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# **Brookhaven National Laboratory Biology Greenhouse Area**

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



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**Brookhaven National Laboratory  
Biology Department Greenhouse Area  
Facility Environmental Monitoring Report  
Calendar Year 2000**

*Summary of Results: Analysis of groundwater samples collected near the Biology Department's greenhouse area during CY 2000 indicates that greenhouse operations have not impacted groundwater quality. No pesticides were detected, and metals and nitrate levels are at concentrations that are consistent with established background levels.*

## **Background**

The Biology Department facility (Building 463) includes 11 greenhouses where various types of plants are grown for biological research. Eight of the greenhouses have dirt floors and three have concrete floors.

Pesticides and fertilizers have been routinely used in the greenhouses. Records also indicate that copper sulfate was applied to the dirt floors on an annual basis until the mid-1980's. During the Facility Review Project, the pesticide Endosulphan II was detected in soil samples collected from a dry well located within Greenhouse 10.

## **Environmental Monitoring Program**

In accordance with DOE Order 5400.1, BNL established a groundwater monitoring program at the greenhouse area to evaluate potential impacts to environmental quality. The monitoring program for the greenhouse area is described in the BNL Environmental Monitoring Plan (Daum *et al.* 2000; BNL, 2001).

## **Monitoring Results**

### **Groundwater**

Two wells are used to monitor groundwater quality in the greenhouse area (Figure 1). The wells were sampled in May and September 2000, and tested for pesticides, metals, and anions. Groundwater monitoring results for CY 2000 indicate that current greenhouse operations are not impacting groundwater quality. Pesticides were not detected in any of the samples, and all water quality and most metals concentrations were below the applicable New York State Ambient Water Quality Standards (NYS AWQS) (see Tables

1 and 2). Sodium was detected at concentrations slightly above the NYS AWQS of 20 mg/L in the samples collected from both wells in May (Table 3). The detection of low levels of sodium is not uncommon in wells located within the developed area of the site, and could be related to road salting operations.

## **Future Monitoring Actions**

Starting in CY 2001, the frequency of groundwater sampling will be reduced from semiannual to annual. Samples will continue to be analyzed for pesticides, metals, and anions.

## **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).

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Pesticides Results for CY 2000**

**Table 1**

| <b>Well</b> | <b>Sample Period</b> | <b>Endosulfan II (see Note 1)<br/>(µg/L)</b> |
|-------------|----------------------|--|
| 084-36      | May                  | <0.1   |
|             | September            | <0.1   |
| 084-37      | May                  | <0.1   |
|             | September            | <0.1   |
| Typical MDL |                      | 0.1  |
| NYSAWQS     |                      | 50 (Note 2)                                  |

MDL: Minimum Detection Limit

Note 1: Endosulfan II was the primary contaminant of concern based upon the findings of the Facility Review Project. All other pesticides analyzed for using EPA Method 608 were non-detectable.

Note 2: Specific standard for this compound has not been established. Default standard is 50 µg/L.

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Water Quality Results for CY 2000**

**Table 2**

| <b>Well</b> | <b>Sample Period</b> | <b>Chlorides<br/>(mg/L)</b> | <b>Sulfates<br/>(mg/L)</b> | <b>Nitrate<br/>(mg/L)</b> |
|-------------|----------------------|-----------------------------|----------------------------|---------------------------|
| 084-36      | May                  | 31.8                        | 19.2                       | 2.7                       |
|             | September            | 23.2                        | 19.1                       | 2.4                       |
| 084-37      | May                  | 21.7                        | 18.1                       | 2.8                       |
|             | September            | 16.8                        | 16.7                       | 2.6                       |
| Typical MDL |                      | 4.0                         | 4.0                        | 1.0                       |
| NYSAWQS     |                      | 250                         | 250                        | 10                        |

MDL: Minimum Detection Limit

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 Metals Results for CY 2000  
 Table 3**

| 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) |
|-------------|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 084-36      | May           | <0.001    | 0.007     | <0.001    | 0.002     | 0.003     | <0.075    | <0.0002   | <0.002    | 29.6      | <0.0013   | <0.004    |
|             | September     | <0.001    | 0.003     | <0.001    | <0.001    | <0.001    | <0.075    | <0.0002   | <0.002    | 16.2      | <0.0013   | 0.009     |
| 084-37      | May           | <0.001    | 0.007     | <0.001    | 0.002     | 0.002     | <0.075    | <0.0002   | <0.002    | 23.7      | <0.0013   | <0.004    |
|             | September     | <0.001    | <0.002    | <0.001    | <0.001    | <0.001    | <0.075    | <0.0002   | <0.002    | 15.9      | <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       |

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

MDL: Minimum Detection Limit

NA: Not analyzed for.

