

EXPLORING EARTH'S MYSTERIES  
...PROTECTING ITS FUTURE

# **Brookhaven National Laboratory Shotgun Range**

## **Facility Environmental Monitoring Report Calendar Year 2000**



April 10, 2001

Prepared by:  
D. Paquette  
Environmental Services Division

**GW74ER.01**

**Brookhaven National Laboratory  
Shotgun Range  
Facility Environmental Monitoring Report  
Calendar Year 2000**

*Summary of Results: Analysis of groundwater samples collected at the Shotgun Range during CY 2000 indicates that range operations have not impacted groundwater quality. Groundwater analyses indicate that all metals (including lead) are at concentrations that are consistent with established background levels for Long Island.*

## **Background**

The BNL shotgun range is utilized for (clay) trap and skeet target shooting by the Brookhaven Employees Recreation Association (BERA). The shotgun range is located in an isolated, wooded area north of the new Waste Management Facility. The range was established by the BERA in 1974. Clay targets are thrown south from the trap house into an open field that is approximately 205 feet east-west by 410 feet north-south (Figure 1). Although most of the shot falls within the cleared range, shooting from several of the trap line positions results in the deposition of some of the shot into the nearby wooded areas.

From 1974 until 2000, the types of shotgun shells used at the facility typically contained lead pellet. It is estimated that as many as 30,000 shotgun rounds per year have been used at the range (BNL, 1992). At an average of 1.125 oz. per round, as much as 2,100 pounds of lead may have been deposited on the surface of the range annually. To prevent additional deposition of lead, in early 2000 BNL implemented a rule that allows only steel shot to be used at the range.

## **Environmental Monitoring Program**

In accordance with DOE Order 5400.1 (Environmental Protection), BNL established a groundwater monitoring program at Shotgun Range to evaluate potential impacts of range operations on environmental quality. In January 2000, BNL installed two wells (046-02 and 046-03) to improve its ability to monitor groundwater quality directly downgradient of the range. The groundwater monitoring program for the Shotgun Range is described in the BNL Environmental Monitoring Plan (Daum *et al.* 2000; BNL, 2001).

## **Monitoring Results**

During CY 2000, groundwater monitoring wells were sampled in May and September. All water quality and metals concentrations were below the applicable New York State

Ambient Water Quality Standards (NYS AWQS) and were consistent with established background levels for Long Island (Tables 1 and 2).

## **Future Monitoring Actions**

The following actions are recommended for the CY 2001 monitoring period:

- Reduce the groundwater monitoring program from semiannual to an annual schedule, and test only for metals.

## **References**

BNL, 2001. Brookhaven National Laboratory Environmental Monitoring Plan, CY 2001 Update (January 2001). BNL-52584 Update.

Daum, M., Dorsch, W., Fry, J., Green, T., Lee, R., Naidu, J., Paquette, D., Scarpitta, S., and Schroeder, G., 2000. Brookhaven National Laboratory, Environmental Monitoring Plan 2000 (March 31, 2000).

**BNL Facility Environmental Monitoring Report  
Shotgun Range  
Groundwater Monitoring Program  
Water Quality Results for CY 2000**

**Table 1**

<b>Well</b>	<b>Sample Period</b>	<b>Chlorides (mg/L)</b>	<b>Sulfates (mg/L)</b>	<b>Nitrate (mg/L)</b>
046-01 (a)	May	6.3	8.5	<1.0
	September	9.5	9.4	<1.0
046-02	May	6.3	8.8	<1.0
	September	5.5	8.0	1.1
046-03	May	4.5	9.4	<1.0
	September	5.0	9.7	<1.0
Typical MDL		4.0	4.0	1.0
NYSAWQS		250	250	10

(a): Well 046-01 is located immediately upgradient of the shotgun range.

MDL: Minimum Detection Limit

**BNL Facility Environmental Report  
Shotgun Range  
Groundwater Monitoring Program  
Metals Analytical Results for CY 2000  
Table 2**

Well	Sample Period	Ag (mg/L)	Al (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Fe (mg/L)	Hg (mg/L)	Mn (mg/L)	Na (mg/L)	Pb (mg/L)	Zn (mg/L)
046-01 (a)	May	<0.001	0.010	<0.001	0.001	<0.002	<0.075	<0.0002	0.009	5.0	<0.0013	0.012
	September	<0.001	0.007	<0.001	<0.001	<0.002	<0.075	<0.0002	0.009	6.2	<0.0013	0.008
046-02	May	<0.001	0.019	<0.001	0.001	0.002	<0.075	0.0003	0.006	4.9	<0.0013	0.013
	September	<0.001	0.004	<0.001	<0.001	<0.002	<0.075	0.0002	0.007	3.3	<0.0013	<0.004
046-03	May	<0.001	0.024	<0.001	<0.001	<0.002	<0.075	<0.0002	0.008	3.8	<0.0013	0.004
	September	<0.001	0.052	<0.001	<0.001	<0.002	<0.075	0.0003	0.006	2.8	<0.0013	<0.004
Typical MDL		0.001	0.002	0.001	0.001	0.002	0.075	0.0002	0.002	1.0	0.001	0.004
NYSAWQS		0.05	0.1	0.01	0.05	0.2	0.3	0.0007	0.3	20	0.025	0.3

(a): Well 046-01 is located immediately upgradient of the shotgun range.

Note: Primary potential contaminants shown. Other metals were analyzed for – see database for complete data set

MDL: Minimum Detection Limit

NA: Not analyzed for.

