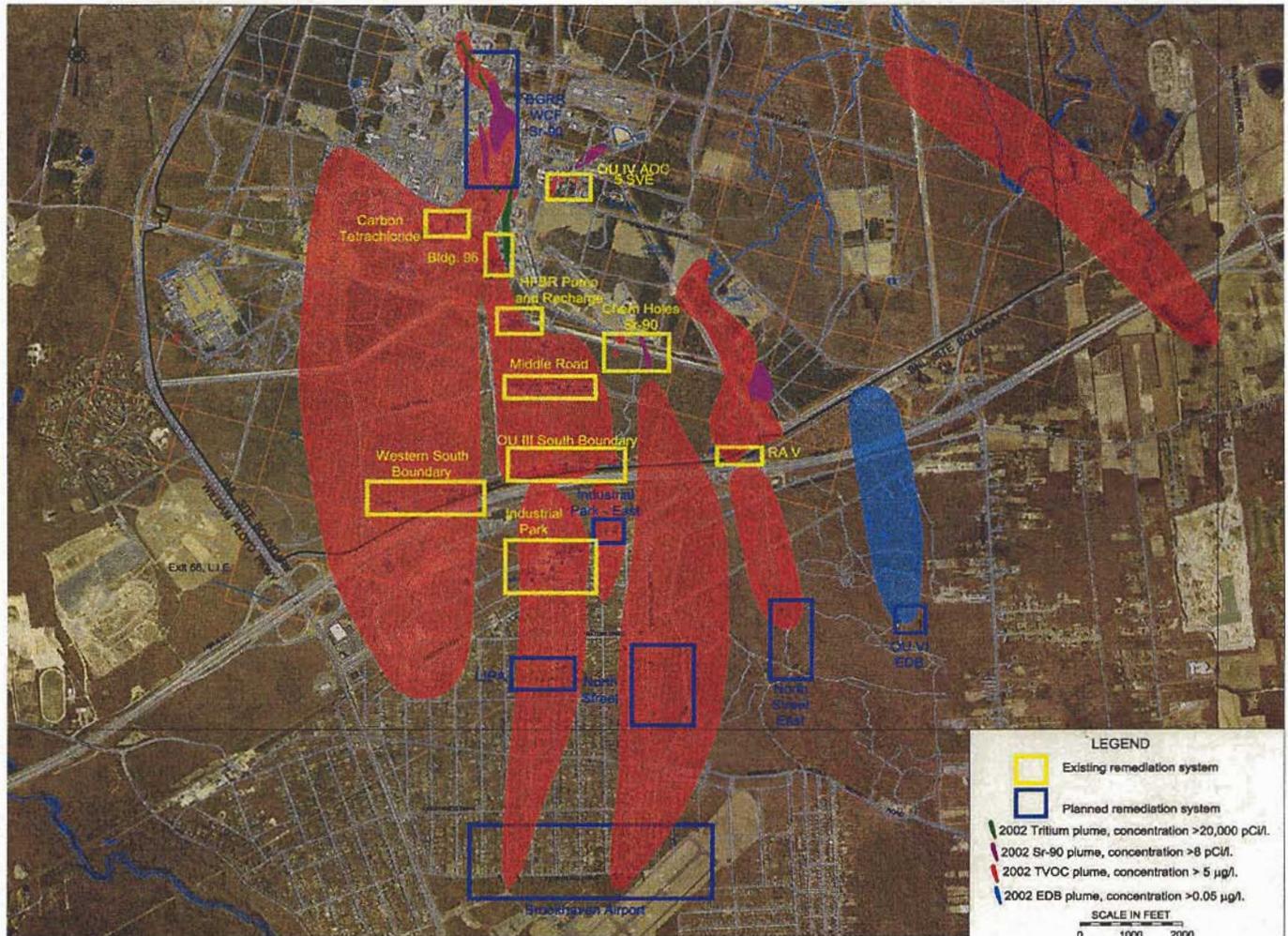
Operations conducted at the site during both World War I and II occupancy that may have impacted the environment are unknown. Generation of medical waste during WWI and WWII is expected as a result of its use as a hospital. The means of medical waste disposal are unknown, but there were several landfills used during this period that may have been used for medical waste disposal. A coal-fired steam plant was located on the subject site. Based upon War Department inventory records, a new plant was built in 1944. The date of the original plant construction is unknown. There are no known environmental issues associated with the operation of the steam plant, however the location of an ash disposal area has not yet been determined.

From 1947 to 1959, the site was used for medical research. Occupancy by the Medical Department included the use of chemicals and radionuclides, though a complete inventory of the types and quantities of these materials is unavailable. In 1997, a review of all present and past BNL facilities was conducted to determine if present/past operations could have resulted in environmental impacts. Issues identified in the *BNL Review of Potential Environmental Release Points for the "Old Medical Department"* included releases of chemicals and radionuclides to the sanitary sewer, contamination of sanitary sewers and buildings with mercury, potential spillage from storage tanks used for holding aqueous waste containing low-levels of radionuclides, and potential PCB transformers. A copy of the "Old Medical Dept." report is included as Attachment I.

From 1959 to approximately 1971, the former medical complex facilities were demolished, moved to other sites, or converted to other present day uses. Since 1971, the subject site has contained no structures enabling the storage, handling or discharge of hazardous substances, hazardous wastes or petroleum products.

In follow up to the issues identified in the *BNL Review of Potential Environmental Release Points for the "Old Medical Department"*, field investigations were conducted which included the performance of a magnetometer survey, installation of Geoprobos for the collection of soil and groundwater samples, and test-pit excavations. In summary, there were no issues requiring further investigation. Remnant piping was discovered during the test pit excavations around former Building 311 (Contaminated Laundry). The piping was found to contain very low but

Figure 4 to BNL Housing Reconstruction Project  
 Environmental Baseline Survey  
 BNL Groundwater Plume Map



detectable levels of cesium-137. All unearthed piping sections were removed. Low concentrations of zinc and manganese were detected in groundwater above ambient water quality standards. There were no VOCs detected above minimum detection limits. Gross beta activities were detected at above minimum detection limits in several groundwater samples. The maximum detected was 14.6 pCi/L, which is less than 1/3 the drinking water screening level of 50 pCi/L. Sediment samples collected from existing sanitary manholes were found to contain elevated levels of mercury, and low concentrations of other metals (e.g., silver, zinc). The sediment was removed from the manholes, but no effort was made to remove sediment from the sanitary waste lines. Figure 5 provides the sanitary line overlay. Samples were collected from Manholes 23, 26 and 37 by the Suffolk County Department of Health Services. Based upon the results of the results for these manholes and historical information, seven manholes were vacuum cleaned. In total approximately 40 gallons of sediment was recovered. The excerpt of the Preliminary Assessment/Site Investigation Report that discusses this investigation is included as Attachment II.

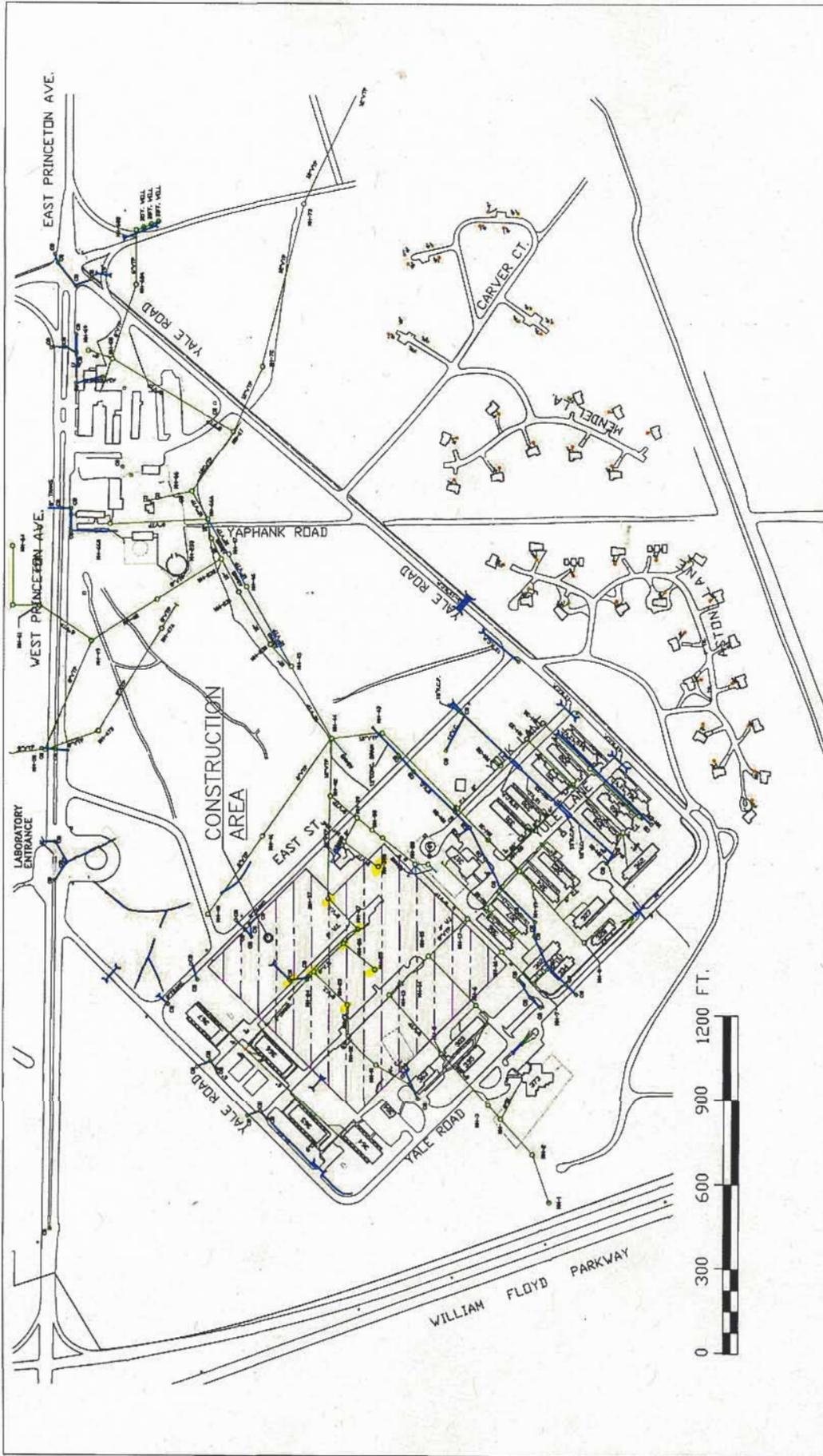
Based upon the issues identified in the reports discussed above there appears to be no evidence of past spillage, or releases that compromised the environmental quality of the subject site which would preclude site development. Radionuclides, PCBs, and organic compounds were not detected in surface soil or groundwater samples and all test pit excavations confirmed that all former tanks were removed. However, there is high probability that during excavation for building foundations, remnant piping or abandoned utilities may be encountered that will have to be evaluated. If former sanitary lines are to be removed during construction, the pipes and surrounding soils should be segregated for further evaluation and sampling if warranted.

## **8.0 Underground Storage Tanks**

Based upon the information provided above, there were underground tanks located at the contaminated laundry (former Building 311) for holdup of sanitary waste. Test-pit excavation of the area in 1998 showed that the tanks had been removed, but remnant piping was present, some of which contained very low levels of fixed cesium-137 contamination. A magnetometer survey of the area failed to identify any additional remnant tanks.

## **9.0 Radioactive Substances and Contamination**

Review of historical operations indicated that former operations of the "Old Medical Department" likely used radionuclides in research. Review of facility review documents indicated there might have been discharges to the sanitary sewer system. Investigations conducted in 1998 showed no evidence of radiological contamination necessitating cleanup. Low concentrations of gross beta activity were detected in groundwater samples and very low levels of cesium were detected in soil samples and abandoned piping systems. All radioactivity levels were less than action levels and did not warrant further evaluation.



 <b>BROOKHAVEN</b> NATIONAL LABORATORY <small>UNDER CONTRACT WITH          UNITED STATES DEPARTMENT OF ENERGY          PLANT-BUILDING DIVISION          UPTON, NEW YORK, 10993</small>	<b>JOB TITLE</b> BNL RE-CONSTRUCTION HOUSING PROJECT	<b>ILR, GPP, LNI, IHM</b> XXXX	<b>DATE</b> 07/11/03	<b>ACCT. NO.</b> XXXX	<b>SHEET</b> 2 <b>OF</b> 3
	<b>DWG. TITLE</b> SANITARY SYSTEM SITE PLAN	<b>SCALE</b> NONE	<b>DWN. BY</b> GGB	<b>REV'D BY</b> GGB	<b>JOB NO.</b> 10478
		<b>ESHQ RISK LEVEL</b> XXXX	<b>APP'D. BY</b> XXXX	<b>BLDG. NO.</b> XXXX	<b>PATH</b> XXXX

Fig. 5- BNL Sanitary Sewer Overlay

## **10.0 Polychlorinated Biphenyls**

Examination of photos of the former medical complex and WWII army hospital show pole- and pad-mounted transformers located throughout the complex. Due to the age of these transformers, they may have contained PCB dielectric oils. Soil samples were collected in 1998 and analyzed for PCBs to determine if the transformers impacted soils. The analytical data did not reveal evidence of PCB contamination of soils.

## **11.0 Asbestos**

There are currently no structures on the proposed project site. There is however, high probability that abandoned utilities could include transite piping. These materials would not expose workers unless it is uncovered during excavation for building footings and foundations.

## **12.0 Environmental Permits**

There are no environmental permits impacted by the proposed construction. Construction activities should include provisions for standard erosion control practices to prevent run-on and run-off of precipitation. Impacts to sewage treatment plant operations will not require revision to the SPDES permit. If drywells are required for storm water management, individual permits will be required for the construction of these devices.

## **13.0 NEPA**

A NEPA review has been completed for the proposed construction. A copy of the Environmental Evaluation Notification Form is attached as Attachment III. The project has received Categorical Exclusion under the NEPA process.

**ATTACHMENT I**

**BROOKHAVEN NATIONAL LABORATORY  
REVIEW OF POTENTIAL ENVIRONMENTAL RELEASE POINTS**

**“OLD MEDICAL COMPLEX”**

# BNL Facility Review Project Former Medical Complex, Potential Abandoned Utilities Summary Closeout Report

Prepared by  
Barbara A. Royce  
Project Manager

## Description:

The Former Medical Complex (FMC) consisted of approximately 25 buildings. These were used by the Medical Department from 1947 until the last buildings were vacated in 1971. Most of the buildings were demolished or moved from 1959 to 1971. During the early years of the FMC the use of radioactive isotopes, mercury and other chemicals was very common and disposal methods were not as controlled as are now required. In addition, the abandonment of utilities in place was a common practice at the time of demolition. A field investigation was required to evaluate the potential impacts from transformer yards, underground storage tanks, and buried piping.

## Summary of Actions:

The field investigation consisted of a magnetometer survey to determine if there were any remaining tanks, utilities or structures in the area of the FMC. Numerous anomalies were identified and documented in the Magnetic Gradiometer Survey at the Former Medical Facility, January 30, 1998. These anomalies were investigated by excavating test pits. Although metal plates and pieces of piping were found in the area of the anomalies, no tanks or abandoned utilities were located. The results of those test pits are documented in the Former Medical Complex Groundwater and Soil Sampling and Analysis Plan dated May 6, 1998. The plan also identified the location of 16 geoprobe installations to collect extensive soil and groundwater samples. The results of those samples are presented as part of the PA/SI conducted during FY98 under the direction of ERD. The recommendations of the PA/SI Report were that no further samples of this area were required. This issue is closed and no further actions will be taken.

MEDICAL

**BROOKHAVEN NATIONAL LABORATORY**  
**Review of Potential Environmental Release Points**

Medical Dept  
"Old Medical Department"  
June 30, 1997



N VOLKOW  
DEPT. CHAIRMAN

ORIGINAL  
(5)

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## *Executive Summary*

NOTE: The list of active building used by the Medical Department prior to 1956 varied over time. Appendix K shows all buildings that were documented as ever having been used by Medical before the construction of Building 490.

The "Old Medical Department" refers to the several building which comprised the Medical Department prior to the construction of Building 490. In 1966, Medical occupied Building 471 and 472, vacating those buildings in 1971. Most buildings were eventually demolished, several were relocated, whole or in part. The function of the Old Department was similar to that of today, although the specialized facilities in the current Department did then not exist. A significant in-patient program was active. Multiple research programs involving lab work, research animals and human subjects were conducted. Radioisotopes were administered to animals and humans as tracers, many produced in Department labs. Chemicals and pharmaceuticals were used extensively. Mercury, in particular, was in heavy use in equipment manometers. "Unique" facilities seem to have been limited to the kinds typical to hospitals - treatment rooms, wards and a morgue. Animals were housed in buildings and pastures were present - although their exact location is unknown.

The areas of greatest concern in the Old Medical Department are:

1. Three 250 gal. Rad waste tanks. Their operating history (leaks/spills) and their fate is unknown.
2. A 500 gal. Holding tank in the morgue (Bldg. 309 may have held rad wastes. It's operating history (leaks/spills) and fate is unknown.
3. "Cold Waste" in tanks in Bldg. 311 overflowed many times. There is concern that, given practices of the time, rad and chemical contamination may be present in the area.
4. Exterior transformers or capacitors can be seen in an aerial photo of the area. There is no record of leaks, but PCBs may be present.

## 1. *Current Facility Description*

*NOTE:* It is apparent from interviews and records that the list of active buildings used by the Medical Department prior to 1957 varied over time. Appendix K shows all buildings that were documented as ever having been used by Medical before the construction of Building 490. Throughout this report, when specific incidents or practices can be related to a particular building, that will be noted. However, many references have been vague or non-specific as far as building number is concerned.

The "Old Medical Department" refers to the several buildings which comprised the Medical department prior to the construction of Building 490. The Old Department was housed primarily in the pre-existing Army Hospital, in what is now the Housing Area. In 1966, Medical also occupied Buildings 471 and 472, vacating those buildings in 1971. Most buildings were eventually demolished, several were relocated, whole or in part (see Appendix K).

The function of the Old Department was similar to that of today, although many of the specialized facilities in the current Department did then not exist. Multiple research programs involving lab work, research animals and human subjects were conducted. Radioisotopes were administered to animals and humans as tracers, many produced in Department labs. Chemicals and pharmaceuticals were used extensively. Mercury, in particular, was in heavy use in equipment manometers. "Unique" facilities seem to have been limited to the kinds typical to hospitals - treatment rooms, wards and a morgue, and one Co-60 source facility. Animals were housed in buildings and pastures were present - although their exact location is unknown. Environmental monitoring was probably limited to rad monitors for specific purposes (i.e., hand-held meters, etc.).

## 2. *Operational Chronology*

The buildings comprising the Old Department originally constructed and operated as an Army camp hospital. Environmental issues related to that use are completely unknown. When BNL opened apparently many of the hospital buildings were assigned to the Medical Department. Specific renovations/conversions are evident (i.e., animal quarters), but details are not known. When Building 490 was opened in 1957, the various functions were shifted to the new locations. Animals continued to be housed in parts of the Old Department until 1963, when Buildings 493 and 494 were constructed. The Medical Department use of Buildings 471 and 472, previously occupied by the Chemistry Department, was limited to the period 1966 To 1971. It appears that by 1971, all Medical Department functions had shifted to Buildings 490, 493 and 494.

### 3. *Identification of Significant Environmental Release Issues*

#### 3.1 General

3.1.1 Past practices included the disposal of many substances via sanitary lines. Although these practices are no longer followed, it is apparent that this was permitted. Significant amounts of Cl-38, I-131, H-3 (Curie amounts), and other isotopes were administered to both humans and animals, resulting, ultimately, in regular discharges to sanitary lines. There is a reference to a decontamination facility in Bldg. 356, although nothing specific is known. It can be assumed that there was some chemical disposal as well. Army era waste lines could very well have leaked resulting in contamination of surrounding soils. Sampling may reveal rad contamination.

Interviews yielded comments about "extensive" mercury contamination of lab floors. Again, additional details are not available. The fate of the materials when many of these bldgs. were demolished is unknown. Need for further action unknown.

3.1.2 The Suffolk County Dept. of Health Services Inspection Report will be appended and addressed when it is received.

#### 3.2 Facility Exterior

3.2.1 There is a reference to "cold waste lines" from bldgs. 352 & 354 to Bldg. 311. Based on known past practices, it is possible these contained low level rad waste or chemicals. Their fate is unknown. Furthermore, there is a reference to (three large hold-up tanks....continually overflowing into the control pit near the "Contaminated Laundry" (Bldg. 311). Sampling of the area around the Bldg. 311 "pits" may reveal rad contamination.

3.2.2 From aerial photo # 7-206-0, electrical transformers or capacitors can be discerned west of Bldg. 353 and between bldgs. 324 & 327. Although there is no record of problems, sampling of the surrounding soil may reveal PCB contamination.

#### 3.3 Facility Interior

3.3.1 There were three 250 gal. Liquid rad waste hold-up tanks at Bldg. 354. It is uncertain as to whether they were inside the building or not. Their contents were routinely analyzed and pumped to sanitary. There are reports that prior to the tanks being installed, 55 gal. drums were stored underneath the Bldg. There are numerous reports of the tanks overflowing. The fate of the tanks and drums is unknown. Sampling of the area around the Bldg. may reveal rad contamination.

3.3.2 There is a reference to a 500 gal. storage tank in Bldg. 309. The contents were unknown, although rad waste is a distinct possibility. It's fate is unknown. With no known problems, the need for further action is unknown.

"Old Medical Department" Review - Appendix A

Level I, II and III Forms

Attached

**Brookhaven National Laboratory  
1997 Building Review Check List  
Level I Form**

Lead Department/Division Medical Date 6/30/97

**Building Review Team Members Names and Affiliation (Dept./Div.)**

	Last Name	First Name	Dept/Div	Bldg. No. (Mail Stop)	Ext.
Team Leader	Bullis	Jim	MO	490	3617
Other Members	Linsley	Mark	MO	490	3556
	Wald	Ted	LANL	-	-
	Lazarski	Tom	TST-PNL	-	-

**Building Identification:**

Building No. See Appendix K Year of Construction 1947?

If not a Bldg, please describe See comment below

**Current Status:**

Operating  Operational Standby \_\_\_\_\_ Shut-down Pending Transfer \_\_\_\_\_

Shut-down Pending Decontamination & Decommissioning (D&D)

D&D in Progress \_\_\_\_\_ Abandoned \_\_\_\_\_ Other

List all current and former occupancies of the building starting from current occupancy back to first building occupancy.

Dept/Div	Period		Mission/Function	Section of Building
	From:	To:		
Medical	1949?	1971	Research	n/a
See also Appendix K				

Has this Bldg always been used for only residential or office space? Yes \_\_\_ No  If "Yes", there is no need to complete the remainder of this Checklist unless you know of activities/areas that should be investigated. If "No", complete one Level II Form for each line in the occupancy table above.

Comments: These forms cover all buildings in the "Old Medical Department" complex. Buildings 471 and 472 will be specifically covered by the Chemistry Department.

Rev. 4; 4/18/97

*J Bullis*

**Brookhaven National Laboratory  
1997 Building Review Checklist  
Level II Form**

Building No. "Old Med. Dept." Yrs of Operation Covered by this Form: From 1949 To 1971

If not a building, describe: \_\_\_\_\_

Dept./Div Responsible: Medical Contact Person J. Bullis Ext. 3617  
Name No.

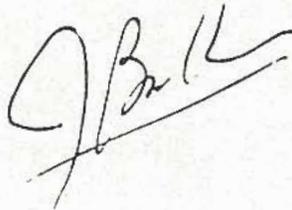
**Potential Vulnerabilities**

Does/did the Building mission currently or formerly involve any of the following:

Activity Description	Yes	No	Unknown
Storage or use of radioactive sources, activated materials or irradiation facilities maintained in pools, pits, cells, vaults, or other liquid containers.		X	
Tanks for storage or use of chemicals or petroleum (above/below ground), or other structures (e.g., storage building, subterranean vault etc.). However, it is not necessary to include those tanks currently registered with Suffolk County Dept of Health Services (List available from SEPD) provided they show no evidence of leaking or spillage.	X		
Pipes that are buried, or in direct contact with the soil, used for conveying chemicals/radioactive materials/petroleum.	X		
Water/wastewater sumps, pits, vaults, lagoons etc. including piping which has the potential to introduce radiological/chemical contaminants to the environment.		X	
Cesspools (including sanitary discharges), drywells, leaching pools, injection wells, or roof drains connected to drywells.			X
Any known incident or practice of dumping, disposing, or otherwise discharging of radiologically/chemically/petroleum contaminated materials or wastes to the soil, cesspools, sanitary or storm water system or any other media.	X		
Any other activities which could release radiological, chemical or petroleum contaminants to soil, groundwater or surface waters.	X		

For each activity identified as "Yes" or "Unknown", please complete at least one Activity Description Checklist (attached). If all items are marked "No", there is no need to proceed further.

Prepared by: J. Bullis Affiliation: Medical Ext.: 3617 Date: 6/30/97



Period of Oper. ? 1949 From: 1971 To: 1971  
 Month/Year Month/Year  
 Dept./Div. Responsible for Activity: MEDICAL Division:  
 Location of Activity: Building Number: 354 Room # Outside Other  
 (for outside or other provide sketch or map showing location)  
 Source of Information: Plans  Interview  Correspondence  Inspection  Other

Material Involved	Radioactivity <input checked="" type="checkbox"/>	Chemical <input type="checkbox"/>	Petroleum <input type="checkbox"/>	Waste Water <input type="checkbox"/>	Other* <input type="checkbox"/>	Unknown <input type="checkbox"/>
Type of Activity	Storage <input checked="" type="checkbox"/>	Collection <input type="checkbox"/>	Emergency Holding <input type="checkbox"/>	Shielding <input type="checkbox"/>	Process <input type="checkbox"/>	Fluid Handling <input type="checkbox"/>
Equipment Type	Tank <input checked="" type="checkbox"/>	Vault <input type="checkbox"/>	Pit <input type="checkbox"/>	Sump <input type="checkbox"/>	Piping <input type="checkbox"/>	Building <input type="checkbox"/>
	Operating <input type="checkbox"/>	Operational Standby <input type="checkbox"/>	Shut-down Pending Xfer <input checked="" type="checkbox"/>	Shut-down Pending D&D <input type="checkbox"/>	D&D in Progress <input type="checkbox"/>	Formerly Abandoned <input type="checkbox"/>
						Other* <input checked="" type="checkbox"/>

Status of Activity: Operating  
 Provide Detailed Description (include information regarding materials, method of storage, etc. Include description of any "other" checked above.) DOCUMENT REVIEW INDICATES THAT WERE THREE 250 GAL LIP RAD WASTE TANKS IN BLDG 354. THEY WERE ANALYZED AND PUMPED TO SANITARY. TO THE TANKS BEING INSTALLED THERE IS REFERENCE TO 55 GAL DRUMS BEING STORED UNDER THE BLDG. THE ULTIMATE FATE OF THESE TANKS AND DRUMS IS UNKNOWN.

Has there ever been a release from this activity? Yes  No  Unknown   
 Is this item/activity currently leaking? Yes  No  Unknown   
 If yes to either, please describe: SEE ABOVE. ALSO NUMEROUS REFERENCES TO TANKS OVERFLOWING. DETAILS ARE UNKNOWN

Potential Environmental Exposure Pathways

Air <input type="checkbox"/>	Surface Water <input type="checkbox"/>	Ground Water <input checked="" type="checkbox"/>	Storm Water <input type="checkbox"/>	Floor Drain <input type="checkbox"/>	Soil <input checked="" type="checkbox"/>	Cesspool <input type="checkbox"/>	Sewer <input type="checkbox"/>	Other <input type="checkbox"/>
------------------------------	--	--	--------------------------------------	--------------------------------------	--	-----------------------------------	--------------------------------	--------------------------------

In your opinion, what is the potential for release or impact to groundwater resulting from this activity? High  Low  None   
 Do you think this activity requires further action? Yes  No  Unknown  Describe further actions (include reasons): SHIPPING IN AREA OF BLDG.  
 Prepared By: J. Bullis Date: 6/25/97 Affiliation: MEDICAL Tel. No: 3617  
 Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_ Affiliation: \_\_\_\_\_  
 Accepted  Returned for Additional Info. \_\_\_\_\_ Date: \_\_\_\_\_  
 FINAL CLOSE OUT BY: \_\_\_\_\_

Period of Op. From: 3 1949 To: ? 1960  
 Dept./Div. Responsible for Activity: MCD:CAL Division: \_\_\_\_\_  
 Location of Activity: Building Number: 309 Room # \_\_\_\_\_ Other \_\_\_\_\_  
 Source of Information: \_\_\_\_\_ Plans  Interview  Correspondence  Inspection  Other

Material Involved: \_\_\_\_\_ Waste Water  Other\*  Unknown   
 Type of Activity: Storage  Shielding  Process  Fluid Handling  Other\*   
Tank  Sump  Piping  Building  Pool  Cell   
Equipment Type \_\_\_\_\_  
 Status of Activity: Operating  Standby  Shut-down Pending Xfer  Shut-down Pending D&D  D&D in Progress  Formerly Abandoned  Other\*

Provide Detailed Description (include information regarding materials, method of storage, etc. Include description of any "other" checked above.) THERE IS A POSSIBILITY THAT A 580 GAL. STORAGE TANK IN THE RIDGUE (BIDE 309). CONTENTS ARE UNKNOWN ALTHOUGH RAD WASTE IS POSSIBILITY. FATE UNKNOWN.

Has there ever been a release from this activity? Yes  No  Unknown   
 Is this item/activity currently leaking? Yes  No  Unknown   
 If yes to either, please describe: \_\_\_\_\_

Potential Environmental Exposure Pathways: Air  Surface Water  Ground Water  Storm Water  Floor Drain  Cesspool  Sewer  Other

In your opinion, what is the Potential for release or impact to ground water resulting from this activity? High  Low  None   
 Do you think this activity requires further action? Yes  No  Unknown  Describe further actions (include reasons): \_\_\_\_\_

Prepared By: J. Bullis Date: 6/25/97 Affiliation: Medical Tel. No: 3617  
 Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_ Affiliation: \_\_\_\_\_ Accepted  Returned for Additional Info  Date: \_\_\_\_\_  
 FINAL CLOSE OUT BY: \_\_\_\_\_



Period of Operation: From ? 1999 To: ? 1971  
 Dept./Div. Responsible for Activity: Department: MEDICAL Division:  
 Location of Activity: Building Number: MULTIPLE Room # \_\_\_\_\_ Outside \_\_\_\_\_ Other \_\_\_\_\_  
 Source of Information: Plans  Interview  Correspondence  Inspection  Other

Material Involved: Radioactivity  Chemical  Petroleum  Waste Water  Other\*  Unknown   
 Type of Activity: Storage  Collection  Emergency Holding  Shielding  Process  Fluid Handling  Other\*   
 Equipment Type: Tank  Vault  Pit  Sump  Piping  Building  Pool  Cell  Other\*   
 Status of Activity: Operating  Operational Standby  Shut-down Pending Xfer  Shut-down Pending D&D  D&D in Progress  Formerly Abandoned  Other\*

Provide Detailed Description (include information regarding materials, method of storage, etc. Include description of any "other" checked above.) BASED ON DOCUMENTATION AND INTERVIEWS, PAST PRACTICES INCLUDED DISPOSAL OF MANY SUBSTANCES VIA SANITARY LINES. ALTHOUGH THESE PRACTICES ARE NO LONGER FOLLOWED, IT IS APPARENT THAT THIS WAS PERMITTED. SIGNIFICANT (ATTN:

Has there ever been a release from this activity? Yes  No  Unknown   
 Is this item/activity currently leaking? Yes  No  Unknown

If yes to either, please describe: SEE ABOVE. THE FATE OF MATERIAL FROM DEMOLISHED BUILDINGS IN UNKNOWN. ARMY EPA SANITARY LINES MAY HAVE LEAKED TO SURROUNDING SOIL.

Potential Environmental Exposure Pathways: Air  Surface Water  Ground Water  Storm Water  Floor Drain  Soil  Cesspool  Sewer  Other  Non

In your opinion, what is the Potential for release or impact to groundwater resulting from this activity? High  Low  None   
 Do you think this activity requires further action? Yes  No  Unknown  Describe further actions (include reasons):

Prepared By: J. Bullis Date: 6/27/97 Affiliation: Medical Tel. No: 3017  
 Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_ Affiliation: \_\_\_\_\_ Accepted  Returned for Additional Info.

FINAL CLOSE OUT BY: \_\_\_\_\_ Date: \_\_\_\_\_

AMOUNTS OF C1-38, I-131, H-3 (LI ARGUMENTS) <sup>AND OTHER</sup> ISOTOPE<sup>S</sup> WERE  
ADMINISTERED TO BOTH HUMAN SUBJECTS AND ANIMALS,  
RESULTING IN REGULAR DISCHARGES TO SANITARY LINES.  
IT CAN BE ASSURED THAT THERE WAS SOME CHEMICAL  
DISPOSAL TO SANITARY THAT WOULD NOT BE PERMITTED  
TODAY, AS WELL.

THERE IS REFERENCE TO A DECON FACILITY IN  
BLDG 356.

INTERVIEWS YIELDED COMMENTS ABOUT EXTENSIVE  
MERCURY CONTAMINATION OF LAB FLOORS. ADDITIONAL  
DETAILS ARE NOT AVAILABLE.

Period of Operation for this Activity: From: ? 1999 To: ? 1960?  
 Dept./Div. Responsible for Activity: Department: NEURONIC Division: \_\_\_\_\_  
 Location of Activity: Building Number: MULTIPLE Room # \_\_\_\_\_ Outside \_\_\_\_\_ Other \_\_\_\_\_  
 Source of Information: Plans  Interview  Correspondence  Inspection  Other

Material Involved	Radioactivity <input type="checkbox"/>	Chemical <input type="checkbox"/>	Petroleum <input checked="" type="checkbox"/>	Waste Water <input type="checkbox"/>	Other* <input type="checkbox"/>	Unknown <input type="checkbox"/>
Type of Activity	Storage <input type="checkbox"/>	Collection <input type="checkbox"/>	Emergency Holding <input type="checkbox"/>	Shielding <input type="checkbox"/>	Process <input checked="" type="checkbox"/>	Fluid Handling <input type="checkbox"/>
Equipment Type	Tank <input type="checkbox"/>	Vault <input type="checkbox"/>	Pit <input type="checkbox"/>	Sump <input type="checkbox"/>	Piping <input type="checkbox"/>	Building <input type="checkbox"/>
Status of Activity	Operating <input type="checkbox"/>	Operational Standby <input type="checkbox"/>	Shut-down Pending Xfer <input type="checkbox"/>	Shut-down Pending D&D <input type="checkbox"/>	D&D in Progress <input type="checkbox"/>	Formerly Abandoned <input checked="" type="checkbox"/>

Provide Detailed Description (include information regarding materials, method of storage, etc. Include description of any "other" checked above.) FROM AERIAL PHOTO WEST SIDE OF BLDG. 353 AND BETWEEN BLDG. 324 + 327. PCB'S MAY BE PRESENT FROM AERIAL PHOTO WEST SIDE OF

Has there ever been a release from this activity? Yes  No  Unknown

Is this item/activity currently leaking? Yes  No  Unknown

If yes to either, please describe: NO EVIDENCE OF LEAKS HAS BEEN FOUND

Potential Environmental Exposure Pathways: Air  Surface Water  Ground Water  Storm Water  Floor Drain  Soil  Cesspool  Sewer  Other

In your opinion, what is the Potential for release or impact to groundwater resulting from this activity? High  Low  None   
 Do you think this activity requires further action: Yes  No  Unknown  Describe further actions (include reasons): \_\_\_\_\_

Prepared By: V. Bullis Date: 6/27/97 Affiliation: Medical Tel. No: 3677  
 Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_ Affiliation: \_\_\_\_\_ Accepted  Returned for Additional Info.

FINAL CLOSE OUT BY \_\_\_\_\_ Date: \_\_\_\_\_

"Old Medical Department" Review - Appendix B

Detailed Description for Level III Forms

N/A

"Old Medical Department" Review - Appendix C

Interviewee List

Date 5/28/97

Name	Facility	Contact Comments	Interviewed On
Charles Meinhold	general/Old Med. Dept./490		May 20, 1997
Charles Flood	Old Med. Dept./490		May 15, 1997
Daniel Slatkin	Old Med. Dept./490		May 22, 1997
Edwin Popenoe	Old Med. Dept./490		May 8, 1997
Eugene Cronkite	Old Med. Dept./490/493/494		May 6, 1997
Harold Atkins	Old Med. Dept./490		May 8, 1997
Jim Robertson	Old Med. Dept./490		May 14, 1997
John Archambeau	Old Med. Dept.		May 28, 1997
Katherine Conkling	Old Med. Dept./490/493/494		May 6, 1997
Richard Stoner	Old Med. Dept./490		May 21, 1997
Rita Straub	Old Med. Dept. (354)/490		May 5, 1997
Robert Conard	Old Med. Dept./490		May 19, 1997
Stanton Cohn	Old Med. Dept./490		May 28, 1997
Walter (Pete) Hughes	Old Med. Dept./490		April 30, 1997
Walton Shreeve	Old Med. Dept./490		May 13, 1997

Old Medical Department Review Appendix D  
 List of Documents/Memos Reviewed  
 June 30, 1997

Document Title	Preparer	Date of Document
Historical Site Review, AOI 1005	IT Corporation	1993
Health Physics Progress Report	Various	1949 - 1971

"Old Medical Department" Review - Appendix E

List of Drawings/Map Reviewed

USA Camp Upton Map	
BNL Map AM 1.3306-A	
BNL Map AM 1.3306-1	
BNL Drawing 4514-A1	(Bldg 356 Cobalt Source Facility)
BNL Drawing 7453-441	(Bldg 464 Physiotherapy Bldg.)
BNL Drawing 7453-211	(Bldg 309 Morgue)
BNL Drawing 7453-253	(Bldg 352, 353, 354 Plumbing Plan)
BNL Drawing 1100-666	(Bldg 356, 357, 358 Ward-Plumbing)

"Old Medical Department" Review - Appendix F

List of Aerial Photographs Reviewed

BNL# 7-206-0

"Old Medical Department" Review - Appendix G

Suffolk County Dept of Health Services Inspection Review

A copy of the SCDHS report will be attached when available

**ATTACHMENT II**  
**EXCERPTS FROM THE**  
**PRELIMINARY ASSESSMENT/SITE INVESTIGATION OF THE**  
**FORMER MEDICAL COMPLEX**

### 6.2.7 Former Medical Complex

The "Former Medical Complex"(FMC) refers to the buildings which comprised the Medical Department before Building 490 was constructed. Approximately 25 buildings were part of this complex.

The Medical Department occupied buildings 471 and 472, vacating them in 1971. Most buildings were demolished between 1959 and 1971, several buildings were completely or partially relocated. The FMC site incorporated such practices as an in-patient program, the use of radioisotopes as tracers, many of which were produced in the Departmental laboratories. Chemicals and pharmaceuticals were used extensively, including equipment manometers containing mercury.

Based upon the findings of the April, 1997, Facility Review, groundwater and soils were sampled as part of the PA/SI. There were varied reasons purposes for the different sample locations based upon information obtained in the Facility Review. Therefore, the locations are discussed below along with the objective of the sampling. More detailed information on the FMC is given in the Former Medical Complex, Sampling and Analysis Plan, May 6, 1998 or the Facility Review Action Plan identification number 3440.

#### FMCGP01/02

Groundwater samples were collected to address potential contamination associated with Building 356, a decontamination facility. Only groundwater samples were collected to determine if contamination exists due to past practices.

#### FMCGP03 through GP06

Soil and groundwater samples were collected to address potential contamination associated with Building 354, a Physiology Building. This building was reported to contain three 250 liquid radiological waste hold-up tanks which discharged to the sanitary lines.

GP04 and GP05 locations: groundwater samples were collected to address potential contamination from experiments that occurred in Building 354 and possible leaking sewer lines.

GP03 and GP06 locations: soil and groundwater samples were collected outside the sewer manhole (still in place) which received waste from Buildings 354 and 353. Wastes contained in the three hold-up tanks would have passed through this manhole.

**Results: Soil**

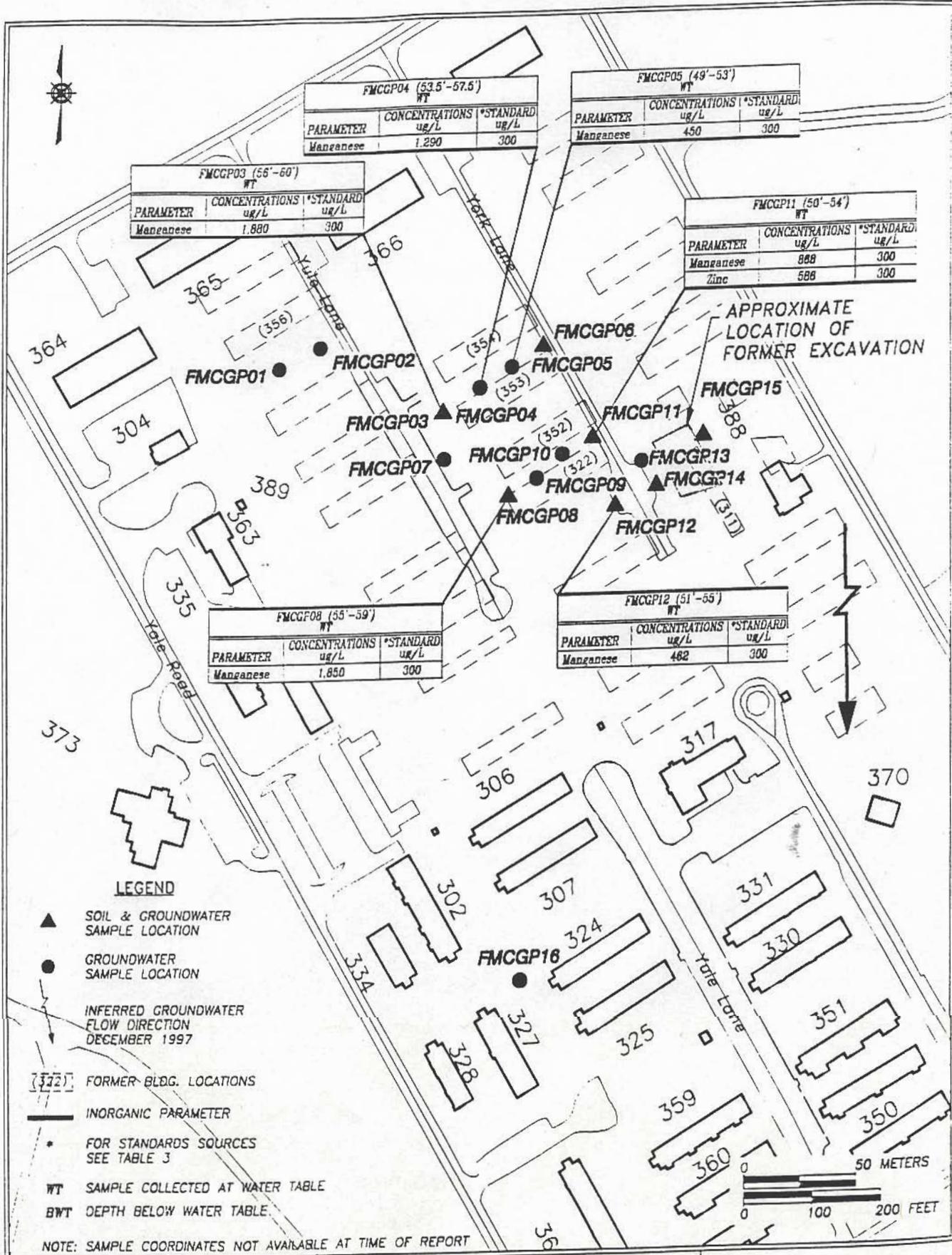
Several metals were detected with concentrations well below guidance criteria. Metals that were detected were: arsenic, chromium, lead, manganese and zinc, at locations: GP03, GP06, GP08, and GP11 through GP15.

Nine soil samples were selected for radiological analysis and are presented on Table 14A. Activities of cesium-137 were detected at locations GP13 and GP14 with levels of 0.7636 pCi/g and 0.1824 pCi/g, respectively. These activities are well below CDM Federal Program calculated background levels of 67 pCi/g. No other radiological activities were reported in the nine samples.

Two soil samples, GP07 and GP16, were submitted for laboratory analysis of PCBs and levels were not detectable, and therefore, below applicable guidance criteria.

**Conclusions and Recommendations**

The reported concentrations in soil and groundwater for radiological parameters, VOCs and PCB's were well below applicable standards. Based upon these results, no additional sampling is warranted for the FMC.



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BROOKHAVEN NATIONAL  
LABORATORY  
ENVIRONMENTAL  
RESTORATION DIVISION



PA/SI - 1997 FACILITY REVIEW  
Groundwater & Soil  
Sampling Locations With  
Contaminant Concentrations in  
Groundwater Over Standards

Former Medical Complex  
Priority II

FIGURE NO. 12  
DATE: 05/19/98 REVIEWED BY: LS  
REVISION NO. 01

**TABLE 8**  
**BROOKHAVEN NATIONAL LABORATORY - Environmental Restoration Division**  
 Preliminary Assessment / Site Inspection - 1997 Facility Review

**Groundwater Sample - Metals Analysis**

PARAMETERS	STANDARDS*	197 GP01	197 GP02	197 GP03	197 GP04	206 GP01	206 GP04	528 GP04	710 GP01	903 GP01	903 GP02	903 GP03
Arsenic	ug/L	48-52	58-60	75-78	83-86	32-34	35-37	34-36	40-43	72.5-74.5	72-74	70.5-72.5
Cadmium	25	2.7 U	3.2 B	NA	NA	2.7 U	2.7 U	5.0 U	2.8 B	2.4 U	2.7 U	2.7 U
Chromium	10	0.40 U	0.40 U	NA	NA	0.40 U	0.40 U	2.0 U	0.40 U	0.30 U	0.40 U	0.40 U
Copper	50	164	94.2	NA	NA	16.3	51.8	20.0	100	NA	64.8	118
Lead	200	15.7 B	19.4 B	NA	NA	11.5 B	3.6	4.4	14.0 B	18.3	29.8	29.8
Manganese	25	4.9	2.4 B	NA	NA	2.0 B	4.43	3.0 U	5.2	1.2 U	7.8	6.9
Nickel	300	1150	259	NA	NA	228	443	149	608	1100	612	981
Silver	100*	76.7	31.8 B	NA	NA	7.2 B	9.9	9.9	33.6 B	52.7	25.3 B	48.1
Zinc	60	1.3 B	1.1 B	NA	NA	0.62 B	0.60 U	2.0 U	0.80 U	0.60 U	0.88 B	19.3 B
Mercury	300	21.9	69.1	NA	NA	10.9 B	30.8	35.8	111	74.7	176	37.2
	2	NA	NA	0.10 U	0.10 U	NA	NA	NA	NA	NA	NA	NA

PARAMETERS	STANDARDS*	904 GP01	904 GP02	911 GP01	911 GP02	912 GP03	960 GP10	FMCGP03	FMCGP04	FMCGP06	FMCGP08	FMCGP11	FMCGP12	FMCGP14	FMCGP15
Arsenic	ug/L	48-50	48-50	32-34	32-34	28-30	40-42	56-60	53.5-57.5	49-53	55-59	50-54	51-56	48.5-53.5	49-53
Cadmium	25	10.5	4.3	3.8 B	2.7 U	2.7 U	5.3 B	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U
Chromium	10	0.30 U	0.30 U	0.40 U	0.40 U	0.40 U	0.40 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Copper	50	NA	NA	126	159	NA	221	0.80 U	0.80 U	0.94 B	0.88 B	26.6	0.80 U	0.80 U	0.80 U
Lead	200	101	43.7	24.3 B	25.2	29.8	53.5	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U
Manganese	25	21.6	11.3	4.1	4.7	5.5	17.1	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Nickel	300	2440	883	641	445	434	1800	1880	1290	450	1850	868	462	274	262
Silver	100*	108	28.0 B	43.4	50.2	121	46.4	17.8 B	15.9 B	11.5 B	7.7 B	21.3 B	12.1 B	5.6 B	7.3 B
Zinc	50	0.60 U	0.60 U	0.74 B	1.5 B	1.9 B	0.60 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 B
Mercury	300	387	196	26.0	39.3	48.1	53.7	46.1	59.5	142	70.1	586	43.8	8.4 B	26.6
	2	NA	NA	NA	NA	NA	NA	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.11 B	0.10 B

**Notes:**  
 Values are reported in concentrations of ug/L.  
 \* = New York State Department of Environmental Conservation, Class GA (groundwater).  
 • = USEPA National Primary Drinking Water Standards, EPA 810-F-94-001A, Feb. 1994.  
 NA = Not analyzed.  
 B = Reported value is less than the Contract Required Deflection Limit but greater than the instrument Detection Limit.  
 U = The analyte was analyzed for but not detected, less than the instrument Detection Limit.  
 J = The reported value is an estimated concentration.  
**Bold exceeds standard or guidance value.**  
 For additional qualifier symbols, refer to Table 2.

**TABLE 9A**  
**BROOKHAVEN NATIONAL LABORATORY - Environmental Restoration Division**  
 Preliminary Assessment / Site Inspection - 1997 Facility Review

**Groundwater Sample - Radiological Analysis**

PARAMETERS	Standard	FMCGP04 56-53			FMCGP02 60-64			FMCGP03 66-60			FMCGP04 63.5-67.5				
		Activity	Error	DetLim	Lab Qual	Error	DetLim	Lab Qual	Activity	Error	DetLim	Lab Qual	Activity	Error	DetLim
Americium-241	1.2	-0.5785	10.02	16.36	U	14.55	19.92	16.2	9.808	11.1	16.48	-1.827	11.1	16.48	U
Beryllium-7	NS	1.218	15.72	28.77	U	-3.466	16.54	29.82	17.6	31.24	25.51	-8.49	14.94	25.51	U
Cesium-134	NS	-1.777	2.064	2.829	UJ-K	-1.894	2.926	3.082	2.118	3.082	3.103	0.7115	1.865	3.103	UJ-K
Cesium-137	120	-0.8653	1.736	2.95	U	-0.5006	1.832	3.257	1.942	3.636	3.226	0.2405	1.814	3.226	UJ-K
Cobalt-57	4000	0.2014	1.521	2.698	U	-0.3396	1.451	2.544	0.3284	2.877	2.534	0.5338	1.555	2.534	U
Cobalt-60	200	0.9854	2.409	3.402	U	-0.4392	1.799	3.32	0.4899	1.806	3.303	1.665	1.431	3.303	U
Europium-152	NS	3.992	5.04	9.172	UJ-K	6.483	7.199	9.677	0.2221	5.61	9.566	1.082	5.517	9.513	UJ-K
Europium-154	NS	-3.726	3.984	6.193	U	-2.028	4.835	8.707	2.864	5.013	10.43	-0.4447	4.114	7.796	U
Europium-155	NS	-2.982	6.644	11.5	UJ-K	-1.613	6.158	10.85	-1.218	7.217	12.56	-0.0913	6.639	11.76	UJ-K
Gross Alpha	15	0.2807	0.2508	0.3473	U	0.0351	0.2551	0.5611	-0.1026	0.2038	0.5787	0.219	0.3272	0.6479	U
Manganese-54	NS	-0.4287	1.76	3.047	U	-0.8061	1.673	2.858	-0.5316	1.691	2.961	1.978	0.6487	1.711	U
Nonviable Beta	50	2.241	0.6194	1.0065	U	1.707	0.6171	1.086	1.024	1.791	3.729	2.041	0.65	1.1232	U
Sodium-22	NS	-1.319	1.423	2.224	U	-0.7375	1.724	3.102	1.024	1.791	3.729	2.041	0.65	1.1232	U
Tritium	20000	181.2433	294.1468	499.5387	U	-30.7952	281.4163	499.5387	6.314	275.3642	481.4632	264.4969	287.0265	480.2148	UJ
Vanadium-48	NS	0.226	2.729	5.206	U	-1.057	2.631	4.623	1.609	3.047	5.988	0.9313	2.797	5.551	U
Zinc-65	NS	-1.588	3.768	6.648	U	-1.658	3.652	6.138	2.758	5.507	7.516	1.615	6.632	7.202	U

PARAMETERS	Standard	FMCGP05 53-57			FMCGP06 49-53			FMCGP08 55-59			FMCGP09 64-68				
		Activity	Error	DetLim	Lab Qual	Error	DetLim	Lab Qual	Activity	Error	DetLim	Lab Qual	Activity	Error	DetLim
Americium-241	1.2	0.3195	10.65	17.67	U	3.183	10.3	18.11	-1.772	11.05	16.3	0.5147	10.29	15.62	U
Beryllium-7	NS	2.854	17.11	31.39	U	-4.42	17.66	30.3	6.265	15.26	28.94	-1.983	16.66	29.83	U
Cesium-134	NS	0.451	1.827	3.347	UJ-K	1.086	1.786	3.285	-1.435	1.726	2.829	2.534	2.468	3.086	UJ-K
Cesium-137	120	0.2468	1.859	3.427	U	-1.498	2.103	3.352	-0.3705	1.861	3.299	-0.3722	1.795	3.167	U
Cobalt-57	4000	-1.031	1.667	2.856	U	-0.3338	1.802	3.012	-0.9775	1.677	2.854	0.8372	1.531	2.768	U
Cobalt-60	200	0.1083	1.973	3.705	U	1.027	1.683	3.423	0.2404	1.745	3.414	1.429	2.023	3.793	U
Europium-152	NS	1.663	5.669	9.867	UJ-K	-5.8	4.932	7.881	1.411	5.964	10.14	0.5008	5.03	8.676	UJ-K
Europium-154	NS	3.427	3.805	10.06	U	4.287	4.826	10.05	0.4594	5.745	10.88	-1.625	4.396	7.866	U
Europium-155	NS	-9.384	7.022	11.51	UJ-K	-1.448	7.548	12.7	7.562	10.32	13.25	0.0147	0.2474	6.137	U
Gross Alpha	15	-0.0846	0.2463	0.6993	U	-0.1047	0.1856	0.5841	0.0552	0.2894	0.6858	0.0172	1.985	3.474	U
Manganese-54	NS	0	3.937	2.409	R-I	-1.257	2.04	2.922	-1.468	1.84	2.937	1.152	0.6047	1.157	UJ-K
Nonviable Beta	50	2.122	0.6953	1.2158	U	0.7528	0.5998	1.2153	1.522	0.6533	1.2126	1.152	0.6047	1.157	UJ-K
Sodium-22	NS	1.224	1.356	3.732	U	1.694	1.695	3.595	0.1575	2.05	3.883	-0.5746	1.571	2.814	U
Tritium	20000	-58.1945	250.6654	443.7572	U	269.6114	292.5766	489.5004	203.454	286.7863	484.8197	354.5806	296.0384	488.6437	UJ
Vanadium-48	NS	-2.504	2.636	4.284	U	2.325	2.712	5.475	-1.272	2.647	4.719	-0.4957	2.574	4.759	U
Zinc-65	NS	-0.2369	3.756	6.97	U	0	3.177	4.691	2.65	4.009	8.1	-4.149	3.55	5.473	U

Note:  
 \* = Activities are reported in pCi/L.  
 • = Brookhaven National Laboratory's groundwater screening level, selected from the most stringent of the state, federal, and DOE screening levels, see Table 4A.  
 J = Entered if reported activity is an estimated value.  
 U = Entered if the analyte was analyzed for but not detected less than the Instrumental Detection Limit.  
 NA = Not analyzed.  
 NS = No standard available.  
 For additional qualifier symbols, please refer to Table 2, Data Qualifiers.  
 Shading indicates a value exceeded the standard.

TABLE 9A  
 BROOKHAVEN NATIONAL LABORATORY - Environmental Restoration Division  
 Preliminary Assessment / Site Inspection - 1997 Facility Review

Groundwater Sample - Radiological Analysis

PARAMETERS	Standard*	FMCGP10 54-58			FMCGP11 50-54			FMCGP12 51-55			FMCG14 49.5-53.5						
		Activity	Error	DetLim	Lab Qual	Activity	Error	DetLim	Lab Qual	Activity	Error	DetLim	Lab Qual				
Americium-241	1.2	0.3031	8.96	14.59	U	2.515	12.59	18.81	U	-0.1408	3.659	5.443	U	0.0496	2.911	4.755	U
Beryllium-7	NS	11.99	15.76	32.95	U	-9.86	15.83	26.67	U	1.622	5.366	9.158	U	-8.865	14.16	24.46	U
Cesium-134	NS	-0.8601	1.876	2.878	UJ-K	0.7322	2.146	3.335	UJ-K	-0.3839	0.5293	0.8986	UJ-K	0.2738	1.632	3.008	UJ-K
Cesium-137	120	-0.0027	1.847	3.384	U	-0.9211	1.981	3.38	U	0	1.051	1.972	UJ-Q	1.411	3.451	3.248	U
Cobalt-57	4000	-0.4564	1.548	2.669	U	-0.6284	1.467	2.507	U	-0.0361	0.4631	0.806	U	1.851	1.824	2.22	U
Cobalt-60	200	0.7924	1.916	3.876	U	-0.1748	1.579	2.846	U	0.6809	0.7523	1.43	U	-1.175	1.542	2.577	U
Europium-152	NS	0.623	5.92	10.76	UJ-K	-3.401	5.424	8.735	UJ-K	-0.5642	1.715	2.507	U	2.292	4.75	9.779	U
Europium-154	NS	-0.1246	4.745	9.173	U	-1.91	4.832	8.31	U	0.4641	1.941	3.427	UJ-K	1.005	4.645	8.337	U
Europium-155	NS	0.7798	6.755	11.96	UJ-K	-4.537	6.814	11.58	UJ-K	0.2834	0.5191	0.9701	U	-0.5382	1.983	3.405	U
Gross Alpha	15	0.0379	0.259	0.6205	U	0.3217	0.3134	0.5185	UJ	1.122	0.6101	1.751	UJ-K	14.5463	1.2771	1.2133	U
Manganese-54	NS	0.1266	1.735	3.2	U	2.357	0.6516	1.0697	U	-0.2075	0.6111	3.14	U	0.818	1.694	3.49	U
Nonvolatile Beta	50	1.654	0.6013	1.0673	U	0	284.3905	497.7681	U	26.3506	266.2111	400.5948	U	-123.278	262.4304	470.0233	U
Sodium-22	NS	-0.0511	1.893	3.271	U	-0.691	1.723	2.952	U	0.2411	0.854	1.557	U	0.7125	3.076	5.631	U
Tritium	20000	-108.603	278.5159	496.8867	U	0	2.711	4.916	U	-0.0241	1.315	2.31	U	-2.742	3.854	6.617	U
Vanadium-48	NS	-0.2274	2.565	4.648	U	0.1175	2.711	4.916	U				U				U
Zinc-65	NS	-1.255	4.052	6.954	U	-0.5693	3.649	6.476	U				U				U

PARAMETERS	Standard*	FMCGP15 49-53		
		Activity	Error	DetLim
Americium-241	1.2	-1.486	13.95	23.71
Beryllium-7	NS	5.679	14.61	26.74
Cesium-134	NS	-0.645	1.52	2.703
Cesium-137	120	-0.08	1.827	3.372
Cobalt-57	4000	-1.251	1.553	2.425
Cobalt-60	200	-0.4416	1.789	3.315
Europium-152	NS	-0.3559	4.659	7.653
Europium-154	NS	-0.863	4.463	8.444
Europium-155	NS	-5.536	6.866	10.79
Gross Alpha	15	0.3692	0.3524	0.7135
Manganese-54	NS	0.2036	1.764	3.278
Nonvolatile Beta	50	1.241	0.7008	1.3792
Sodium-22	NS	-0.3141	1.592	3.01
Tritium	20000	186.7973	292.8948	495.8867
Vanadium-48	NS	1.614	2.204	4.548
Zinc-65	NS	-2.608	3.641	4.793

Notes:  
 Activities are reported in pCi/L  
 \* = Brookhaven National Laboratory groundwater screening level, selected from the most stringent of the state, federal, and DOE screening levels, see Table 4A.  
 J - Entered if reported activity is an estimated value.  
 U - Entered if the analyte was analyzed for but not detected less than the Instrumental Detection Limit.  
 NA - indicates that compound was not analyzed for.  
 NS - indicates that no standard was available.  
 For additional qualifier symbols, please refer to Table 2, Data Qualifiers.  
 Shading indicates a value exceeded the standard.



**FORMER MEDICAL COMPLEX**

**Groundwater and Soil**  
*Sampling and Analysis Plan*

**Follow-up Investigation  
For Facility Review**

**Prepared by: Environmental Restoration Division**

**May 6, 1998**

## 1.0 BACKGROUND

The "Former Medical Complex" refers to the several building which comprised the Medical Department prior to the construction of Building 490. In 1966, the Medical Department occupied Building 471 and 472, vacating those buildings in 1971. Most buildings were eventually demolished (between 1959 and 1971), several buildings were relocated, whole or in part. The function of the Old Medical Department was similar to that of today. A significant in-patient program was active. Radioisotopes were used as tracers, many produced in Department labs. Chemicals and pharmaceuticals were used extensively. Mercury, in particular, was in heavy use in equipment manometers. "Unique" facilities seem to have been limited to the kinds typical to hospitals - treatment rooms, wards and a morgue. Animals were housed in buildings and pastures were present - although their exact location is unknown.

The following are findings from the April, 1997 Facility Site Review for the "Old Medical Complex" which will be addressed in this sampling and analysis plan:

- ▶ Past practices included the disposal of many substances via sanitary lines. Although these practices are no longer followed, it is apparent that this was permitted. Significant amounts of <sup>137</sup>Cs, <sup>131</sup>I, <sup>3</sup>H (Curie amounts), and other isotopes were administered to both humans and animals, resulting, ultimately, in regular discharges to sanitary lines. There is a reference to a decontamination facility in Bldg. 356, although nothing specific is known. It can be assumed that there was some chemical disposal as well. Army era waste lines could very well have leaked resulting in contamination of surrounding soils. Sampling may reveal rad contamination.
- ▶ Interviews yielded comments about "extensive" mercury contamination of lab floors.
- ▶ There is a reference to "cold waste lines" from bldgs. 352 & 354 to Bldg. 311. Based on known past practices, it is possible these contained low level rad waste or chemicals. Their fate is unknown. Furthermore, there is a reference to three large hold-up tanks....continually overflowing into the control pit near the "Contaminated Laundry" (Bldg. 311). Sampling of the area around the Bldg. 311 "pits" may reveal rad contamination.
- ▶ From aerial photo # 7-206-0, electrical transformers or capacitors can be discerned west of Bldg. 353 and between bldgs. 324 & 327. Although there is no record of problems, sampling of the surrounding soil may reveal PCB contamination.
- ▶ There were three 250 gal. Liquid rad waste hold-up tanks at Bldg. 354. It is uncertain as to whether they were inside the building or not. Their contents were routinely analyzed and pumped to sanitary. There are reports that prior to the tanks being installed, 55 gal. drums were stored underneath the Bldg. There are numerous reports of the tanks overflowing. The fate of the tanks and drums is unknown. Sampling of the area around the Bldg. may reveal rad contamination.

## 2.0 ENVIRONMENTAL SAMPLING AND ANALYTICAL DESIGN

The following Sampling and Analysis Plan (SAP) has been developed for the Former Medical Complex (FMC) Geoprobe groundwater and soil investigation. The main purpose of the SAP is to ensure that sampling is conducted in accordance with the required protocol and that the quality of the analysis is not compromised. Existing sources of procedures are referenced wherever possible.

### 2.1 Data Quality Objectives (DQOs)

The Data Quality Objective (DQO) Process, as defined by "Guidance for the Data Quality Objectives Process", EPA QA/G-4, is a planning tool that is used to develop the design criteria for data collection. There are seven steps to the DQO Process, as follows:

- Step 1: State the Problem - Concisely describe the problem to be studied. Review prior studies and existing information to gain a sufficient understanding to define the problem.
- Step 2: Identify the Decision - Identify what questions the study will attempt to resolve, and what actions may result.
- Step 3: Identify the Inputs to the Decision - Identify the information that needs to be obtained and the measurements that need to be taken to resolve the decision statement.
- Step 4: Define the Study Boundaries - Specify the time periods and spatial area to which decisions will apply. Determine when and where the data should be collected.
- Step 5: Develop a Decision Rule - Define the statistical parameter of interest, specify the action level, and integrate the previous DQOs outputs into a single statement that describes the logical basis for choosing among alternative actions.
- Step 6: Specify Tolerable Limits on Decision Errors - Define the decision maker's tolerable decision error based on a consideration of the consequences of making an incorrect decision.
- Step 7: Optimize the Design - Evaluate information from the previous steps and generate alternative data collection designs. Choose the most resource effective design that meets all DQOs.

The following is a summary of the DQO Process as it relates to the Geoprobe groundwater and soil investigation at the Former Medical Complex:

- Step 1: When the complex was operating, the use of radioactive isotopes, mercury, and

chemicals was very common in several buildings and disposal methods were not as controlled as required now. Soil and/or groundwater quality data surrounding several of the buildings associated with the complex is not available, therefore, characterization of these areas is required.

Step 2: The analytical data obtained from this sampling and analysis program will be used to help determine the soil and groundwater quality surrounding several of the former buildings within the FMC. The characterization conducted by ERD under Preliminary Assessment/Site Inspection (PA/SI) activities will be conducted in one or more phases. This SAP relates to the first phase of sampling that will utilize the Geoprobe to collect soil and groundwater samples in the FMC area. Results from this sampling event will be summarized within the PA/SI final report along with recommendations for further investigation or no additional action required. If no contamination is identified, the phase I data will be relied on to prepare the closeout report for the facility review process. Depending on the radiological and chemical results of the first phase sampling, additional locations under a separate sampling and analysis plan and DQO process may be necessary to further define the nature and extent of soil and/or groundwater contamination (phase II). Should there be significant soil and/or groundwater contamination within the FMC area, remedial action may be required (phase III).

Step 3: The information required to evaluate the potential for soil and/or groundwater contamination at the FMC is:

- ▶ Identify the chemicals and/or radionuclides that were used during its operation;
- ▶ Identify the buildings or facilities associated with past practices that would have potentially contaminated the soil and/or groundwater;
- ▶ Research and determine the location of potential underground storage tanks, buried pipes, and utilities;
- ▶ Understanding of the groundwater flow; and,
- ▶ Sample and analyze soil and groundwater for chemical and radiological contaminants of concern.

Step 4: The soil and groundwater investigation will be limited to the areas (Buildings/Facilities) within the Former Medical Complex that were associated with practices that may have contaminated the soil and/or groundwater (See attached Figure of the FMC).

Step 5: Where applicable, the action level for both groundwater and soil will be if the reported concentration in any Geoprobe sample location exceeds the MCLs. If an MCL does not exist for any one of the reported compounds, a comparison will be made between the reported concentration and existing, established BNL background concentrations. Contaminants of concern (COC) would include:

- ▶ Individual radionuclides
- ▶ Gross activity measurements (Gross alpha/beta)
- ▶ Volatile organic compounds
- ▶ Metals
- ▶ PCB's

Step 6: The analytical methods selected for this investigation will deliver the ability to check against MCL's and enable ERD to make a confident decision if any contamination exists.

Step 7: The data collection design that has been selected is the most resource effective design that meets all DQOs and will be used as the initial means of determining any potential problems at the FMC.

## 2.2 Field Investigation Activities

### 2.2.1 Completed Activities

The following is a summary of field activities that have been completed to date at the FMC:

**January 20-22, 1998:** IT Corporation conducted a magnetometer survey at the FMC (800' x 800' area) in order to locate possible underground storage tanks (USTs) and other ferrometallic objects on the site. A report was prepared by IT Corporation summarizing the findings of the magnetometer survey (Magnetic Gradiometer Survey at the Former Medical Complex, January 30, 1998). There were numerous anomalies and anomalous areas observed on the color-enhanced contour maps within the report, only two were potentially characteristic of a UST. Of the two locations determined to be potential USTs, only one construction test pit was performed to further characterize the source of the anomaly detected. The other large anomalous area was determined to be steel pipes and other ferrometallic objects associated with the steam plant (T-315) that provided heat throughout the Medical Complex.

**March 13, 1998:** Plant Engineering excavated the area where significant magnetometer anomalies existed and only found several iron pipes (2" - 6" in diameter) and (2) large metal rectangular plates (probably associated with the former tanks). No tanks were found. SCDHS was on-site to witness the excavation and agreed that the tanks must have been removed when Building 311 was demolished. It was discovered at a later date by SCDHS that the (3) tanks associated with the "Old Decontaminated Laundry" (Building 311) were indeed removed. One tank was immediately disposed of at the BNL landfill. The other two tanks were decontaminated first, and then disposed of at the BNL landfill as well.

In addition, a sample of the clay pipe associated with the "cold-waste" lines was collected during the excavation because of above background readings from the micro-R meter. The sample was collected near the end of the line where "cold-waste" would have discharged into the (3) tanks and was analyzed for gamma emitting nuclides. The results showed that the activity that was observed in the field was due to natural radioisotopes within the clay pipe.

**March 30, 1998:** Prior to disposal of the pipes and other scrap metal found during the excavation, an extensive radiological survey was conducted using a high purity germanium detector on the material. The larger pipes (probably associated with Building 311) were found to be contaminated with Cesium-137 as fixed contamination internal to the pipes. The pipes are now in a controlled area awaiting proper disposal.

### 2.2.2 Proposed Activities

The following are additional field activities that will be conducted to address findings from the April, 1997 Facility Site Review of the FMC:

ERD's Geoprobe will be utilized for installing the Phase I soil and groundwater sample points. Collection of the samples will be performed by P.W. Grosser Consultants. A total of sixteen (16) locations have been chosen for this sampling program (See attached map for locations). Geoprobe locations were selected based upon the following information:

- ▶ Review of Potential Environmental Release Points, "Old Medical Department" Report dated June 30, 1997 which included Historical Document Summary Sheets
- ▶ Results of Magnetometer Survey conducted in January 1998 and associated construction test pits.
- ▶ Review of army utility maps associated with the FMC area.

All groundwater sample locations were located by a ERD/BNL hydrogeologist, hydraulically down gradient of potential sources and will be collected at the water table using Geoprobe's SP15 groundwater sampling screen (4 foot drop screen). The water table elevation around the FMC area is approximately 55 feet below ground surface.

Groundwater samples for radiological and metals analysis will be filtered in the field using the QuickFilter™ in-line filtration system prior to sample collection. The procedure for its use can be found in Attachment 3. In addition, a second set of sample containers will be collected (unfiltered) for radiological and metals analysis and will be archived on-site for future analysis, if necessary. Groundwater samples collected for volatile organic compound analysis will not be filtered through the QuickFilter™ in-line filtration system prior to sample collection.

*All soil samples will be collected from a depth below potential sources of contamination discussed in this plan using Geoprobe's Macro-Core soil sampler (Bottom of sewer lines, former tanks, etc.).*

Below, you will find an individual explanation for placement of the sixteen (16) Geoprobe locations. Please refer to Tables 1 and 2 for a summary of the types of analysis to be performed on the groundwater and soil samples collected during this investigation. Soil samples collected for radiological analysis will be analyzed for Gamma Spectroscopy, only, for the following reasons:

- ▶ Gross alpha/beta measurements in soil are not useful due to self adsorption; and.
- ▶ Since Tritium tends to move through the soil like water, any potential Tritium contamination would be found in the groundwater sample collected at the same location.

Samples will be shipped to either General Engineering Laboratories or H2M Labs for analysis. Volatile organic analysis will be performed by H2M Labs, Inc. All other required analysis (Radiological, Metals, and PCBs) will be performed by General Engineering Laboratories.

Note: Although there is no record of extensive chemical use or disposal, groundwater sample locations will be analyzed for volatile organic compounds in order to establish if there is any chemical contamination from past practices at the FMC. Metals analysis, including mercury, in groundwater and soil will be performed at all manhole and former tank locations.

#### FMC-GP01 & GP02 (Groundwater, only)

Address potential groundwater contamination associated with Building 356. Since there is no specific information on this "decontamination facility", only groundwater samples will be collected to establish if any contamination occurred in the past.

#### FMC-GP03, GP04, GP05, and GP06 (Groundwater & soil)

Address potential groundwater and soil contamination associated with Building 354 (Physiology Building). This building was reported to contain three (3) 250 liquid rad waste hold-up tanks which discharged to the sanitary lines on a regular basis. Geoprobe locations FMC-GP04 & GP05 (GW, only) will address potential groundwater contamination from experiments that occurred within the building and/or possible leaking sewer lines. Geoprobe locations FMC-GP03 & GP06 will include a groundwater and soil sample collected outside the sewer manhole which received waste from Building 354 and 353. Any discharge from Buildings 354 and 353 (including the (3) hold-up tanks) would have passed through these manholes.

#### FMC-GP07 (Soil, only)

Address possible PCB contamination in the soil from a electrical transformer that used to be next to Buildings 352 and 353.

#### FMC-GP08, GP09, GP10, and GP11 (Groundwater and soil)

Address potential groundwater and soil contamination associated with Building 352. This building was reported to contain labs where experiments involving radiological isotopes may have been discharged to sanitary lines on a regular basis. Geoprobe locations FMC-GP09 & GP10 (GW, only) will address potential groundwater contamination from experiments that occurred within the building and/or possible leaking sewer lines. Geoprobe locations FMC-GP08 & GP11 will include a groundwater and soil sample collected outside the sewer manhole which received waste from Building 352. Any discharge from Building 352 would have passed through these manholes.

#### FMC-GP12 (Groundwater and soil)

Address potential groundwater and soil contamination associated with the "cold waste lines". Geoprobe location FMC-GP12 will include a groundwater and soil sample collected outside the junction box which received "cold waste" from Buildings 352 and 353. Any discharges from Buildings 352 and 354 would have passed through this junction box prior to discharge into the hold-up tanks at Building 311.

#### FMC-GP13 (Soil) & GP14 (Groundwater and soil)

Address potential groundwater and soil contamination associated with the three (3) hold-up tanks located outside of Building 311 (Contaminated Laundry). An excavation performed outside Building 311 confirmed that the tanks had been removed but several of the pipes that remained were found to be contaminated with Cesium-137 as fixed contamination internal to the pipes. The pipes found to contain the fixed contamination were most likely associated with Building 311 activities and not the "cold waste lines" from Buildings 352 and 354. A soil sample will be collected at FMC-GP13 & GP14 within the recently excavated area near the bottom of the former tanks location (Approx. 6-10 feet below ground surface). One groundwater sample will be collected at FMC-GP14 in order to establish if past spills or potentially leaking tanks contaminated the groundwater.

#### FMC-GP15 (Groundwater and soil)

Address potential groundwater and soil contamination associated with sewer manhole #37. Geoprobe location FMC-GP15 will include a groundwater and soil sample collected outside the sewer manhole which received waste from Buildings 311, 322, 352, 353, and 354. Any discharge from these buildings would have passed through this junction. Discharges from the (3) hold-up tanks associated with Building 311 and the "cold waste lines" would have been made to manhole #37 as well.

#### FMC-GP16 (Soil. only)

Address possible PCB contamination in the soil from a electrical transformer that used to be in between Buildings 324 and 307.

### **3.0 QUALITY ASSURANCE PROJECT PLAN**

A Quality Assurance Project Plan (QAPP) has been developed for the BNL PA/SI project and will be followed during this sampling event. A copy of the cover page and the table of contents from this document can be found on attachment 4. The purposes of the QAPP are to ensure sampling is conducted in accordance with the required protocol and that the quality of the analysis is not compromised.

All analytical requirements, decontamination procedures, quality assurance objectives, sampling procedures, and analytical procedures will be performed in accordance with those mentioned in the PA/SI Sampling and Analysis Plan dated, November 1997. Below, is a explanation of ERD's updated Sample Tracking System.

### 3.1 Sample Tracking System

Samples will be tracked by the ERD Environmental Information Management System (EIMS). Tracking is initiated when a sample is recorded on a chain-of-custody form.

#### 3.1.1 Sample Identification

Each sample will be identified by an alpha numeric code. This code is comprised of the location identification (ID), the sample depth, sample date, sample time, and QA/QC code.

The location ID is the permanent BNL well number that is assigned by the ERD Technical Support Group (TSG). It consists of a three digit grid number followed by a sequential number. If a well to be sampled has not yet been assigned a permanent BNL well number, the location ID will be the temporary ID as it appears in the ERD database.

Quality Assurance/QC samples will be identified by codes specified on the ERD chain-of-custody forms (Attachment 1). Blind duplicates will be identified on a supplemental form that will be submitted by the field team to the TSG (Attachment 2). The blind duplicate will be given the designation "BD" on the chain-of-custody form. Sampling rounds will be identified within the ERD EIMS by sample collection date.

#### 3.1.2 Sample Tracking

Copies of the chain-of-custody forms will be provided daily to the ERD TSG for entry into the EIMS. The status of each sample will be updated when:

1. The sample is assigned to a Sample Delivery Group and this information is communicated to the TSG by the laboratory;
2. Upon receipt and approval by the Project Manager of the hard copy sample analysis results;
3. Upon receipt and successful ingest of the Electronic Data Deliverable (EDD) analytical results into the ERD EIMS;
4. Upon receipt and approval by the Project Manager of the hard copy data validation package (when applicable);
5. Upon receipt and successful ingest of the EDD data validation results (when applicable).

A sample will have been tracked to closure upon acceptance by ERD of all required results for each analytical method specified for that sample.

### 3.1.3 Sample Containers and Analytical Requirements

Tables 1 and 2 summarize the sample containers, preservation, and general analytical requirements for the Geoprobe soil and groundwater investigation. Prior to collecting a soil or groundwater sample, the field team will review the sample container and preservation requirements. At the completion of sample collection activities at each Geoprobe location, the sampling team will ensure that the proper number and types of bottles were filled.

### 4.0 HEALTH AND SAFETY PLAN

The Health and Safety Plan developed for the PA/SI project will be followed for this sampling event. A copy of the cover page and the table of contents from this document can be found on attachment 4. Personnel performing sampling and analysis will be required to read, understand, sign, and agree to abide by the provisions as detailed in the Health and Safety Plan.

### 5.0 PROJECT ORGANIZATION

Each member of the field team and their associated responsibilities include:

Jason Remien	-	ERD Project Manager
William Dorsch	-	Technical Oversight
Carlee Beecher	-	ERD Field Engineer
Andrea Epple	-	ES&H Facility Support Representative
Robert Litzke	-	Site Health and Safety Officer
Art Harris	-	QA/QC Officer
Kalogeras and Grosser- Consulting Engineers		Sample technicians



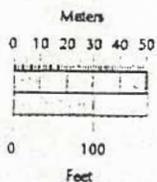
Brookhaven National Laboratory

Environmental Restoration Division

PA/SI  
 FORMER MEDICAL COMPLEX

PROPOSED GEOPROBE SOIL AND  
 GROUNDWATER SAMPLE LOCATIONS

SCALE



LEGEND

- |   |                      |                          |                      |                  |
|---|----------------------|--------------------------|----------------------|------------------|
| Current Buildings                           | Sanitary Sewer Lines | Magnetometer Survey Grid | Monitoring Wells     | Soil Only        |
| Groundwater Contours (feet AMSL, June 1996) | Manholes, Cesspools  | Buildings, 1919 Map      | Groundwater and Soil | Groundwater Only |

**TABLE 1**  
**Former Medical Complex**  
*Geoprobe Groundwater Sampling*

Sample ID	Depth to Water (BGS)	Depth Interval (BGS) Water Table	Laboratory Radiochemical Analysis	Laboratory Chemical Analysis	Laboratory Metals Analysis	Sample Amount & Size	Type of Bottle	Preservative
FMC-GP01 & GP02	56 feet	56-60	Rad Combo* Tritium	TCL + Library Search**	NA	Rad (1) 1 Gallon Tritium (2) 125 mL VOC (3) 40 mL	Plastic Amber Glass VOA	Nitric Acid None HCL
FMC-GP03, GP04, GP05 and GP06	56 feet	56-60	Rad Combo* Tritium	TCL + Library Search**	TAL Metals GP03 and GP06 Only	Rad (1) 1 Gallon Tritium (2) 125 mL VOC (3) 40 mL Metals (1) 1 liter	Plastic Amber Glass VOA Plastic	Nitric Acid None HCL Nitric Acid
FMC-GP08, GP09, GP10 and GP11	56 feet	56-60	Rad Combo* Tritium	TCL + Library Search**	TAL Metals GP08 and GP11 Only	Rad (1) 1 Gallon Tritium (2) 125 mL VOC (3) 40 mL Metals (1) 1 liter	Plastic Amber Glass VOA Plastic	Nitric Acid None HCL Nitric Acid
FMC-GP12	56 feet	56-60	Rad Combo* Tritium	TCL + Library Search**	TAL Metals	Rad (1) 1 Gallon Tritium (2) 125 mL VOC (3) 40 mL Metals (1) 1 liter	Plastic Amber Glass VOA Plastic	Nitric Acid None HCL Nitric Acid
FMC-GP14	56 feet	56-60	Rad Combo* Tritium	TCL + Library Search**	TAL Metals	Rad (1) 1 Gallon Tritium (2) 125 mL VOC (3) 40 mL Metals (1) 1 liter	Plastic Amber Glass VOA Plastic	Nitric Acid None HCL Nitric Acid
FMC-GP15	56 feet	56-60	Rad Combo* Tritium	TCL + Library Search**	TAL Metals	Rad (1) 1 Gallon Tritium (2) 125 mL VOC (3) 40 mL Metals (1) 1 liter	Plastic Amber Glass VOA Plastic	Nitric Acid None HCL Nitric Acid

BGS = Below Ground Surface (estimated)

Note 1: Sample depths may be adjusted based upon field conditions

\* Rad Combo = Gross alpha/beta and Gamma Spectroscopy

\*\* Modified 8260 method to include library search for all SCDIIS parameters

**TABLE 2**  
**Former Medical Complex**  
*Geoprobe Soil Sampling*

Sample ID	Depth to Bottom of Manhole	Sample Interval (BGS)	Laboratory Radiochemical Analysis	Bottle Requirements	Type of Bottle	Laboratory Metals/PCB Analysis	Bottle Requirements	Type of Bottle
FMC-GP03	4.5 feet	4.5-8.5	Gamma Spec.	(1) 1 liter	Amber Glass	Metals	(2) 250 mL	Amber Glass
FMC-GP06	2.5 feet	2.5-5.5	NONE	NA	NA	PCB	(2) 250 mL	Amber Glass
FMC-GP07	NA	0-4	Gamma Spec.	(1) 1 liter	Amber Glass	Metals	(2) 250 mL	Amber Glass
FMC-GP08	4 feet	4-8	Gamma Spec.	(1) 1 liter	Amber Glass	Metals	(2) 250 mL	Amber Glass
FMC-GP11	4 feet	4-8	Gamma Spec.	(1) 1 liter	Amber Glass	Metals	(2) 250 mL	Amber Glass
FMC-GP12	4 feet	4-8	Gamma Spec.	(1) 1 liter	Amber Glass	Metals	(2) 250 mL	Amber Glass
FMC-GP13	NA	6-10	Gamma Spec.	(1) 1 liter	Amber Glass	Metals	(2) 250 mL	Amber Glass
FMC-GP14	NA	6-10	Gamma Spec.	(1) 1 liter	Amber Glass	Metals	(2) 250 mL	Amber Glass
FMC-GP15	4 feet	4-8	Gamma Spec.	(1) 1 liter	Amber Glass	Metals	(2) 250 mL	Amber Glass
FMC-GP16	NA	0-4	NONE	NA	NA	PCB	(2) 250 mL	Amber Glass

BGS = Below Ground Surface (estimated)

Note 1: Sample depths may be adjusted based upon field conditions

# Attachment 1

*ERD Chain of Custody Form*



**INSTRUCTIONS:**

**SAMPLE ID:**

Sample ID is Site ID + Depth + Date  
(See below for individual components of the Sample ID)  
Example: 105-05 90 12/01/97

**SITE ID:**

Site ID is the sample location ID  
Standard BNL IDs are 3-digit grid number (hyphen) 2- or 3-digit well number  
Example: 105-05  
If temporary IDs must be used, use hyphens (no spaces)  
Example: AOC15B-GP03

**DEPTH:**

All samples taken at a specified depth (wells, borings, sediment samples) must have a sample depth recorded in feet  
**WELLS:** If no depth is indicated, use the midpoint of the screen in feet BLS  
**SOIL, SEDIMENT:** Use depth range  
Examples: 0-0.5, 10-15  
**OTHER SAMPLE TYPES:** If depth is not applicable, leave blank

**DATE:**

Month/Day/Year (MM/DD/YY)  
Example: 12/01/97

**TIME:**

Military time, no colons  
Example: 1430

**SAMPLE TYPE:**

W Water (groundwater, surface water)  
S Soil (soil, sediment)  
A Air

**QA/QC CODE:**

(omit if not applicable)  
TB Trip Blank  
FB Field Blank  
MS Matrix Spike  
MSD Matrix Spike Duplicate

# Attachment 2

*ERD Blind Duplicate Form*



# Attachment 3

*QuickFilter™ In-line Filtration Procedure*

Suffolk County Department of Health Services  
 Division of Medical-Legal Investigations & Forensic Sciences  
 Public & Environmental Health Laboratory  
 (Industrial Waste Solid Samples)

FIELD  
 Field No. 3EG7-2

Laboratory  
 Lab No. TW 798 023

Date Completed 8/21/98

Name of Firm BNL  
 Address or Location Former Medical Complex

Remarks/ Instructions STP Manhole # 28

TEST	RESULT	TEST	RESULT ug/g (PPM)	TEST	RESULT ug/g (PPM)
pH (Field)		COD		Potassium	110.
pH (Lab)		Cyanide		>Selenium	< 10.
TEST	RESULT	Phenols		>Silver	< 2.
	ug/g (PPM)	<i>X</i> METALS		Sodium	200.
Chloride		Aluminum	800.	Thallium	< 25.
Fluoride		Antimony	< 10.	Vanadium	< 10.
Sulfate		>Arsenic	< 10.	Zinc	73.
Sulfite		>Barium	64.		
Sulfide		Beryllium	< 1.	EP Toxicity	
MBAS		>Cadmium	4.0	TCLP	
TOC		Calcium	1000.	<i>X</i> Mercury	15.3 $\mu\text{g/g}$
Nitrate - N		>Chromium	< 10.		
Nitrite - N		Cobalt	< 10.		
Ammonia - N		Copper	117.		
TKN		Iron	36000.		
Total Solids		>Lead	66.		
Susp. Solids		Magnesium	265.		
Diss. Solids		Manganese	82.		
TPH		Molybdenum	< 10.		
Oil & Grease		Nickel	20.		

EP Toxicity and TCLP includes all metals marked with >



Suffolk County Department of Health Services  
 Division of Medical-Legal Investigations & Forensic Sciences  
 Public & Environmental Health Laboratory  
 (Industrial Waste Solid Samples)

FIELD  
 Field No. 2E97-2

Laboratory  
 Lab No. IW 798022

Name of Firm PONL Date Completed 8/28/98

Address or Location Former Medical Complex

Remarks/ Instructions STP Humble In Box #23

TEST	RESULT		TEST	RESULT ug/g (PPM)		TEST	RESULT ug/g (PPM)
pH (Field)			COD			Potassium	196.
pH (Lab)			Cyanide			>Selenium	<10.
TEST	RESULT		Phenols			>Silver	<2.
	ug/g (PPM)	X	METALS			Sodium	270.
Chloride			Aluminum	4700		Thallium	<.25.
Fluoride			Antimony	<10.		Vanadium	12.
Sulfate			>Arsenic	<10.		Zinc	120.
Sulfite			>Barium	81.			
Sulfide			Beryllium	<1.		EP Toxicity	
MBAS			>Cadmium	2.1		TCLP	
TOC			Calcium	1800.	X	Mercury	7.38 ug/g
Nitrate - N			>Chromium	<10.			
Nitrite - N			Cobalt	<10.			
Ammonia - N			Copper	40.			
TKN			Iron	7600.			
Total Solids			>Lead	56.5			
Susp. Solids			Magnesium	680.			
Diss. Solids			Manganese	42.			
TPH			Molybdenum	<10.			
Oil & Grease			Nickel	11.			

EP Toxicity and TCLP includes all metals marked with X

BLDG#: N/A LOCATION: OLD MEDICAL AREA DATE/TIME: 03-31-98/C045 REASON FOR SURVEY: ROUTINE SPECIAL RWP #: N/A  
 INSTRUMENTS, MODEL/SERIAL #: LUD3/124061 TENN 1092286

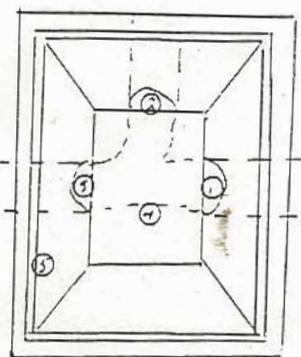
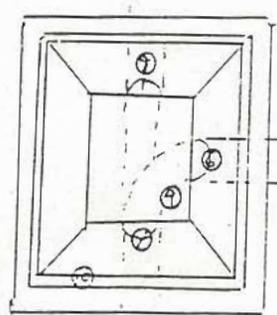
DOSE RATES (HIGHEST)		AIRBORNE CONTAMINATION			LEGEND: ○ SMEAR SURVEY LOCATION □ MASSLINSY SURVEY LOCATION	
CONTACT		TIME	uCi/cc	%DAC	XXX Y	ZZZ - READING @ 30 Cm
GENERAL AREA	N/A		N/A			Y = RADIATION TYPE

SMEAR SURVEY RESULTS (DPM/100 cm <sup>2</sup> )										MASSLINSY SURVEY RESULTS (DPM/LAST)																			
					'H (B) (C)																								
1. <MDA	2. <MDA	3. <MDA	4. <MDA	5. <MDA	6. <MDA	7. <MDA	8. <MDA	9. <MDA	10. <MDA	11. <MDA	12. <MDA	13. <MDA	14. <MDA	15. <MDA	16. <MDA	17. <MDA	18. <MDA	19. <MDA	20. <MDA	21. <MDA	22. <MDA	23. <MDA	24. <MDA	25. <MDA	26. <MDA	27. <MDA	28. <MDA	29. <MDA	30. <MDA
	23.03																												

a MDA = 18.97 Dpm  
 B MDA = 17.28 Dpm  
 LUD3 BKGD = 40cpm

SPOT FRISKED INSIDE OF DRAIN PIPES, AROUND OPENINGS OF PIPE 10-20cpm ABOVE BKGD

CHECKED VARIOUS LOCATIONS INSIDE OF SUMPS, NO DETECTABLE ACTIVITY ABOVE BKGD.



THIS DRAINS UNDER ROAD TO EXCAVATED AREA WHERE OLD STEEL PIPES REMOVED

SURVEYED BY: Norm E. Keith 3-31-98 REVIEWED BY: [Signature] 4/9/98  
 Signature Date Signature Date

LB5100-W Low Background Counting System -- Smear Analysis

Date: 3/31/98  
 Counting Unit id: 1  
 Data file name: C:\LBXL\UNIT1\SMETA185.XLD  
 Batch Ended: 3/31/98 11:45  
 Crosstalk Correction: Not Applied

Alpha activity action level (DPM): 10.00  
 Beta activity action level (DPM): 500.00  
 Certainty level for MDA and flags: 95.00%  
 High Voltage Setting: 1440

Application Revision: 3

Application Version: Standard

Batch ID: OLD MEDICAL O/S SUMPS

Alpha efficiency log file: PU299C

Alpha Efficiency: 18.74%  
 Alpha to Beta Crosstalk: 5.23%  
 Alpha Background (CPM): 0  
 Alpha Correction Factor: 1.000

Beta efficiency log file: TC99IC

Beta Efficiency: 24.19%  
 Beta into Alpha Crosstalk: 4.15%  
 Beta Background (CPM): 0.9  
 Beta Correction Factor: 1.000

Count	Alpha CPM	Beta CPM	Completion
1.70	0.000	2.04	3/31/98 11:28
1.70	0.000	5.57	3/31/98 11:30
1.70	0.588	2.63	3/31/98 11:32
1.70	0.000	0.86	3/31/98 11:34
1.70	0.588	2.63	3/31/98 11:36
1.70	0.000	5.57	3/31/98 11:38
1.70	0.588	1.45	3/31/98 11:39
1.70	0.000	3.22	3/31/98 11:41
1.70	1.765	1.45	3/31/98 11:43
1.70	0.000	0.28	3/31/ 11:45

Carrier	Alpha Activity			Beta Activity				
	DPM	$\sigma$	flags	MDA	DPM	$\sigma$	flags	MDA
1	0.000	3.18	<MDA	18.97	8.44	5.58	<AL	17.28
2	0.000	3.18	<MDA	18.97	23.03	8.17	<AL	17.28
3	3.140	3.19	<MDA	18.97	10.87	6.09	<AL	17.28
4	0.000	3.18	<MDA	18.97	3.57	4.39	<MDA	17.28
5	3.140	3.19	<MDA	18.97	10.87	6.09	<AL	17.28
6	0.000	3.18	<MDA	18.97	23.03	8.17	<AL	17.28
7	3.140	3.19	<MDA	18.97	6.01	5.02	<AL	17.28
8	0.000	3.18	<MDA	18.97	13.30	6.56	<AL	17.28
9	9.419	5.47	AI AL	18.97	6.01	5.02	<AL	17.28
10	0.000	3.18	<MDA	18.97	1.14	3.66	<MDA	17.28

BNL RADIOLOGICAL SURVEY FORM

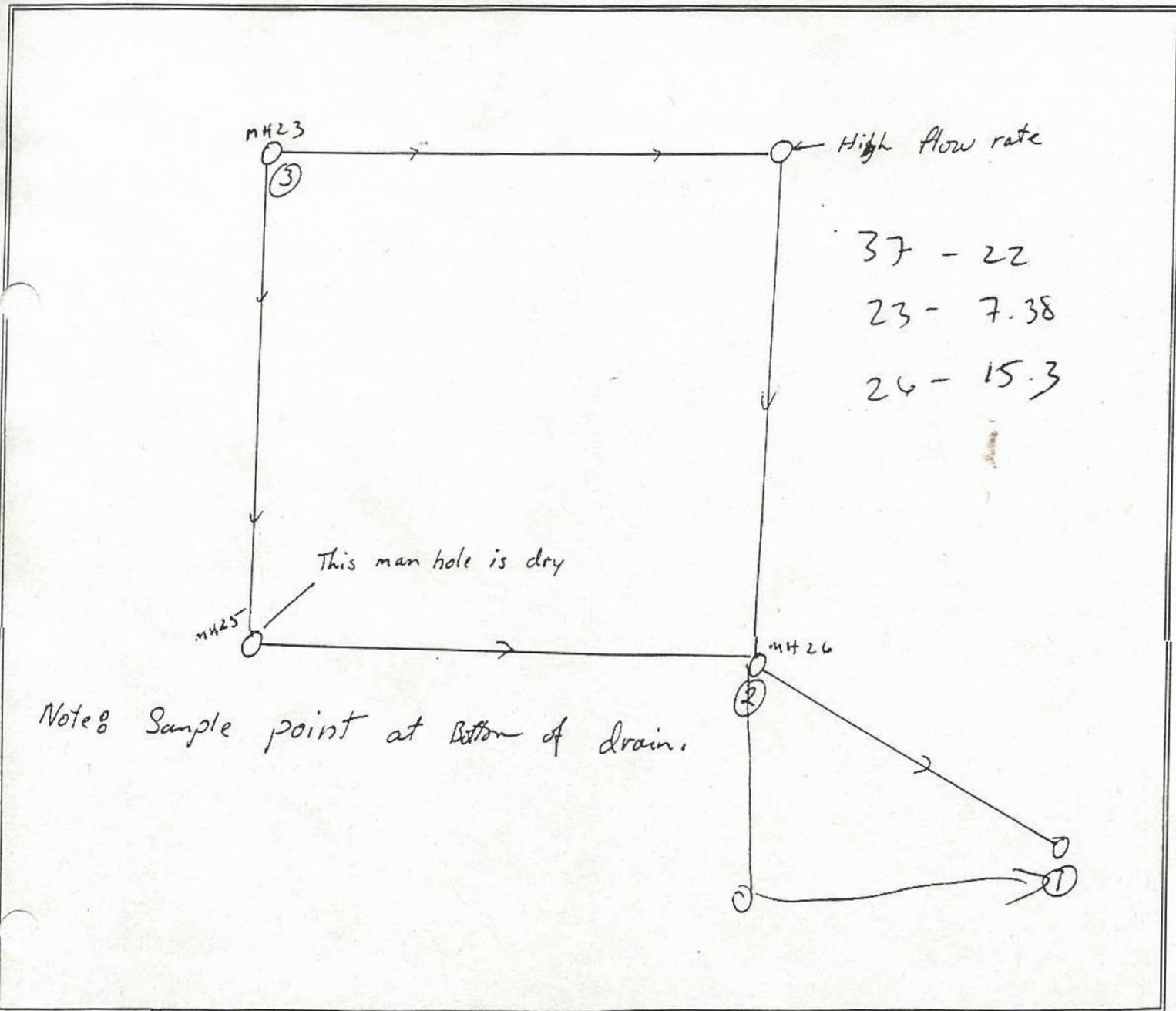
REASON FOR SURVEY

BLDG #: NA LOCATION: Old Medical Facility DATE/TIME: 7-23-98/0858 ROUTINE  SPECIAL  RWP #:

INSTRUMENTS, MODEL / SERIAL #: Figuid Sin # 85543 Bicron # B306W

DOSE RATES (HIGHEST)		AIRBORNE CONTAMINATION			LEGEND: ○ SMEAR SURVEY LOCATION □ MASSLINN SURVEY LOCATION	
CONTACT		TIME	uCi/cc	%DAC	XXX Y	ZZZ
	<u>15 uR/hr</u>				XXX = CONTACT READING	ZZZ = READING @ 30 Cm
GENERAL AREA	<u>5 uR/hr</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	Y = RADIATION TYPE	

SMEAR SURVEY RESULTS (DPM/100 cm <sup>2</sup> )						MASSLINN SURVEY RESULTS (DPM/LAS)				
		<sup>238</sup> U	B-γ	α						
1. <u>Blank</u>	8.	<u>NA</u>			22.	<u>NA</u>	1.	<u>NA</u>	8.	<u>NA</u>
2. <u>&lt; 1000 DPM</u>	9.				23.		2.		9.	
3. <u>↓</u>	10.				24.		3.		10.	
4. <u>NA</u>	11.				25.		4.		11.	
5. <u>↓</u>	12.				26.		5.		12.	
6. <u>↓</u>	13.				27.		6.		13.	
7. <u>↓</u>	14.				28.		7.		14.	



SURVEYED BY: Jim Seala 8-17-98  
Signature/date

REVIEWED BY: A. Epple 8/19/98  
Signature/date

A: LL-UL=0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=2.00  
 B: LL-UL=18.6-156. Lcr= 0 Bkg= 0.00 %2 Sigma=2.00  
 C: LL-UL=156.-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=2.00  
 me = 2.00 QIP = tSIE/AEC ES Terminator = Count

Conventional DPM

S#	TIME	DPM1	H <sup>3</sup>	C <sup>14</sup>	allother β-	tSIE
Blank	10.00	3502	5.00	12.40	10.40	403.
12	2.00	0.00	0.00	1.10	1.10	190.
28	2.00	0.00	0.00	2.60	3.60	250.
34	2.00	7.42	1.50	0.00	0.00	253.

**ATTACHMENT III**

**NATIONAL ENVIRONMENTAL POLICY ACT**

**ENVIRONMENTAL EVALUATION NOTIFICATION FORM**

**BNL HOUSING RECONSTRUCTION PROJECT**



## Department of Energy

Brookhaven Area Office  
P. O. Box 5000  
Upton, New York 11973

**MAY 28 2003**

Mr. George Goode  
Brookhaven Science Associates, LLC  
Brookhaven National Laboratory  
Upton, New York 11973

Dear Mr. Goode:

**SUBJECT: NEPA DETERMINATION**

We have reviewed the Environmental Evaluation Notification Form for the BNL Housing Reconstruction Project and have determined it to be a Categorical Exclusion. A copy of the determination is enclosed.

If you should have any questions regarding this matter, please contact Caroline Polanish of my staff at extension 5224.

Sincerely,

A handwritten signature in cursive script that reads "M. Holland".

Michael D. Holland  
Area Manager

Enclosure:  
As stated

cc: J. R. Oprzedek, TS, CH, w/encl.  
J. Eng, BAO, w/o encl.  
C. Polanish, BAO, w/encl.  
T. Sperry, BNL, w/o encl.

M. Davis, BNL, w/encl.  
M. Fallier, BNL, w/o encl.  
E. Murphy, BNL, w/o encl.

III. Potential Environmental Effects : (Attach explanation for each "yes" response, and "no" responses if additional information is available and could be significant in the decision making process.)

- |   |  |               |
|---|--|---------------|
| A. Sensitive Resources: Will the proposed action result in changes and/or disturbances to any of the following resources?     |  | <u>Yes/No</u> |
| 1. Threatened/Endangered Species and/or Critical Habitats   |  | N             |
| 2. Other Protected Species (e.g. Burros, Migratory Birds)   |  | N             |
| 3. Wetlands   |  | N             |
| 4. Archaeological/Historic Resources  |  | Y             |
| 5. Prime, Unique or Important Farmland  |  | N             |
| 6. Non-Attainment Areas   |  | N             |
| 7. Class I Air Quality Control Region   |  | N             |
| 8. Special Sources of Groundwater<br>(e.g. Sole Source Aquifer)   |  | N             |
| 9. Navigable Air Space  |  | N             |
| 10. Coastal Zones   |  | N             |
| 11. Areas w/Special National Designation<br>(e.g. National Forests, Parks, Trails)  |  | N             |
| 12. Floodplain  |  | N             |
| B. Regulated Substances/Activities: Will the proposed action involve any of the following regulated substances or activities? |  | <u>Yes/No</u> |
| 13. Clearing or Excavation (indicate if greater than 5 acres)   |  | Y             |
| 14. Dredge or Fill (under Clean Water Act section 404; indicate if greater than 10 acres)                                     |  | N             |
| 15. Noise (in excess of regulations)  |  | N             |
| 16. Asbestos Removal  |  | N             |
| 17. PCBs  |  | N             |
| 18. Import, Manufacture or Processing of Toxic Substances   |  | N             |
| 19. Chemical Storage/Use  |  | N             |
| 20. Pesticide Use   |  | N             |
| 21. Hazardous, Toxic, or Criteria Pollutant Air Emissions   |  | N             |
| 22. Liquid Effluent   |  | Y             |
| 23. Underground Injection   |  | N             |
| 24. Hazardous Waste   |  | N             |
| 25. Underground Storage Tanks   |  | N             |
| 26. Radioactive (AEA) Mixed Waste   |  | N             |
| 27. Radioactive Waste   |  | N             |
| 28. Radiation Exposures   |  | N             |
| C. Other Relevant Disclosures. Will the proposed action involve the following?  |  | <u>Yes/No</u> |
| 29. A threatened violation of ES&H regulations/permit requirements  |  | N             |
| 30. Siting/Construction/Major Modification of Waste Recovery, or TSD Facilities   |  | N             |
| 31. Disturbance of Pre-existing Contamination   |  | N             |
| 32. New or Modified Federal/State Permits   |  | N             |
| 33. Public controversy<br>(e.g. Environmental Justice Executive Order 12898 consideration and other related public issues.)   |  | N             |
| 34. Action/involvement of Another Federal Agency<br>(e.g. license, funding, approval)   |  | N             |
| 35. Action of a State Agency in a State with NEPA-type law.<br>(Does the State Environmental Quality Review Act Apply?)       |  | N             |
| 36. Public Utilities/Services   |  | N             |
| 37. Depletion of a Non-Renewable Resource   |  | N             |

IV. Section D Determination: Is the project/activity appropriate for a determination by the Group Manager under Subpart D of the DOE NEPA Regulations for compliance with NEPA?

Yes

Indicate the recommendation and specific class of action from Appendix A-D to Subpart D (10 CFR 1021):

CX

B1.13 Construction/acquisition/relocation of onsite pathways, short access roads/railroads

And CX

B1.15 Siting/construction/operation of support buildings/support structures

DOE Recommendation:

BAO NEPA Coordinator: Caroline Polanish

Signature: *Caroline Polanish*

Date: 5/16/03

LGL-GL: Irene P. Atney

Signature: *Irene P. Atney*

Date: 5/20/03

Group Manager Subpart D CX Determination and Approval:

The preceding pages are a record of documentation required under DOE Final NEPA Regulation, 10 CFR Part 1021.400, to establish that an action may be categorically excluded from further NEPA review. I have determined that the proposed action meets the requirements for the Categorical Exclusion referenced above. Therefore, by my signature below, I have determined that the proposed action may be categorically excluded from further NEPA review and documentation.

Acting BAO Area Manager: Michael D. Holland

Signature: *M. Holland*

Date: 5/28/03

Section V.: Additional Information

A4 Archaeological/Historic Resources

Although it is not part of the initial project, construction of these housing units would likely lead to the future phase-out and demolition of surrounding structures utilized for housing. These structures are all barracks style structures that have been modified over time during the Laboratory history to serve as apartment facilities for visiting scientists and other relocated employees. Should future occupancy rates or economic issues involving the upkeep of these older facilities become an issue, some structures could be demolished in the future. Prior to any demolition proceedings an evaluation in accordance with the National Historic Preservation Act to determine historic significance prior to removal would be completed as well as a separate NEPA evaluation.

B13 Clearing or Excavation

Construction of the proposed apartment facilities and recreation center would result in the conversion of approximately 5.5 acres of maintained lawn area to erected apartment units (3 acres) and associated roadways and parking (2.5 acres). In addition, during the construction phase of operation, temporary excavation would be conducted to relocate or extend utilities to provide all services to the new structures.

The disturbance of the area would be minimized by excavating only those areas necessary for construction activities. Excavated soil would be stockpiled for reuse in final site grading and/or use in other on-site areas per established protocols. Standard erosion controls, such as silt fences or hay bales would be employed during excavation. Impacted lands would be regraded and seeded to return disturbed areas to pre-project conditions. The current utility infrastructure has the necessary capacities to serve the new complex.

B22 Liquid Effluent

Established practices for connecting to existing water and sewer lines would be employed. The usage of the existing utility infrastructure in the apartment area would not change, as the occupancy of the new apartments would not increase the number of people housed in that area. As the new apartments are brought into service the existing dwellings would be taken out of service

The final site contours would be similar to the existing site. Storm water runoff from this area does not flow into any permitted recharge basin(s) or wetland areas. Implementation of the proposed action would not have any significant effect on storm water related issues.

**TABLE 13**  
**BROOKHAVEN NATIONAL LABORATORY - Environmental Restoration Division**  
 Preliminary Assessment / Site Inspection - 1997 Facility Review

PARAMETER	TAGM <sup>1</sup>	EASTERN USA1	Soil Sample - Metals Analysis									
			197 GP01	197 GP02	904 GP01	904 GP02	911 GP01	911 GP02	960 GP02	960 GP02	FMCGP03	
Arsenic	7.5 or SB	3-12	2.4'	10-12'	2.4'	2.4'	2.4'	2.5-4.5'	4.5-6.5'	0.5-4'	FMCGP03	
Barium	300 or SB	15-600	0.45 B	0.32 B	1.7	1.2	0.25 U	0.64 B	0.95 B	0.85 B	4-6'	
Cadmium	1 or SB	0.1-1	NA	NA	17.1 B	11.2 B	NA	NA	NA	NA	0.85 B	
Chromium	10 or SB	1.5-40	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.12 U	NA	
Copper	25 or SB	1-50	3.3	3.5	6.6	4.9	1.3	5.6	3.9	3.1	3.1	
Lead	SB	4-61	2.1 B	6.5	15.6	5.6	1.1 B	2.8	2.1	1.5 B	2.4	
Manganese	SB	50-5,000	2.6	3.4	4.9	2.6	0.87	1.6	2.1	2.4	2.4	
Nickel	13 or SB	0.5-25	37.4	36.1	79.5	127	23.0	54.4	54.4	32.6	32.6	
Selenium	2 or SB	0.1-3.9	8.0	39.2	4.7	0.34 U	NA	93.1	13.2	2.1 B	2.1 B	
Silver	SB	NS	NA	NA	0.36 U	0.21 B	NA	NA	NA	NA	NA	
Zinc	20 or SB	9-50	0.27 B	0.06 U	0.19 B	0.21 B	0.23 B	0.23 B	0.06 U	0.21 U	0.21 U	
Mercury	0.1	0.001-0.2	6.4	3.4	37.3	10.3	3.2	7.9	6.0	9.9	0.03 B	
			NA	NA	NA	NA	NA	NA	NA	NA	0.03 B	

PARAMETER	TAGM <sup>1</sup>	EASTERN USA1	Soil Sample - Metals Analysis									
			FMCGP06	FMCGP08	FMCGP11	FMCGP12	FMCGP13	FMCGP14	FMCGP15			
Arsenic	7.5 or SB	3-12	4-6'	4-6'	4-6'	4-8'	6-10'	6-10'	8-10'	4-6'	FMCGP15	
Barium	300 or SB	15-600	1.00 B	0.29 U	1.6	0.61 B	0.88 B	0.88 B	0.88 B	1.6	1.6	
Cadmium	1 or SB	0.1-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Chromium	10 or SB	1.5-40	0.12 U	0.12 U	0.12 U	0.12 U	0.13 B	0.13 B	0.11 U	0.12 U	0.12 U	
Copper	25 or SB	1-50	1.7	1.7	2.6	2.5	3.1	3.1	1.6	4.7	4.7	
Lead	SB	4-61	1.6 B	1.1 B	2.3 B	1.7 B	1.8 B	1.8 B	1.0 B	2.4 B	2.4 B	
Manganese	SB	50-5,000	1.1	0.83	2.7	1.2	4.9	29.4	2.7	3.4	3.4	
Nickel	13 or SB	0.5-25	40.7	22.0	36.7	35.1	1.5 B	28.2	75.3	75.3	75.3	
Selenium	2 or SB	0.1-3.9	1.2 B	0.80 B	2.1 B	1.9 B	NA	NA	1.8 B	3.4 B	3.4 B	
Silver	SB	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Zinc	20 or SB	9-50	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.20 U	0.21 U	0.21 U	
Mercury	0.1	0.001-0.2	3.6	2.0	5.7	3.2	18.7	8.8	7.4	7.4	7.4	
			0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.03 B	0.03 B	

**Note:**  
 Values are reported in concentrations of ug/kg.  
 ' = NYSDEC Technical & Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives & Cleanup Levels, HWR94-4046 1/24/94 (TAGM)  
 SB = Site background.  
 NA = Not analyzed.  
 U = The analyte was analyzed for but not detected, less than the Instrument Detection Level.  
 B = Reported value is less than the Contract Requirement.  
 J = The reported value is an estimated concentration.  
**Bold exceeds TAGM.**  
 For additional qualifiers, refer to Table 2.

**TABLE 14A**  
**BROOKHAVEN NATIONAL LABORATORY - Environmental Restoration Division**  
 Preliminary Assessment / Site Inspection - 1997 Facility Review

**Soil Sample - Radiological Analysis**

PARAMETERS	Standard	FMCGP03 4-6			FMCGP06 4-6			FMCGP08 4-6			FMCGP11 4-6		
		Activity	Err	DetLim	Lab Qual	Activity	Err	DetLim	Lab Qual	Activity	Err	DetLim	Lab Qual
Americium-241	NS	-0.0159	0.0457	0.0877	UJ-K	-0.0159	0.0457	0.0877	UJ-K	-0.0027	0.0613	0.0988	UJ-K
Beryllium-7	NS	-0.0488	0.0904	0.1828	U	-0.0488	0.0904	0.1828	U	-0.004	0.1072	0.1953	U
Cesium-134	NS	-0.0041	0.0133	0.0208	UJ-K	-0.0041	0.0133	0.0208	UJ-K	-0.0107	0.0153	0.0221	UJ-K
Cesium-137	67**	0.0015	0.0143	0.0231	UJ-K	0.0015	0.0143	0.0231	UJ-K	0.0324	0.022	0.0237	JK
Cobalt-57	NS	0.0052	0.0082	0.0141	UJ-K	0.0052	0.0082	0.0141	UJ-K	0.0045	0.0115	0.0147	UJ-K
Cobalt-60	3.356**	-0.0037	0.0121	0.0219	UJ-K	-0.0037	0.0121	0.0219	UJ-K	-0.0011	0.0079	0.0147	UJ-K
Europium-152	NS	-0.0016	0.032	0.0562	UJ-K	-0.0016	0.032	0.0562	UJ-K	0.0006	0.0151	0.0274	UJ-K
Europium-154	NS	-0.0009	0.0386	0.0679	UJ-K	-0.0009	0.0386	0.0679	UJ-K	-0.0459	0.0386	0.0627	UJ-K
Europium-155	NS	0.0523	0.0536	0.0598	UJ-K	0.0523	0.0536	0.0598	UJ-K	0.0183	0.0412	0.0779	UJ-K
Manganese-54	NS	-0.0063	0.0127	0.0217	UJ-K	-0.0063	0.0127	0.0217	UJ-K	0.0243	0.034	0.0655	UJ-K
Sodium-22	NS	-0.0003	0.0131	0.0242	UJ-K	-0.0003	0.0131	0.0242	UJ-K	0.0154	0.0127	0.0237	UJ-K
Vanadium-48	NS	0.0175	0.0165	0.0343	UJ-K	0.0175	0.0165	0.0343	UJ-K	0.0065	0.0147	0.0278	UJ-K
Zinc-65	NS	-0.0581	0.0336	0.0481	U	-0.0581	0.0336	0.0481	U	0.0063	0.0196	0.0369	UJ-K
											0.0322	0.0518	U

PARAMETERS	Standard	FMCGP12 4-8			FMCGP13 6-10			FMCGP14 8-10			FMCGP15 4-6		
		Activity	Err	DetLim	Lab Qual	Activity	Err	DetLim	Lab Qual	Activity	Err	DetLim	Lab Qual
Americium-241	NS	0.0209	0.0608	0.0897	UJ-K	0.0034	0.0144	0.0254	UJ-K	0.0014	0.0298	0.0572	UJ-K
Beryllium-7	NS	-0.0451	0.0777	0.1303	U	-0.0485	0.0995	0.1779	U	0.0393	0.0933	0.1664	U
Cesium-134	NS	-0.0189	0.0102	0.0141	UJ-K	-0.0025	0.0094	0.0168	UJ-K	-0.0047	0.0119	0.018	UJ-K
Cesium-137	67**	0.0001	0.0253	0.0182	UJ-K	0.7636	0.1057	0.021	UJ-K	0.1824	0.0307	0.0178	UJ-K
Cobalt-57	NS	-0.002	0.0063	0.0119	UJ-K	0.0021	0.0062	0.0117	UJ-K	0.0024	0.0078	0.0143	UJ-K
Cobalt-60	3.356**	-0.003	0.0106	0.0182	UJ-K	0.0073	0.0082	0.0172	UJ-K	-0.0081	0.0105	0.0171	UJ-K
Europium-152	NS	-0.0238	0.0271	0.0457	UJ-K	-0.0094	0.0291	0.0499	UJ-K	-0.0055	0.0293	0.052	UJ-K
Europium-154	NS	0.0184	0.0257	0.0497	UJ-K	0.0019	0.0316	0.0588	UJ-K	0.0209	0.0315	0.0594	UJ-K
Europium-155	NS	0.0077	0.027	0.0521	UJ-K	0.0004	0.0244	0.0458	UJ-K	0.0351	0.0443	0.0581	UJ-K
Manganese-54	NS	0.0033	0.0093	0.0173	UJ-K	0.012	0.0159	0.0161	UJ-K	0.0048	0.0141	0.0192	UJ-K
Sodium-22	NS	0.0066	0.0092	0.0178	UJ-K	0.0006	0.0113	0.021	UJ-K	0.0075	0.0113	0.0212	UJ-K
Vanadium-48	NS	0.004	0.0135	0.0253	UJ-K	0.0082	0.0162	0.0303	UJ-K	0	0.0159	0.0289	UJ-K
Zinc-65	NS	0.001	0.0185	0.0296	U	-0.0227	0.0247	0.0419	U	0.0195	0.0275	0.0454	U

Notes:  
 Activities reported in pCi/g.  
 \* = Cleanup levels and site background levels calculated by CDM Federal Programs.  
 J = Entered if reported activity is an estimated value  
 U = Entered if the analyte was analyzed for but not detected less than the Instrument Detection Limit.  
 NA = Not analyzed.  
 NS = No standard available.  
 Shading indicates value exceeded the standard.  
 For additional qualifier symbols, please refer to the qualifier data sheet.

**TABLE 12**  
**BROOKHAVEN NATIONAL LABORATORY - Environmental Restoration Division**  
 Preliminary Assessment / Site Inspection - 1997 Facility Review

**Soil Sample - PCB Analysis**

PESTICIDE	TAGM <sup>1</sup>	206GP03		206GP04		206GP06		FMCGP07N		FMCGP07S		FMCGP16E		FMCGP16	
		4-8	6-8	6-8	6-8	6-8	6-8	0-4	0-4	0-4	0-4	0-4	0-4	0-4	0-4
alpha-BHC	110	0.66 U	0.66 U	0.66 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	200	0.66 U	0.66 U	0.66 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	300	0.66 U	0.66 U	0.66 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	60	0.66 U	0.66 U	0.66 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	100	0.66 U	0.66 U	0.66 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	41	0.66 U	0.66 U	0.66 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	200	0.66 U	0.66 U	0.66 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	900	0.66 U	0.66 U	0.66 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	44	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	2,100	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	100	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	900	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDD	2,900	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1,000	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2,100	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	NA	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	10,000	6.6 U	6.6 U	6.6 U	6.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin aldehyde	NS	1.3 U	1.3 U	1.3 U	1.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toxaphene	NS	1.3 U	1.3 U	1.3 U	1.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1016	10,000	33.2 U	32.9 UJ-C	32.9 UJ-C	32.7 U	35 U	35 U	36 U	36 U	36 U	36 U	36 U	36 U	36 U	38 U
Aroclor-1221	10,000	3.3 U	3.3 UR-C	3.3 UR-C	3.3 U	72 U	72 U	73 U	73 U	74 U	74 U	74 U	74 U	74 U	78 U
Aroclor-1232	10,000	3.3 U	3.3 UR-C	3.3 UR-C	3.3 U	35 U	35 U	36 U	36 U	36 U	36 U	36 U	36 U	36 U	38 U
Aroclor-1242	10,000	3.3 U	3.3 UR-C	3.3 UR-C	3.3 U	35 U	35 U	36 U	36 U	36 U	36 U	36 U	36 U	36 U	38 U
Aroclor-1248	10,000	3.3 U	3.3 UR-C	3.3 UR-C	3.3 U	35 U	35 U	36 U	36 U	36 U	36 U	36 U	36 U	36 U	38 U
Aroclor-1254	10,000	3.3 U	3.3 UR-C	3.3 UR-C	3.3 U	35 U	35 U	36 U	36 U	36 U	36 U	36 U	36 U	36 U	38 U
Aroclor-1260	10,000	3.3 U	3.3 UR-C	3.3 UR-C	3.3 U	35 U	35 U	36 U	36 U	36 U	36 U	36 U	36 U	36 U	38 U
Chlordane (tech.)	540	8.3 U	8.2 U	8.2 U	8.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

**Notes:**

Values are reported in concentrations of ug/kg.

<sup>1</sup> = NYSDEC Technical & Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives & Cleanup Levels, HWR94-4046 1/24/94 (TAG)

NS= no standard or guidance value.

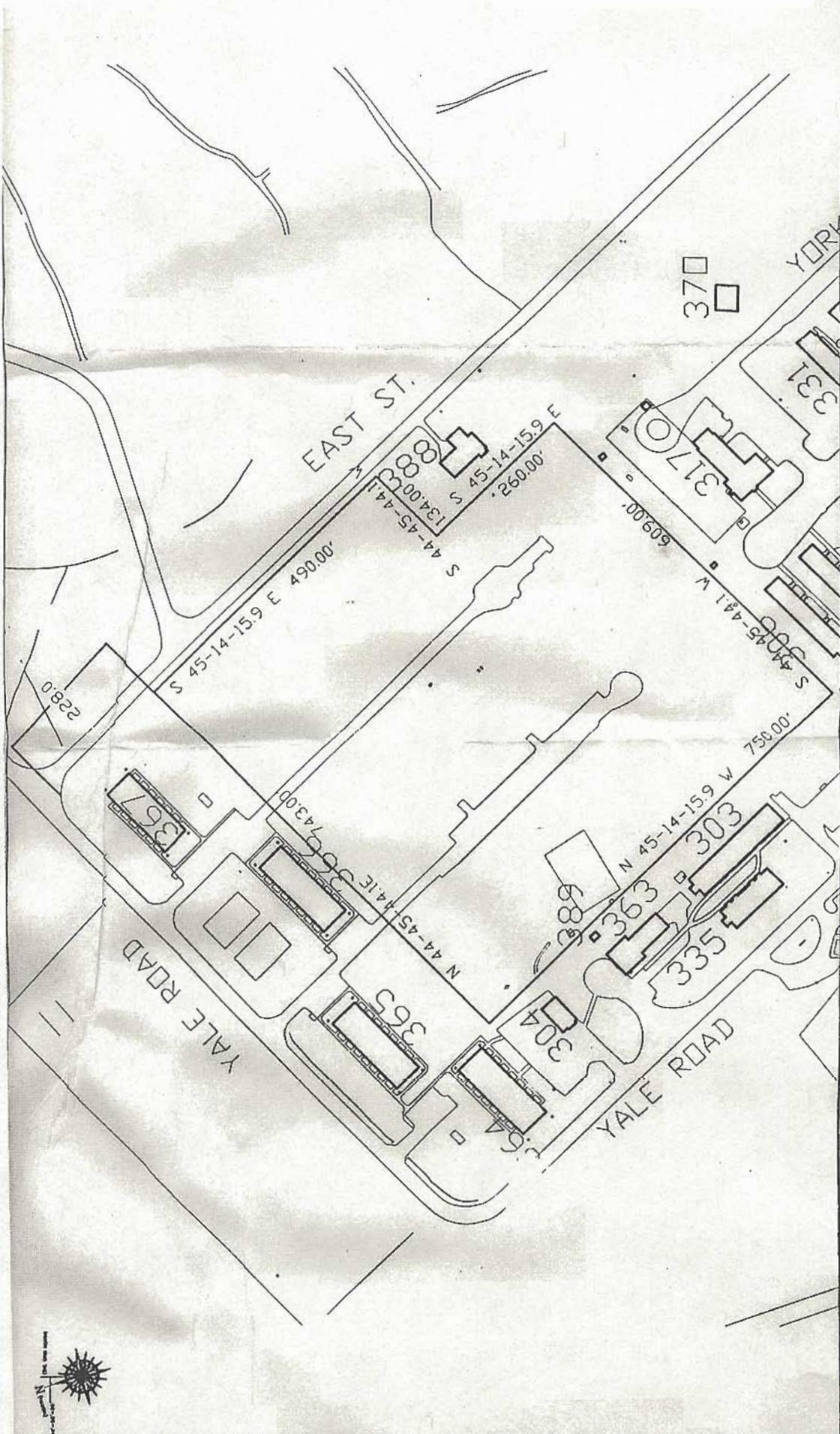
NA = indicates that the compound was not analyzed for.

U = the analyte was analyzed for but not detected, less than the instrument detection limit.

**Bold exceeds standard or guidance value.**

For additional qualifier symbols, please refer to Table 2, Data Qualifiers.

B = Analyte is found in the associated blank as well as in the sample.



<b>BROOKHAVEN</b> NATIONAL LABORATORY <small>UNDER CONTRACT WITH          UNITED STATES DEPARTMENT OF ENERGY          PLANT ENGINEERING DIVISION          UPTON, NEW YORK 11973</small>	JOB TITLE	HOUSING RECONSTRUCTION PROJECT	ILR, GPP, LNI, ITEM	DATE	8/7/02	ACCT. NO.	SHEET 1 OF 1
	DWG. TITLE	EXHIBIT B SITE PLAN	SCALE	1" = 150'	DWN. BY	JAS	REV'D BY
			ESHQ RISK LEVEL	APP'D. BY		BLDG. NO.	SITE
			PATH	J./PROPHOUSING/10478/PROPLINES			
							2001-M1

Figure 1

Figure 2

