



State of New Jersey

Department of Environmental Protection

James E. McGreevey  
Governor

Bradley M. Campbell  
Commissioner

Richard K. Smith  
Viacom, Inc.  
11 Stanwix Street, Room 383  
Pittsburgh, PA 15222

OCT 1 2002

Re: ISRA Case Name: North American Phillips Lighting Company  
Responsible Party/Property Owner: Viacom (formerly CBS Corporation / Westinghouse Electric)  
1 Westinghouse Plaza  
Bloomfield Township, Essex County  
ISRA Case #E86070  
Progress Report Groundwater Remedial Investigation Phase IIA Activities dated April 26, 2002  
Transmittal – Electronic Data for Groundwater Phase IIA Activities dated May 22, 2002  
QA/QC for Job 8850 from Phase IIA Activities dated May 31, 2002  
Transmittal – Dose Assessment Report to NRC dated July 25, 2002

Dear Mr. Smith:

The New Jersey Department of Environmental Protection (NJDEP) has reviewed the above referenced submittals. The NJDEP also is in receipt of the monitoring well certification forms, for the seven most recently installed wells, submitted on March 19, 2002. The NJDEP's comments regarding the above referenced documents are detailed below.

The Phase IIA activities included: aquifer characteristic testing, monitoring well installation, monitoring well abandonment, ground water sampling and analysis, and ground water level measurements. The objective of the Phase IIA activities was to obtain hydrogeological data for the three bedrock ground water units at the site, provide additional horizontal and vertical delineation of the impacted ground water at the site, and select monitoring well locations and analytes to be analyzed during future sampling events.

#### Field Activities

1. Aquifer Characteristic Testing: Slug tests were performed at a majority of the site monitoring wells.
2. Monitoring Well Installation: Seven wells were installed. Five background wells were set in the three bedrock ground water units: shallow (0-45') wells MW-4A and MW-9A; intermediate (45-145') wells MW-15A and MW-15B; and deep (145-355') well P-9. Well P-1D was installed to vertically delineate ground water contamination in the deep zone. The screen in P-1D was set from 422-432 feet below grade. Additionally, a replacement well for PW-3 (PW-3R) was installed. Each of the wells was constructed using 2" PVC casing with a 10 foot screened interval.
3. Monitoring Well Abandonment: Monitoring well GTW-1, recovery well PW-3 and the Building 9 elevator shaft were abandoned by backfilling with grout.
4. Ground Water Sampling and Analysis: Ground water samples were collected from 31 wells and analyzed for VOCs, five metals, and radiological parameters. Not all wells were analyzed for all parameters. For existing wells with screen lengths exceeding 10 feet, multiple depth ground water samples were collected within the well screen. The samples were collected using either the low flow or passive diffusion bag (PDB) technique.

5. Water Level Measurements: Synoptic water level measurements were obtained at each of the site's 56 wells on January 24, 2002 and February 18, 2002. The ground water recovery system was turned off on August 30, 2001 and the water levels are representative of static ground water conditions.

### Summary of Results from Field Activities

1. Water Level Measurements: Potentiometric maps were constructed for the shallow, intermediate, and deep bedrock ground water zones. Shallow Zone: a ground-water high is near the center of the site beneath Arlington Avenue, with ground water flow southeast and northwest away from the high. Intermediate Zone: ground water flow is to the east (new wells MW-15A and MW-15B installed off-site to the west, are therefore hydraulically up-gradient intermediate zone wells). Deep Zone: ground water flow is to the east and southeast (new well P-9, installed off-site to the west, is therefore hydraulically an up-gradient deep well). A downward vertical-gradient exists between the shallow and intermediate zones and also between most of the intermediate and deep zones (along the southern portion of the site there is an upward vertical-gradient between the intermediate and deep zones). New well P-1D is screened 70-110 feet deeper than the wells in the deep zone, but it had a higher ground water elevation in February 2002 (but not in January 2002). This indicates an upward vertical-gradient between well P-1D and the deep zone at this location of the site during February 2002.

2. Aquifer Characteristic Test Data: The range of slug test hydraulic conductivity values for each bedrock zone (in feet/day) is: Shallow 3.597-96.26; Intermediate 0.000187-33.226; and Deep 0.179-25.943. The values are variable indicating the fractured bedrock is heterogeneous.

3. Sample Interval Selection: Multiple samples were collected in wells with screen intervals exceeding 10 feet in length. Future sample intervals were selected based on the highest VOC, metals, and radiological concentrations in each well for the Phase IIA sampling event.

4. Groundwater Analytical Results: The following four tables show wells with the highest contaminant levels in each zone. Values are in ppb unless otherwise stated and the Class II-A Ground Water Quality Criteria (GWQC) are in parentheses:

Perched Zone	HOW-2	HOW-3
Arsenic (8)	401	
Cadmium (4)	14.9	
Chromium (100)		2570
Lead (10)		210
Mercury (2)		10.5
Gross Alpha (15 pCi/L)		162 ± 88.4

Shallow Zone	CC-4S	MW-1S	MW-11	MW-9A	MW-13
Benzene (1)	4.6				
Tetrachloroethene (1)				5	
Trichloroethene (1)		18.6			
Chloroform (6)				8	
1,1-DCE (2)		23.9			
Vinyl Chloride (5)		8			
Uranium (30 pCi/L)					320 ± 10.3
Gross Alpha (15 pCi/L)			175 ± 90.6		

Intermediate Zone	MW-6S	PW-3R	BW-1SR	PW-1	MW-2D	CC-3D
Benzene (1)					1.2	
Carbon Tetrachloride (2)		8.9				
Trichloroethene (1)		1220				
Chloroform (6)	25					
1,1-DCA (50)	846					
1,1-DCE (2)	187					
Tetrachloroethene (1)		4.8				
1,2-DCA (2)	6.9					
1,1,1-TCA (30)	633					
Vinyl Chloride (5)	423					
Cis-1,2-DCE (70)	177					
Arsenic (8)				11.3		
Radium-228 (5 pCi/L)			5.25 ± 1.8			
Gross Alpha (15 pCi/L)						28.5 ± 18.3

Deep Zone	P-3R	P-8	P-2R	P-1D*
Trichloroethene (1)	890			3420
Tetrachloroethene (1)				10.4
Chloroform (6)				8.3
1,1-DCE (2)	20.3			64
Cis-1,2-DCE (70)	226			271
Vinyl Chloride				126
Arsenic (8)		11		
Lead (10)		84.4		
Uranium (30 pCi/L)			56 ± 1.81	
Gross Alpha (15 pCi/L)		41 ± 23.2		

Note: \* P-1D is the deepest well at this facility at 432 feet and was installed to vertically delineate the deep zone

**5. Shallow Bedrock Background Wells:** Two new monitoring wells (MW-4A and MW-9A) were installed off-site to the east to determine up-gradient ground water conditions in the shallow bedrock unit. Well MW-4A was non-detect however MW-9A had three VOCs above the GWQC: chloroform at 8 ppb (GWQC is 6 ppb), PCE at 5 ppb (GWQC is 1 ppb), and TCE at 5.4 ppb (GWQC is 1 ppb). Water level elevations indicate that the hydraulic gradient in the shallow bedrock ground water on the eastern portion of the site (where MW-4A and MW-9A are located) is eastward. Wells MW-4A and MW-9A are down-gradient wells and not background wells.

In the second paragraph on page 19 of the above referenced report it is stated that "*Shallow Wells CC-3RR, CC-5A and MW-2 indicated radiological activity and uranium concentrations consistent with historical results.*" It shall be noted that wells CC-5A and MW-2 were not sampled during the Phase IIA sampling event.

**6. Intermediate Bedrock Background Wells:** Two new monitoring wells (MW-15A and MW-15B) were installed off-site to the west to determine up-gradient ground water conditions in the intermediate bedrock unit. Both monitoring wells had carbon tetrachloride and TCE above the GWQC of 2 ppb and 1 ppb, respectively (MW-15A had carbon tetrachloride at 4.8 ppb and TCE at 505 ppb; and MW-15B had carbon tetrachloride at 3.3 ppb and TCE at 182 ppb). Water level elevations indicate that the hydraulic gradient in the intermediate bedrock ground water is eastward.

7. Deep Bedrock Background Well: One new monitoring well (P-9) was installed off-site to the west to determine up-gradient ground water conditions in the deep bedrock unit. P-9 contained TCE at 450 ppb, above the GWQC of 1 ppb. Water level measurements indicate the hydraulic gradient in the deep bedrock ground water is eastward.

8. Vertical Delineation Well: Well P-1D was screened below the deep zone for vertical delineation. Six VOCs were found above the GWQC: chloroform at 8.3 ppb (GWQC is 6 ppb); 1,1-DCA at 64 ppb (GWQC is 50 ppb); PCE at 10.4 ppb (GWQC is 1 ppb); TCE at 3,420 (GWQC is 1 ppb); vinyl chloride at 126 ppb (GWQC is 5 ppb); and ~~cis-1,2-DCE~~ at 271 ppb (GWQC is 70 ppb). Water level elevations indicate that there is an upward vertical hydraulic gradient between P-1D and the deep bedrock zone (note this was not the case during the January 2002 sampling event).

### **Viacom's Findings based on the Results of Phase IIA**

Viacom's findings are presented below followed by the NJDEP's response to each of the findings.

1. Horizontal groundwater flow gradient directions are generally consistent with past findings. One exception is that the recently installed wells in the shallow bedrock groundwater zone (MW-4A and MW-9A) have identified the presence and location of a possible groundwater high in the vicinity of Arlington Avenue. It is uncertain what effect the current drought emergency has on these water levels.

NJDEP's Response: NJDEP acknowledges Viacom's findings.

2. Slug testing conducted in site monitoring wells has provided an estimated range of hydraulic conductivity values to be used during future modeling efforts for the three primary bedrock groundwater zones (shallow, intermediate, and deep).

NJDEP's Response: NJDEP was informed that Viacom was re-conducting the slug tests. Viacom shall submit the results to NJDEP with the Phase IIB report.

3. Stratification of VOCs, metals, and radiological parameters is not prevalent, but was observed to occur in some monitoring wells. Intervals for future groundwater samples were selected based on the highest concentrations (of specific parameters) observed in the wells where samples were collected from multiple zones.

NJDEP's Response: NJDEP acknowledges Viacom's findings.

4. Groundwater analytical results for VOCs, metals, and radiological parameters from samples collected at site wells are generally consistent with past results. Several wells show a decrease in metals concentrations, which may be the result of using low-flow purging and sampling techniques allowing more representative groundwater samples to be collected.

NJDEP's Response: NJDEP acknowledges Viacom's findings.

5. Analytical results from samples collected from wells monitoring the shallow bedrock groundwater zone indicate that VOC concentrations were generally lower than previous results while metal concentrations were generally consistent (and possibly somewhat lower) than previous results.

NJDEP's Response: NJDEP acknowledges Viacom's findings.

6. The majority of existing wells sampled display consistent or decreased radiological activities and concentrations. Uranium concentrations have decreased in well MW-11, but increased in MW-13.

NJDEP's Response: NJDEP acknowledges Viacom's findings.

7. Analytical results from samples collected from wells monitoring the intermediate bedrock groundwater zone indicate that impacted groundwater was detected at locations up-gradient from the site (MW-15A and MW-15B). Samples from these monitoring wells indicate that concentrations of TCE and carbon tetrachloride in groundwater entering the site exceed regulatory standards. Concentrations of select metals and radiological parameters from the up-gradient locations do not exceed regulatory standards.

NJDEP's Response: NJDEP acknowledges Viacom's findings and will review the Phase IIB results when submitted. Although it appears the wells are hydraulically up-gradient it has not been proven that the contamination is from an off-site source. Viacom shall demonstrate that the contamination is from an off-site source via tracer tests, additional wells, etc. Viacom shall submit a cross-section(s) depicting the depths and screened intervals of all wells. See NJDEP's comments below regarding Viacom's Phase IIB Activities.

8. Analytical results from water samples collected from wells monitoring the deep bedrock groundwater zone indicate that impacted groundwater was detected at locations up-gradient from the site (monitoring well P-9). The sample from this monitoring well indicates that the concentration of TCE in groundwater entering the site exceeds regulatory standards. Concentrations of select metals and radiological parameters from monitoring well P-9 do not exceed regulatory standards.

NJDEP's Response: NJDEP acknowledges Viacom's findings and will review the Phase IIB results when submitted. See NJDEP's comments below regarding Viacom's Phase IIB Activities.

9. The well with the highest concentrations of uranium in 2000 (MW-11) was analyzed for uranium isotopes. The results indicate that the uranium is a natural form and not a form of processed uranium.

NJDEP's Response: The NJDEP acknowledges Viacom's statement.

10. Analytical results from the sample collected from the monitoring well installed in the first water-bearing zone encountered below the deep bedrock groundwater zone (P-1D) indicate that impacted groundwater is present. Six VOC parameters including chloroform; 1,1-DCE; PCE; TCE; vinyl chloride; and cis-1,2-DCE were detected at concentrations above corresponding regulatory standards. No metals or radiological exceedances were detected in P-1D.

NJDEP's Response: NJDEP acknowledges Viacom's findings and will review the Phase IIB results when submitted. See NJDEP's comments below regarding Viacom's Phase IIB Activities.

#### **Viacom's Proposed Phase IIB Activities and Schedule**

1. Additional water levels will be measured from site wells to confirm groundwater flow directions and hydraulic gradients.

NJDEP's Response: The proposal is conditionally acceptable. Groundwater elevations shall be collected from all wells in all water-bearing zones. A table may be submitted which includes each well's groundwater elevation however an additional table shall be submitted that groups the wells, and their respective groundwater elevation, by water-bearing zone (perched, shallow, intermediate, deep, etc.). Additionally, a table shall be prepared that contains the following data for each well: Well I.D., Ground Elevation, Depth to Top of Screened

Interval, Depth to Bottom of Screened Interval, Depth to Water, Elevation of Screened Interval above mean sea level, Water Bearing Zone, Well Included on Current Contour Map, and Water Table Elevation.

In the future only those wells in each zone shall be on that zone's contour map (i.e. only shallow zone wells shall be on the shallow zone contour map, etc.). The base map may have all wells on it for reference.

2. Groundwater samples will be collected from specified monitoring wells and analyzed for VOCs, select metals, radiological parameters and natural attenuation parameters. VOC samples will be collected from 55 of 56 site wells in the next sampling round. Ground water samples from HOW-1 have not detected VOCs in previous sampling rounds, therefore, VOCs will not be collected from this well.

NJDEP's Response: The proposal is conditionally acceptable. HOW-1 has not had any VOCs above the GWQS in the last three sampling rounds. Viacom's Phase IIB report shall discuss the potential sources of the contaminants detected in off-site monitoring wells MW-15A, MW-15B, and P-9.

3. Based on a review of recent and historical analytical results (since 1995), groundwater samples from several monitoring wells have not detected metals or radiological parameters above appropriate NJDEP regulatory limits. The following 13 wells will not be sampled for metals in future rounds because metals have not been detected in previous rounds: BW-1A, BW-1SR, CC-1R, CC-4R, CC-5A, CC-5SR, MW-1D, MW-2D, MW-2S, MW-14, P-1R, P-2R, P-7. The following 22 wells will not be sampled for radiological parameters in future rounds because they have not been detected in previous rounds: BW-1A, BW-1SR, CC-1D, CC-1R, CC-2D, CC-4D, CC-4S, CC-5A, CC-5DR, CC-5SR, DTW-1R, HOW-1, MW-1D, MW-1S, MW-2D, MW-2S, MW-3D, MW-3S, P-1R, P-4R, PW-1, SVE-A.

NJDEP's Response: The proposal is conditionally acceptable. Regarding metals sampling, although these 13 wells have not had any metal contamination in at least the last two rounds they may need to be sampled in the future.

Regarding radiological sampling, although these 22 wells have not had any radiological contamination in at least the last two rounds they may need to be sampled in the future. Additionally, during the February 2002 sampling event Gross alpha was higher in the 39.5 feet depth interval of MW-11 than in the 29.5 feet depth interval whereas Total Uranium was higher in the 29.5 feet depth interval of MW-11 than in the 39.5 feet depth interval. Both intervals, if they have water, in radiological source area monitoring wells MW-11 and MW-13 shall be sampled for radiological parameters during Phase IIB to confirm the worst case interval. Also, monitoring well CC-2D shall be sampled for radiological parameters since it is the most down-gradient on-site intermediate zone well from the radiological source area.

4. Eighteen newer wells (less than three sampling events since 1995) will be sampled for all parameters; VOCs, metals, and radiological parameters.

NJDEP's Response: The proposal is acceptable.

5. PDB samplers and low-flow sampling procedures will be used to evaluate VOC stratification in monitoring wells, with screen lengths exceeding 10 feet, that were not evaluated during Phase IIA. The analytical results will be used to identify specific zones to be monitored during future sampling events.

NJDEP's Response: The proposal is acceptable.

6. Wells with screens greater than 10 feet of screen not sampled in Phase IIA will have interval samples collected for metals and radiochemistry parameters. Intervals will be sampled using low-flow techniques. After the completion of Phase IIB specific sample intervals will be identified for each well to be monitored during future sampling events. It is understood that the groundwater samples analyzed for VOCs may be collected from a different zone than samples analyzed for metals or radiological parameters.

NJDEP's Response: The proposal is acceptable.

7. Three shallow wells along Arlington Avenue (MW-1S, MW-11, and CC-3RR) will be analyzed for fluoride. Fluoride data will be used in evaluating the possibility of a broken (or leaking) potable water line potentially causing the shallow ground water high under Arlington Avenue.

NJDEP's Response: The proposal is acceptable.

8. Based upon historical and new Phase IIB data, Viacom believes that sufficient information will be available to complete the remedial investigation and delineate the horizontal and vertical extent of impacted groundwater related to the site, identify migration pathways, and evaluate remedial action alternatives. It is understood that additional monitoring wells may be required for delineation at well P-1D. A remedial action workplan will be submitted 45 days after approval of the remedial investigation report. The remedial action work plan will address the deed notice, classification, exception area, and groundwater remedial action, if any. The remedial action work plan will be prepared in accordance with N.J.A.C. 7:26E-6.2.

NJDEP's Response: The proposal is conditionally acceptable. Viacom shall submit a revised project schedule with the Phase IIB report that identifies the dates for addressing the items Viacom detailed above.

### **Radiological Issues Raised in Phase IIA Progress Report**

Page ii of the SC&A report in "Radiological Laboratory Data" stated that "there were no specific detection limits requested." "Required Regulatory Detection Limits" are specified in Table I-9 (page 76725) of EPA's "National Primary Drinking Water Regulations, 40 CFR 9, 141, 142" dated December 7, 2000 (<http://www.epa.gov/safewater/rads/radfr.pdf>). Namely 3 pCi/L for gross alpha, 4 pCi/L for gross beta, and 1 pCi/L for Radium 226 and for Radium 228. Radiological results in this report and in General Engineering's report do not meet these requirements therefore Viacom shall make sure they meet these requirements in all future reports.

See below for the NJDEP's radiological comments on the July 25, 2002 Dose Assessment Report to NRC.

### **Data QA/QC**

The laboratory utilized by Viacom, Accutest Laboratories (NJ Certification No. 12129), is acceptable based on N.J.A.C. 7:26E requirements. The analytical data, VOCs and PPM, are generally acceptable and in conformance with N.J.A.C. 7:26E requirements. Additionally, the electronic data submitted on May 22, 2002 is acceptable as submitted.

### **Dose Assessment Report to NRC dated July 25, 2002**

One conclusion in Chapter 5 states that the total dose assessment is 18.3 mRem/yr., which meets the NRC criteria of 25 mRem/yr. NJDEP radiological criteria for groundwater is not a total dose per year. NJDEP radiological criteria for groundwater mirrors the numerical criteria in EPA's National Primary Drinking Water Regulations; Radionuclides; Final Rule. Namely, concentration limits of: 5 pCi/L of radium 226 and radium 228 combined, 15 pCi/L of gross alpha, 4 millirem per year due to beta particle and photon radioactivity, and 30 ug/L for uranium. Data in Tables 4, 5, 6, and 7 clearly show that NJDEP criteria are not met.

### **General Conditions**

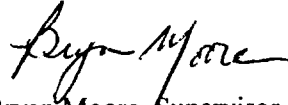
1. Viacom shall perform all actions as outlined in the RIW, and conditioned in this approval. If any change in methods outlined in the RIW is necessary, Viacom shall inform BEECRA in writing prior to implementation.
2. Viacom shall notify the Case Manager at least 14 calendar days prior to implementation of all field activities included in the RIW. If Viacom fails to initiate sampling in accordance with the approved schedule, any request for an extension may be denied.
3. Viacom shall collect and analyze all samples in accordance with the protocol outlined in the most current edition of the NJDEP's "Field Sampling Procedures Manual" and the Technical Requirements for Site Remediation (TRSR), N.J.A.C. 7:26E.
4. Viacom shall submit a project schedule detailing the initiation and completion of all field activities and report submittals. Viacom shall submit all reports or additional workplans in triplicate. Please note that only one copy of the Quality Assurance/Quality Control deliverables is needed. All reports shall follow the requirements of the TRSR, N.J.A.C. 7:26E. Technically and administratively incomplete submissions not prepared pursuant to N.J.A.C. 7:26E may be rejected.
5. If contamination is determined to exist above a level found acceptable by NJDEP, Viacom may prepare and submit either a Remedial Investigation Workplan or a Remedial Action Workplan pursuant to N.J.A.C. 7:26E. If contamination exists on-site, but has not been fully delineated pursuant to N.J.A.C. 7:26E-4, then such delineation shall be completed as a Remedial Investigation which meets the criteria of N.J.A.C. 7:26E.
6. Any remedial action performed, or proposed in a Remedial Action Workplan, shall be in accordance with N.J.S.A. 58:10B-12.
7. Pursuant to N.J.A.C. 7:26E-3.13(c)3v all analytical data shall be presented both as a hard copy and an electronic deliverable using the database format outlined in detail in the current HAZSITE application or appropriate spreadsheet format specified in the NJDEP's electronic data interchange manual.

For further information related to electronic data submissions, please refer to the Site Remediation Program's (SRP's) home page at the following Internet address: <http://www.state.nj.us/dep/srp>. The **Regulations and Guidance** page of this web site has a section dedicated to HazSite which includes downloadable files, an explanation of how to use these files to comply with the NJDEP's requirements, the SRP's Electronic Data Interchange (EDI) manual, and **Guidance for the Submission and Use of Data In GIS Compatible Formats Pursuant to "Technical Requirements for Site Remediation"**.



**Viacom shall submit a revised project schedule, detailing the dates for well installation, well sampling, report submission, etc., within 30 days of receipt of this letter.** If you have any questions regarding this letter, please contact the Case Manager, Stephen Myers, at 609-633-1392 or [smyers@dep.state.nj.us](mailto:smyers@dep.state.nj.us).

Sincerely,



Bryan Moore, Supervisor  
Bureau of Environmental Evaluation,  
Cleanup and Responsibility Assessment

c: Health Officer, Bloomfield Township Board of Health  
Ken Bird, Cummings/Riter  
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