SOLUTIA. Solutions for a better life.™

Solutia Inc.
575 Maryville Centre Drive
St. Louis, Missouri 63141

P.O. Box 66760
St. Louis, Missouri 63166-6760
Tel: 314-674-1000

September 30, 2002

Ms. Jennifer L. Shoemaker
Remedial Project Manager
United States Environmental Protection Agency - Region III
1650 Arch Street
Mail Delivery - 3WC23
Philadelphia, Pennsylvania 19103-2029

Re: Response to August 1, 2001 Comment letter from Jennifer Shoemaker, "Review of Report of Phase IA Activities Corrective Measures Study"

Solutia Inc. Facility; 1 Monsanto Road, Nitro, West Virginia ("Site")
EPA ID. No. WVD039 990 965

Dear Ms. Shoemaker:

Solutia Inc. ("Solutia") submitted to the United States Environmental Protection Agency ("USEPA") the report entitled *Report of Phase IA Activities* dated December 28, 2001 (Phase IA Report). Solutia received USEPA's Comments on Phase IA Report in a letter dated August 1, 2002. USEPA's August 1 Comment letter required a response from Solutia within sixty (60) calendar days of receipt. In addition to this written correspondence from the Agencies, on August 28-29 there was a review and discussion meeting held at the Nitro Plant with the Agencies on the Nitro Corrective Action program in general and the specific Response that Solutia would be making to USEPA pursuant to the August 1 2002 Comment letter. Specific Responses to the USEPA's Comments on Phase IA Report are included as Attachment I.

In the August 28-29 meeting, the Agencies and Solutia reached agreement on the direction of the Nitro Plant RCRA Corrective Action program. Solutia committed to the Agencies that its Response to USEPA's August 1 Comment letter would be consistent with USEPA's Environmental Indicator ("EI") short-term protectiveness goals (i.e. consistent with the CA 725 and CA 750 process Site wide).

In summary, Solutia and the Agencies agreed on the following approach:

Investigations - Determine if the Site is stable or if additional Interim Measures are required. Investigations needed - listed in order of priority – are as follows:

1. Determine extent of "tars" along Kanawha River - Areal & vertical / push sampling / visual inspection[1].
2. Past Disposal Area ("PDA") source investigation – Waste characterization / push sampling / in top-of-bank disposal area[2].
3. Surface Water and Sediment Characterization Supplemental Investigation - Data gap filling[3].

Work Plans – (Priority 4 & 5)

4. **CA 725** – Current Human Exposure (end of October)
   - Soil Sampling Plan[4]
   - HHRA Work Plan
5. **CA 750** - Draft to Agency 12-01. Additional work now recognized as needed but not included in the 12-01 draft include:
   - GW Sampling Plan[5] (Plume Identification)
   - ERA Work Plan (Using data from Surface Water & Sediment Sampling Plan)

Additionally, Solutia notes that in the August 28-29 meeting you requested that Solutia supply USEPA with a map depicting surface water runoff flow direction for the operating portion of the Site. We will be working on this item next week and will have a completed document later in October.

Please feel free to contact me at 314-674-1617 should you have any questions.

Sincerely,

D. Michael Light
Manager remedial Projects
Solutia Inc.

---

[1] Work Plan in development – will be completed in October.

[2] Work Plan in development – will be completed in October. Solutia will propose additional characterization utilizing the recently approved Interim Measures Work Plan (Slough repair).

[3] On September 13, 2002, Solutia sent to the Agencies a *Supplemental Surface Water and Sediment Sampling Work Plan* (Work Plan). The Work Plan was prepared as a supplement to the September 13, 2001 *Surface Water and Sediment Sampling Work Plan* submitted to the United States Environmental Protection Agency (USEPA).

[4] Solutia will propose the use of a grid based system spread across the Site to determine 3-6 inch exposures & 3-6 feet exposures, using broad scan analyses (VOCs, SVOCs, herbicide, dioxin & metals).

[5] Solutia will propose the use of direct push technology to identify plumes Site wide.

Response to August 1, 2001 Comment letter from Jennifer Shoemaker, "Review of Report of Phase IA Activities Corrective Measures Study"

Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including, the possibility of fine and imprisonment for knowing violations.

Permittee:	**Solutia Inc, and Flexsys America L.P.**
Permit No.:	**WVD 039 990 965**
Facility Address:	**No.1 Monsanto Road** **Nitro, West Virginia 25143**
Name:	**D. Michael Light**
Title:	**Manager Remedial Projects**
Signature:	
Date:	**September 30, 2002**

W/ Attachments

cc: Tom Bass - WVDEP
Jim Duranti - WVDEP
Mark Priddy – WVDEP
Naresh Shah – WVDEP
Bruce Yare – Solutia (1S)
Mike Gonshor - Roux
Chris Grose – Potesta
Bob Wilkinson – H&E

Without Attachments
Ken Ellison - WVDEP
Camille Costa – Roux
Ron Potesta – Potesta
Brent Gilhousen – Solutia (3S)

ATTACHMENTS

I. Responses to USEPA Comments in August 1, 2002 letter: "Review of report on Phase IA Activities – Corrective Measures Study"

II. Seep dye study summary and maps

III. Surface water and sediment sampling in the Kanawha River
   a. Temperature and conductivity data

IV. Monitoring well locational information

V. Plant well status and proposal

VI. Plant well inspection log, February 2001

VII. Dioxin / Furan soils database and map

VIII. Rationale for "No-Dig" limits

Attachment I

Responses to USEPA Comments in August 1, 2002 letter: "REVIEW OF REPORT OF PHASE IA ACTIVITIES – CORRECTIVE MEASURES STUDY"

General

1. Part I.B.7b of the Corrective Action Permit for this facility states that all submittals must be signed and certified as required by 40 C.F.R. §§ 270.11(b) and 270.30(k). The above referenced report did not include a certification from Solutia as required by the Permit.

   Solutia must submit a certification for this submittal within ten (10) calendar days of receipt of this letter.

   Response: ***Solutia prepared and submitted the required certification compliant with the regulatory requirements.***

2. Dye Study – Solutia must provide information on the dye study that was conducted at the facility in response to West Virginia Department of Environmental Protection (WVDEP) Water Program. This should include a map showing the dye injection location, the groundwater seep location, procedures followed during the event and evaluation of the results of the study.

   Response: ***The referenced dye study was conducted by Potesta & Associates, Inc. in January 2001 to determine the relationship between impounded water in the adjacent, off-site HUB Industrial Park drainage ditch and the increase in runoff from the 3 acres soil cap on the AES site. The cap was constructed under a Remedial Action Plan (RAP), which was reviewed and approved by Mr. Dennis Matlock of the USEPA. The dye study was voluntarily completed during the design phases of the AES capping project.***

   A map showing the location of the seep and the dye test sample points has been prepared. Also, a narrative of dye study detaining the tests and findings of the study are also included – both in Attachment II.

Surface-Water and Sediment Sampling in the Kanawha River

3. Temperature and conductivity measurements were taken prior to sampling sediment and surface water. Solutia must provide the temperature and conductivity probing results with a map showing probing locations.

   Response: ***Temperature and conductivity information is included as Attachment III. The conductivity information is incomplete because the***

conductivity probe broke after taking measurements at the first few locations.

On September 13, 2002, Solutia sent to the Agencies a Supplemental Surface Water and Sediment Sampling Work Plan (Work Plan). This package included a map showing the locations of the original sediment sampling points in addition to the new sampling locations.

4. EPA is continuing to evaluate the sediment and surface water sampling data submitted by Solutia. However, recent events at the facility reveal that there may be previously unidentified sources that are impacting the Kanawha River, in addition to the contaminants identified in the groundwater (reference Solutia's letter dated April 15, 2002 regarding Notification of Potential Release). Based on the lack of definition of the south plume (discussed in more detail below) and new information of seeps to the Kanawha River, EPA is deferring reevaluation of the groundwater Environmental Indicator until sufficient information is collected to address these issues.

   Response: As discussed in the Site meetings August 28-29 and as evidenced by this submittal, Solutia will cooperate with the EPA in developing Site wide investigations to address the two Environmental Indicators, "Current Human Exposures Under Control" and "Migration of Contaminated Groundwater Under Control."

Ground-Water Database

5. *We were successful in accessing the groundwater data provided by Solutia on a 3.5" floppy disk. The database, however, did not include the locational information for each monitoring well. Locational data was provided in hard copy form as Table 1 of the document but not electronic format. To facilitate the inclusion of the information into EPA's database, Solutia must resubmit the database to include the State-Plane Coordinates and the latitude/longitude coordinates in decimal degrees (NAD 1983) for information for all outfalls by surveying each location. The outfall coordinates provided by Chris Grose of Potesta on July 17, 2001 as handwritten latitude/longitude references on a Site map, are imprecise and vary from mapped locations by several hundreds of feet to more than 4000 feet for 007 (see Attachment 1).*

   Response: The requested locational information is included as Attachment IV. In addition, all of the locational information for all wells and all outfalls is being incorporated into the GW database file and will be communicated to the Agencies in a separate transmittal.

6. As discussed in the 1999 Stabilization /Corrective Measures Effectiveness Report, Solutia samples monitoring wells MW-1A/B, MW-5A/B, MW-20A/B, MW-23A, WT-15A, WT-14A, WT-13A, TD-5, MW-14, MW-7, MW-22R, and MW-24A on a quarterly basis as part of the performance monitoring program. Solutia must submit the results of the quarterly sampling, with the

measured groundwater elevations, to EPA in an electronic format and include this information with the bimonthly Interim Status Reports. The data must be presented in a manner for inclusion in the groundwater database.

***Response:** The current database has been updated to include the quarterly analytical results through the second quarter of 2002. Solutia will maintain the database by updating on a quarterly basis. The updated database has been submitted to the EPA in digital format. Future bi-monthly submittals will include a diskette containing the updated database.*

Monitoring Well Evaluation and Survey

7. EPA has reviewed the information submitted by Solutia and noted that many wells appear to be damaged. Solutia must submit a plan in the Phase 1B report to repair or abandon and replace wells that were noted by the field team as needing attention. In particular, EPA requires that Solutia repair or replace monitoring wells MW-10, 12, and 13. These wells are critical to determine the extent of contamination since high levels of total organic carbon were found in all three wells and trichloroethene was detected at well MW-13 in the past. Also, the plan must include a proposal for installation of deep alluvial aquifer wells to be paired with the three shallow wells MW-10, 12, and 13.

***Response:** A database has been prepared and maintained by Solutia of the existing conditions of all of the known well locations within the plant limits (see Attachment V – Plant Well Status and Proposal).*

As was discussed in the August 28-29 meetings, Solutia will propose to the Agencies the use of direct push technology to identify plumes Site wide. We continue to collect semi-annual water level measurements in all of the plant wells. Attachment V also contains a proposal for dealing with all currently existing GW wells.

The following data corresponds to the three wells noted specifically:

Well ID	Surface Elev.	Total Depth	Well Dia.	Remarks
MW-10	590.20'	28.6'	2" PVC	Protective Casing Hinge Repaired
MW-12	589.80'	28.0'	2" PVC	Casing Damage, Abandoned 11/98
MW-13	590.84'	29.0'	2" PVC	Protective Casing Lid Rusted

Monitoring well MW-12 could not be accessed due to surface damage and was abandoned in November 1998. The wellhead has been damaged to the point that the well is inaccessible and cannot be sampled or gauged. The remaining two wells have been gauged for water levels.

8. Wells WT-11A, B, and C are listed as "OFF-SITE, ABANDONED?" on Table 1. Were these wells identified in the field, and, if so, why weren't depth

measurements taken? Also, please explain why wells EW-1, 2, 3, 4, do not have total depth measured.

Response: ***Monitoring wells WT-11A, B, and C are located outside the limits of the plant boundaries. The locations were determined from historic records, however no evidence of these wells can be found in the field. They are located on a parcel of property owned by Moldagraph Corporation. Their location is near the edge of a paved parking lot near the rear of the tract and may have been removed in the past during development operations by the current owner.***

Wells EW-1, 2, 3, and 4 are the groundwater extraction wells constructed in the LNAPL area. These wells housed extraction pumps for several years preventing access to the wells. POTESTA provided oversight during the drilling and construction of these wells and the well logs including the TCE wells (EW-5A, 5B, 6A, 6B, 7A, 7B and 8). These construction logs were submitted to EPA in the Corrective Measures Effectiveness Report.

Well ID	Surface Elev.	Total Depth	Screened Interval
EW-1	593.63'	56.80'	16.80' – 56.80'
EW-2	593.40'	57.30'	17.00' – 57.30'
EW-3	593.49'	56.60'	16.90' – 56.60'
EW-4	592.76'	56.50'	17.00' – 56.50'
EW-5A	594.46'	41.20'	21.20' – 41.20'
EW-5B	594.48'	55.75'	35.75' – 55.75'
EW-6A	593.93'	40.76'	25.76' – 40.76'
EW-6B	593.94'	58.40'	43.40' – 58.40'
EW-7A	594.72'	41.50'	21.50' – 41.50'
EW-7B	594.75'	57.38'	37.38' – 57.38'
EW-8	596.50'	40.40'	20.40' – 40.40'

Evaluation of the Extent of COCs in Ground-Water South of the Facility

9. Solutia must submit copies of the field sampling forms used during the February 2001 groundwater elevation survey. Why were only the shallow wells measured for groundwater elevations.

Response: ***A copy of the February 2001 groundwater inspection log is included as Attachment VI- Plant Well Inspection Log, February 2001. All of the existing plant wells were gauged during this Site visit. All wells were gauged on an annual basis through 2001. Since 2001, all wells have been gauged on a semi-annual basis.***

10. Solutia's first conclusion of this section states: "In addition, a minor component of the groundwater flow direction at the southern Site boundary appears to be from the GLC site to the Solutia Site." This conclusion does not appear to be supported by the submitted information.

Response: ***The regional groundwater flow direction at the plant Site has been shown to be toward the west-northwest toward the Kanawha River. The flow directions along the southern plant boundaries appear to be northwesterly direction from the Great Lake Chemical (GLC) property. An attempt was made by POTESTA to review the WVDEP files related to location of groundwater monitoring wells at the GLC site. The results of this inquiry indicated that there are no groundwater monitoring wells currently existing on the property.***

As we discussed during the August 28, 29 meetings, the Agencies will conduct additional investigations on the future plans of the property owners with respect to the installation of additional. Any data available will be incorporated into the plant wide groundwater flow regime to determine what flow contributions might exist from the GLC site to the Flexsys plant.

11. None of the tasks presented by Solutia resulted in a determination of the extent of contamination to the south of the facility as requested by EPA in a letter dated August 17, 2001. This item remains an outstanding issue for the Phase I CMS. EPA considers this issue a data gap for groundwater and must be evaluated as part of the Phase 1B groundwater data gap analysis.

    Response: ***As discussed during the August 28-29 meeting, Solutia agrees that determination of the extent of groundwater contamination to the south of the facility is a groundwater data gap. We will make proposals for addressing this data gap in the Site wide groundwater plume delineation work plan.***

Discrete Ground-Water Sampling for Dioxin from the Benzene Plume at MW-7

12. In EPA's letters dated August 16, 2000 and August 17, 2001, Solutia was required to "obtain and/or provide discrete dioxin groundwater data which demonstrates the absence of dioxin from the benzene plume which is evident in MW-7." Solutia has not complied with this requirement of the CMS and EPA considers this an open issue. When the Site wide dioxin soil data is compiled (as discussed in comment14), the need for this data will be reassessed.

    Response: ***USEPA expressed in a July 24, 1998 letter to Solutia concerns related to the potential for dioxin in groundwater at the Site, including the TCE wells and the LNAPL extraction wells. This letter was issued in response to the issuance of an NOV by the WVDEP dated February 5, 1998. The July 24, 1998 letter requested that the extracted groundwater in the TCE hot spot area as well as the LNAPL kerosene phase be sampled for dioxins using existing recovery and/or extraction wells from each area.***

    The agreed scope of work was to collect a single composite sample from all seven existing TCE extraction wells, a second composite groundwater sample from the four LNAPL extraction wells and a third sample of the LNAPL free product (kerosene) phase from wells EW-1, MW-7, R-2, B-2, B-3, and B-4. Approved sampling protocol was followed throughout the sampling process

and WVDEP personnel were onsite during the sampling event to observe the methods and sample collection techniques. The resulting two composite groundwater samples and the remaining separate-phase kerosene composite sample were analyzed for Dioxin using USEPA Method 8290.

The analytical results follow:

	TCE Groundwater *(ppt)*		**LNAPL Groundwater** *(ppt)*		**LNAPL Product** *(ppt)*	
Analyte	WVDEP	Solutia	WVDEP	Solutia	WVDEP	Solutia
2,3,7,8-TCDD	(0.002)	(0.00283)	0.085	(0.00109)	313.625	306.000
1,2,3,7,8-PeCDD	(0.001)	(0.00694)	(0.001)	(0.00373)	(5.393)	[11.700]
1,2,3,4,7,8-HxCDD	(0.002)	(0.00239)	(0.002)	(0.000349)	(2.862)	[7.740]
1,2,3,6,7,8-HxCDD	(0.001)	(0.00173)	(0.001)	(0.000341)	(2.524)	4.370
1,2,3,7,8,9-HxCDD	(0.002)	(0.00196)	(0.001)	(0.000323)	(2.448)	4.840
1,2,3,4,6,7,8-HpCDD	(0.002)	0.0345	(0.001)	0.0173	56.276	35.700
OCDD	(0.012)	0.476	(0.006)	0.455	2914.759	2280.000
2,3,7,8-TCDF	(0.002)	(0.00175)	(0.002)	(0.000848)	1254.828	706.000
1,2,3,7,8-PeCDF	(0.001)	(0.00235)	(0.001)	(0.000929)	110.759	79.600
2,3,4,7,8-PeCDF	(0.001)	(0.00195)	(0.001)	(0.000773)	37.103	29.600
1,2,3,4,7,8-HxCDF	(0.001)	(0.000803)	(0.001)	(0.000323)	85.862	50.300
1,2,3,6,7,8-HxCDF	(0.001)	[0.00219]	(0.001)	0.00187	36.759	27.100
2,3,4,6,7,8-HxCDF	(0.001)	[0.00199]	(0.001)	0.00171	(10.800)	(14.900)
1,2,3,7,8,9-HxCDF	(0.001)	[0.00548]	(0.001)	0.00481	(11.566)	29.100
1,2,3,4,6,7,8-HpCDF	(0.001)	0.00688	(0.001)	0.00375	153.586	80.100
1,2,3,4,7,8,9-HpCDF	(0.002)	(0.00285)	(0.001)	(0.00148)	55.172	31.100
OCDF	(0.007)	0.05[illegible]	(0.004)	0.0274	416.069	254.000
Total TCDDs	[0.0022]	(0.00283)	0.10[illegible]	(0.00109)	313.625	306.000
Total PeCDDs	[0.004]	(0.00694)	(0.001)	(0.00373)	[667.586 21]	(6.160)
Total HxCDDs	(0.001)	(0.000823)	(0.001)	(0.000337)	20.690	29.500
Total HpCDDs	(0.002)	0.0603	(0.001)	0.0249	127.586	76.400
Total TCDFs	(0.002)	(0.00175)	[0.0192]	(0.000848)	3508.966	1570.000
Total PeCDFs	(0.001)	0.00385	(0.001)	(0.000931)	524.138	272.000
Total HxCDFs	(0.001)	0.0279	(0.001)	0.00819	246.207	185.000
Total HpCDFs	(0.001)	0.022[illegible]	(0.001)	0.0141	331.034	157.000
Total PCDD/Fs	0.000	N/A	0.103	N/A	9403.073	N/A

[ ] **Estimated maximum possible concentration. Peak was present but did not meet ratio criteria. Value is given as the detection limit.**

( ) Non-detect, noise-based limit given as the detection limit.

XXXXX - Detects

Summary of Soil Concentrations, No-Dig Areas, and Institutional Controls

13. Solutia did not adequately address this comment. This section only included copies of files that EPA provided previously from review of EPA's internal file without discussion of the existence of any other information or analysis of the available information. In the next submittal, Solutia must provide all dioxin soil analytical results or a statement that additional sampling data from either Monsanto, Solutia, or Flexsys does not exist.

    Response: ***An Access format dioxin/furan soils database is included as Attachment VII – "Dioxin/Furan Soils Database". This database contains all existing dioxin/furan data on Nitro Plant Site soils available from the Solutia files located to date.***

    Attachment VII also contains the dioxin/furan soils data for the plant in tabular form and location within the plant on Drawing No. 1 entitled, "Compilation Summary of Plant Dioxin/Furan Analytical Results". Also included is Drawing No. 3, "Exposure Control Overlays Surface Features / Coverings".

14. It is still unclear how Solutia determined the extent of the onsite no-dig areas due to dioxin contamination. Solutia must plot all available Site wide dioxin soil data on a facility map with the no-dig areas identified, show the results of any dioxin soil analysis which determined the extent of contaminated soil, discuss the relationship between the soil result and the extent of the no-dig areas, and evaluate whether the current engineering controls are adequate to prevent exposure and migration of contaminants.

    Response: ***The current "no-dig" limits were developed based on the EPA data obtained during the 1980's. Attachment VII Drawing No. 1, "Compilation Summary of Plant Dioxin/Furan Analytical Results" also illustrates the limits of the plant areas where digging is more rigorously restricted based on these dioxin results. Attachment VII Drawing No. 3, "Exposure Control Overlays Surface Features / Coverings" is another reference which should be used in understanding the "no-dig" rationale.***

    Attachment VIII presents the "Rationale for NO-DIG limits".

ATTACHMENT II

Seep Dye Study Summary & Maps

SUMMARY OF HUB DRAINAGE DITCH DYE STUDY

Flexsys America L.P. Nitro Production Facility
Nitro, West Virginia

INTRODUCTION

The dye study was proposed to determine the discharge and flow mechanisms associated with an existing storm water drainage ditch which services the HUB Industrial Park located along Interstate 64 in the town of Nitro, West Virginia. The ditch collects and conveys storm water runoff from approximately 84 acres of developed properties located within the industrial park boundaries. The ditch parallels the main access road servicing the industrial park and coveys the collected runoff to an area of impounded water near the Flexsys plant boundary in the vicinity of the LNAPL recovery area.

Solutia, Inc. entered into an Administrative Order by Consent (AOC) dated December 30, 2000 to construct a soil cap on a 3-acre parcel of land located immediately north of the ponded area of the HUB Industrial Park storm water drainage ditch. A Remedial Action Plan was developed and approved by USEPA-Region III to construct a soil cap with a geotextile marker layer. During the development of the proposed cap construction design plans, assessment of the increased storm water runoff from the capped area was completed. It was determined that the majority of the drainage would be directed and discharged to the adjacent storm water drainage ditch. This in turn raised questions related to the nature of the discharge from this ditch.

Field reconnaissance work was completed to determine if a discharge structure was located within the ponded areas of the ditch. No evidence could be gathered in the field that would indicate the presence of a discharge culvert or structure at the ponded area. Water levels in the ditch have been monitored by POTESTA for sometime, the ditch has never overflowed or flooded; however, the water levels do fluctuate with rainfall events and increased runoff. This would indicate that some type of outlet structure does exist at the site but no evidence of such a structure could be collected in the field.

Given the information collected at the site, it was determined that a dye study be developed and utilized to determine a connection between the ponded area and a potential outlet point along the river or in portions of the old City of Nitro sewer existing in the area.

DYE STUDY DEVELOPMENT

A background study was conducted at each of the planned dye receptor locations prior to the introduction of the dye. The background study was conducted to determine if fluorescent dye compounds existed in the study media prior to introduction of the dye compound at the injection site. Results are then used to determine the amount of interference that could be expected during

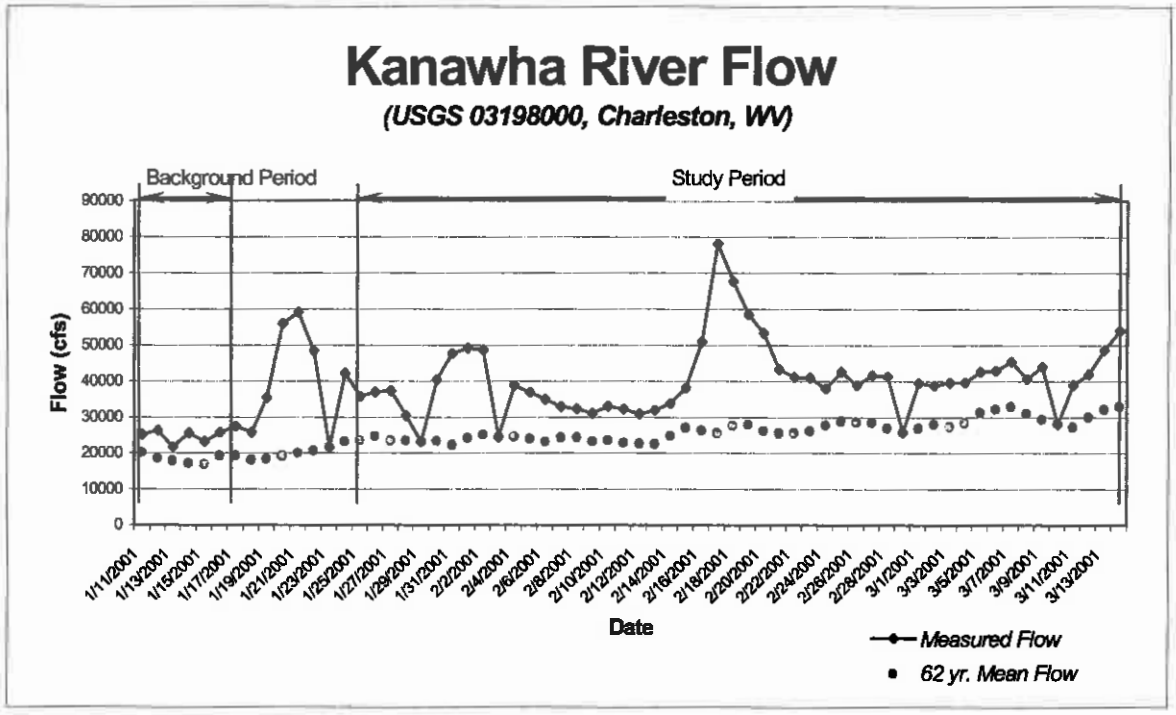
the period of study. These results are then used to calibrate the final analytical results received from the laboratory. In the event that background levels of the individual dye are excessive, alternate dye compounds will be utilized. The background results indicated that fluorescent dye would be an acceptable dye of choice for the study. Background interference is often common in surface water systems due to discharges from both industrial and municipal outfalls.

The background study utilized points R01, R03, R09 and the extraction wells EW-2 and EW-4 located at the LNAPL area. On January 10, 2001, the receptors at the river points and extraction wells were deployed. Each receptor was retrieved and replaced on January 11, 14 and 17, 2002.

The dye study incorporated ten receptor locations, which were established along the Kanawha River. These locations were denoted as sampling points R01 thru R10 and are indicated on the attached figures 1 and 2. Two additional receptors were suspended in existing extraction wells located in the adjacent LNAPL area. These were added to determine if flow from the ditch line was recharging the LNAPL area. A one-time receptor was placed and retrieved from a manhole (no. 414) in the old City of Nitro sewer near the end of the study location. The receptors were individually prepared using 12 grams of fresh activated coconut charcoal contained in a 3-inch by 5-inch nylon mesh packet. The river sample points were established by driving a 2-foot piece of rebar into the river sediment at the edge of the water at each location. The receptor packet was then attached to the rebar for anchorage with a plastic zip tie. The receptors that located in the extraction wells and manhole were suspended from the ground surface from a nylon cord with zip ties. Each of the receptors was weighted to ensure full submergence.

The dye receptors were placed at all of the sample collection points at 0930, January 24, 2001 and 2 pounds of fluorescent dye (acid yellow 73) were introduced into the standing water within the swale at 1330, January 24, 2001. Immediately after introduction of the dye into the swale, the ditch was flushed with 2000 gallons of water using a gravity fed hose connected to a 1000-gallon mobile polyethylene storage tank. The water used for flushing was obtained from the potable water source within the plant. The receptors were then collected and replaced daily on January 25 through 31, 2001. On March 7, 2001 receptors were placed in EW-2 and EW-4 only, and were retrieved on March 14, 2001. A onetime, 1 day test was completed on manhole 414 beginning on February 5, 2001 and ending on February 6, 2001.

POTESTA also obtained daily river flow and gage data for the study period. The data is collected and maintained by the USGS for the Charleston, West Virginia monitoring Station No. 03198000. The data indicates that during the dye study period (winter/spring, 2001), the river flow was consistently higher than the 62-mean flow. This data represents flow condition at Charleston but should be acceptable to indicate the general river flow conditions at the Nitro plant location.



The collected dye receptors, which were derived from both the background and actual study, were transmitted via overnight mail to Crawford & Associated, Inc. of Bowling Green, Kentucky for laboratory analysis. The activated carbon contained in the charcoal receptors absorbs any dye compounds passing over or through the receptor during the study period. The laboratory washes the carbon in an individual receptor with an alcohol based solvent to extract the absorbed dye. The resulting samples are then analyzed with a spectrofluorophotometer to result in a quantification (ppb) of the dye concentration.

DYE STUDY RESULTS

The analytical results of the dye study indicated small concentrations of fluorescent dye in R03 through R09. The highest concentration was found in R03 on January 27, 2001 (164.4 ppb). There was a positive dye response at all river sampling points with the exception of R01 and R02. Point R01 was located at the southern Flexsys property boundary with Great Lakes Chemical and R02 is located along the river just downstream of the equalization tanks. The remaining points were established in numerical order downstream spaced approximately 100 feet apart. The farthest downstream point, R09, was located just upstream of the I-64 interstate bridge. At no time during the test were dye concentrations detected above the background concentrations in points R01 and R02. Likewise, no positive hits were collected on either of the extraction wells located in the LNAPL area, EW-2 and EW-4. The analytical result from manhole 414 located in the old City of Nitro sewer indicated a positive result for the fluorescent dye (26.5 ppb).

The presence of dye at points R03 through R10, coupled with the absence of dye at points R01 and R02, suggested there was an outlet along the river between R02 and R03. With this information, a seep was located along the edge of the river shortly after conclusion of the dye study during reconnaissance of the bank between the R02 and R03 locations. The discharge was visible, entering the river from underneath a large slab of concrete rubble along the riverbank. The exact nature of the discharge was obscured from view by the concrete. The reduction in concentration downstream from R03 leads to a deduction that this is the only seepage point. The lack of dye detection in EW-2 and EW-4 suggests there is no discharge via groundwater to the LNAPL recovery area from the industrial park drainage swale.

WATER SAMPLING

After review of the dye study results and field reconnaissance resulting in the determination of the location of the riverbank seepage location, POTESTA collected a sample of both the water in the HUB storm water drainage ditch as well as a grab sample of the seepage along the riverbank. These samples were transmitted to REIC laboratories of Beaver, West Virginia for analysis. The purpose of the analysis was to prepare a Stiff diagram of each of the analysis results for comparison purposes. The Stiff diagram is a graphic tool to represent the water chemistry associated with each of the samples. A polygon results from plotting the specific ions present in the individual sample and their relative or absolute concentrations. The comparison was inconclusive resulting in much higher concentrations of SO_4 and Ca in the riverbank seepage than the ion concentrations in the HUB storm water drainage ditch.

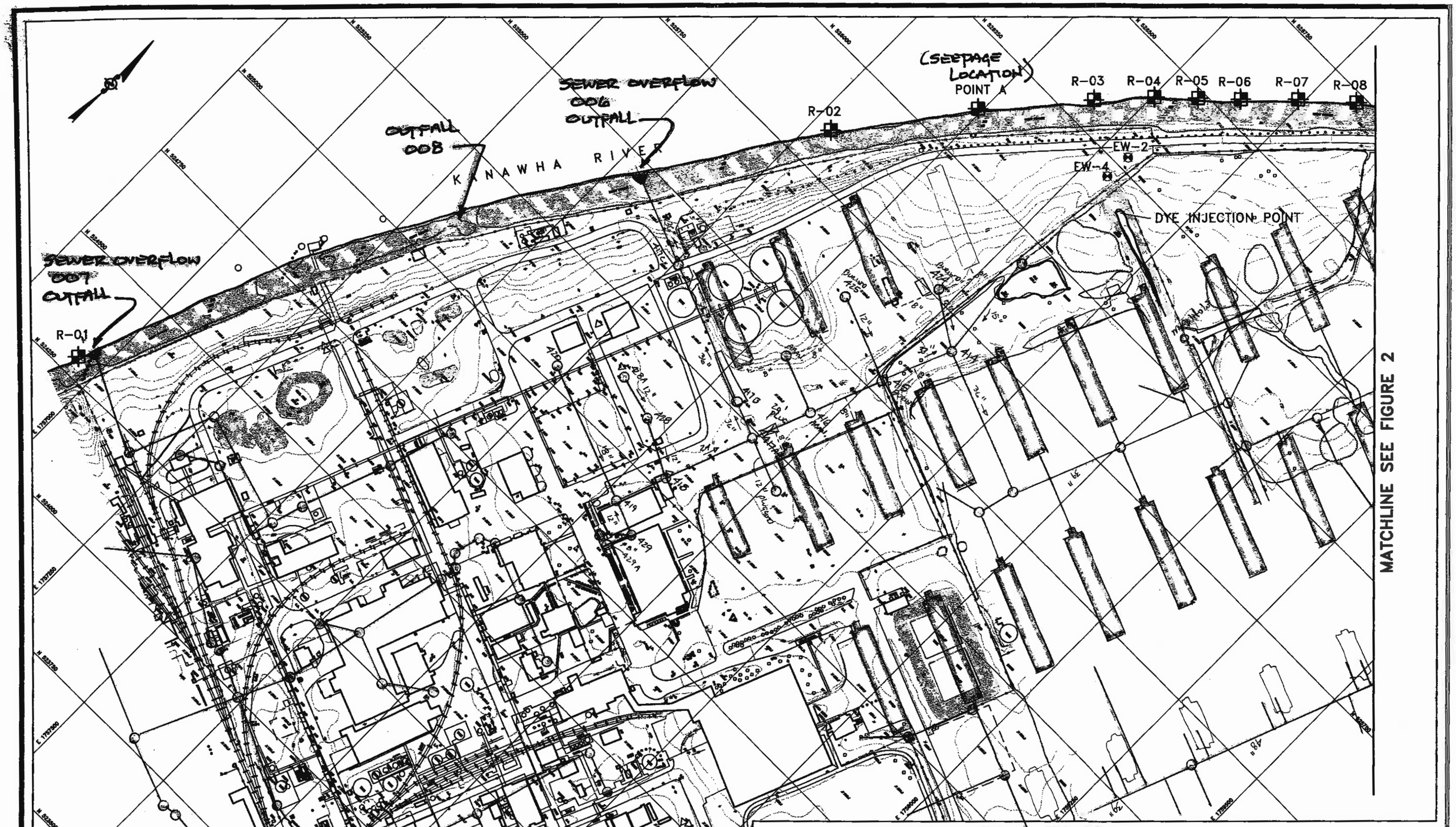
Additional samples were collected on July 26, 2002 at both of the locations. These samples were analyzed for VOC's (method 8260B) and SVOC's (method 8270C). No SVOC's were detected in either of the collected samples. The only positive results were for VOC's and are as follows:

VOCs	HUB Ditch	Riverbank Seepage
cis-1,2-Dichloroethene	1.6 ug/l	3.3 ug/l
1,2,4-Trimethylbenzene	1.9 ug/l	ND

CONCLUSIONS

There appears to be some level of connection between the discharge of water from the HUB storm water drainage ditch and the riverbank seep located during the field reconnaissance conducted after completion of the dye study. The results of the dye study indicate that at least a portion of the flow from the storm water drainage ditch migrates to the riverbank seep location through an unknown flow mechanism. The dye study results also indicate a connection between the HUB storm water drainage ditch discharge and manhole 414 located within portions of the old City of Nitro sewer system located in the area. Available mapping of the old sewer was obtained; however, a discharge point at the riverbank seep location was not indicated on the mapping.

Direct storm water runoff from the plant property does not contribute to flow in the HUB ditch drainage. The plant boundary in the vicinity of the drainage ditch is bermed to prevent storm water runoff from draining to the adjacent parcel. Based on the information collected during the completion of this study, the seep located along the riverbank appears to be discharging at least a portion of the flow from the HUB ditch; however, commingling of stored water from the old City of Nitro sewer in the seep is a likely possibility. Further study, analysis and characterization of the water in the sewer system as well as assessment of the sewer either through remote camera or additional mapping study will be required to better understand the relationship between the seepage at the riverbank, the HUB ditch discharge and the sewer line.



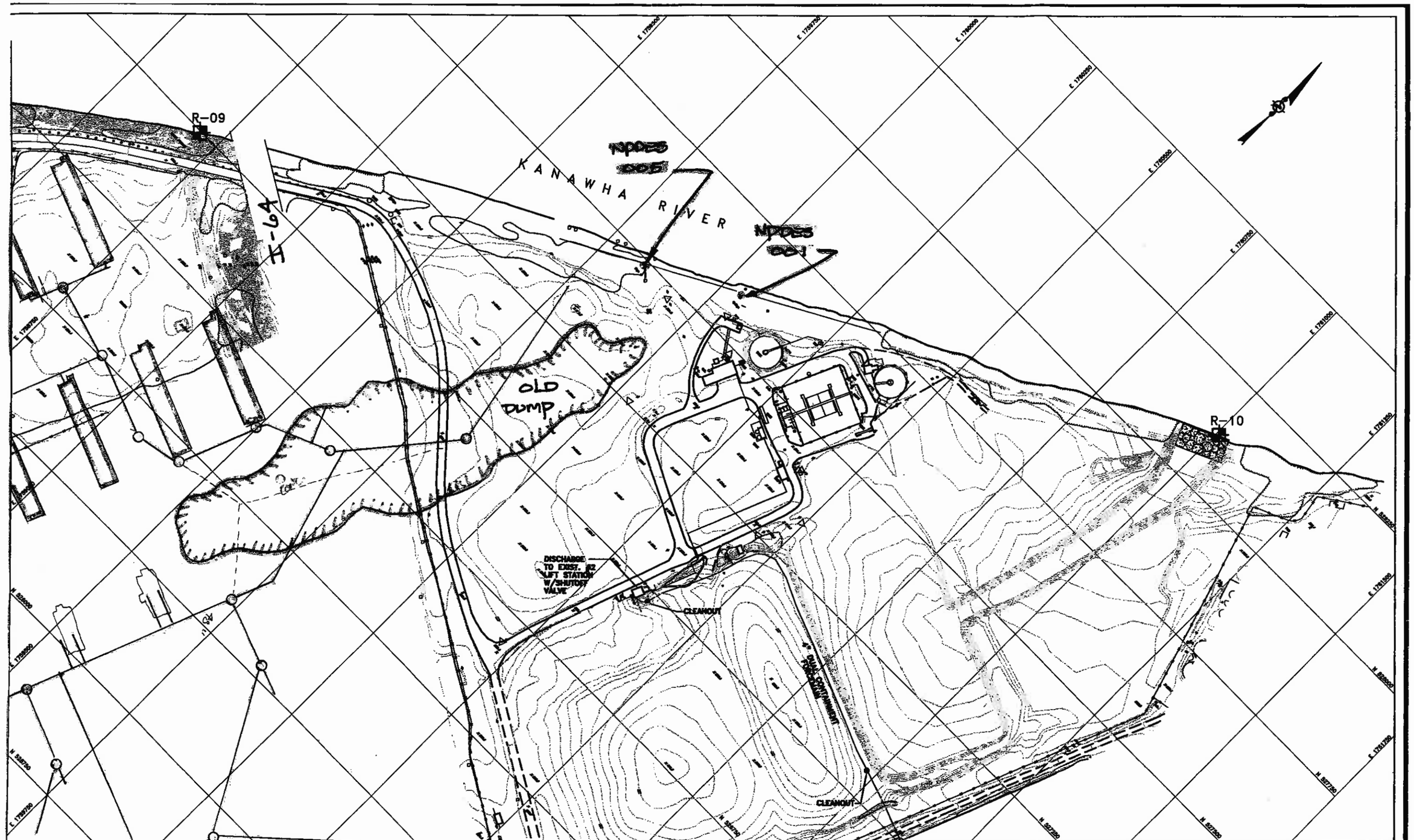
Potesta & Associates, Inc.
ENGINEERS AND ENVIRONMENTAL CONSULTANTS
2300 MacCorkle Ave. SE, Charleston, WV 25304
TEL: (304) 342-1400 FAX: (304) 343-9031
E-Mail Address: potesta@potesta.com

Project
AES HUB CAP
SOLUTIA, INC.
DYE TEST

Scale 1"=200'

Date NOVEMBER 2001

Dwg. No.
FIGURE 1



Potesta & Associates, Inc.
ENGINEERS AND ENVIRONMENTAL CONSULTANTS
2300 MacCorkle Ave. SE, Charleston, WV 25304
TEL: (304) 342-1400 FAX: (304) 343-9031
E-Mail Address: potesta@potesta.com

Project
AES HUP CAP
SOLUTIA, INC.
DYE TEST

Scale 1"=200'

Date NOVEMBER 2001

Dwg. No.
FIGURE 2

ATTACHMENT III

Surface-Water and Sediment Sampling in the Kanawha River

- **Temperature and Conductivity Data**

Segment A Temperature and Depth Profiles of the Kanawha River. Solutia, Nitro, West Virginia.

Segment	Distance from Edge of River Bank (feet)	Temperature (°C)	Depth (feet bws)
A-1	3	23	0.25
	6	23	0.42
	9	23.3	0.63
	12	23.4	0.75
	15	23.6	1.02
	18	23.6	0.92
	21	23.4	1.73
	24	23.6	3.1
A-2	3	23.3	0.62
	6	23.2	0.42
	9	23.4	0.55
	12	23.6	0.72
	15	23.8	0.8
	18	23.8	1.15
	21	23.7	2
A-3	3	23.2	0.44
	6	23.3	0.64
	9	23.4	0.71
	12	23.5	0.73
	15	23.7	0.85
	18	23.7	0.83
	21	23.8	1.41
A-4	3	23	0.42
	6	23.2	0.68
	9	23.4	0.92
	12	23.6	1.05
	15	23.7	0.95
	18	23.8	0.98
	21	23.9	1.33
A-5	3	22.2	0.33
	6	22.7	1.05
	9	22.9	1.34
	12	23.9	2.23
	15	23.7	3.04
	18	23.6	4.1
A-6	3	23.3	0.45
	6	23.3	0.81
	9	23.4	0.84
	12	23.5	1.15
	15	23.2	1.1
	18	23.8	1.29
	21	23.7	2.32

Segment A Temperature and Depth Profiles of the Kanawha River. Solutia, Nitro, West Virginia.

Segment	Distance from Edge of River Bank (feet)	Temperature (°C)	Depth (feet bws)
A-7	3	22.9	0.53
	6	23.5	0.79
	9	23.5	0.95
	12	23.7	1.11
	15	23.8	1.27
	18	23.7	2.02
	21	23.7	3.35
A-8	3	23	0.63
	6	23	0.82
	9	23.1	0.87
	12	23.36	0.82
	15	23	0.91
	18	23.2	0.91
	21	23.4	0.87
A-9	3	23.4	0.83
	6	23.4	1.11
	9	23.4	1.62
	12	23.6	2.32
	15	23.6	3.15
	18	23.5	4.3
A-10	3	23.2	0.42
	6	23.3	1.16
	9	23.5	1.38
	12	23.7	1.83
	15	23.8	2.85
	18	23.6	4.7

Notes:
Measurements taken on September 20, 2001.
bws - below water surface.
°C - degrees Celsius.

Segment B Temperature and Depth Profiles along the Kanawha River. Solutia, Nitro, West Virginia.

Segment	Distance from Edge of River Bank (feet)	Temperature (°C)	Depth (feet bws)
B-1	3	23.5	0.35
	6	23.5	0.57
	9	23.6	0.75
	12	23.7	0.82
	15	23.7	0.88
	18	23.8	0.92
	21	23.6	1.51
B-2	3	22.9	0.34
	6	23.5	0.63
	9	23.4	0.92
	12	23.5	0.85
	15	23.6	0.94
	18	23.7	1.01
	21	23.7	1.33
B-3	3	22.9	0.59
	6	23.1	0.67
	9	23.4	1.02
	12	23.3	0.93
	15	23.4	0.92
	18	23.4	1.25
	21	23.5	1.71
B-4	3	22.8	0.33
	6	23.1	0.75
	9	23.3	0.82
	12	23.4	0.87
	15	23.5	0.91
	18	23.6	0.95
	21	23.7	1.02

Notes:
Measurements taken on September 20, 2001.
bws - below water surface.
°C - degrees Celsius.

Segment C Temperature and Depth Profiles along the Kanawha River. Solutia; Nitro, West Virginia.

Segment	Distance from Edge of River Bank (feet)	Temperature (°C)	Depth (feet bws)
C-1			
3	3	23.6	0.83
6	6	23.6	1.34
9	9	23.7	23.7
12	12	23.7	2.92
15	15	23.7	3.45
C-2			
3	3	23.7	1.15
6	6	23.8	1.45
9	9	23.9	1.75
12	12	23.8	3.35
C-3			
3	3	23.5	0.93
6	6	23.6	1.28
9	9	23.8	3.32
12	12	23.8	3.35
15	15	23.7	4.81
C-4			
3	3	24	0.59
6	6	23.9	1.1
9	9	24	1.05
12	12	24	1.28
15	15	24	1.62
18	18	23.9	2.81
C-5			
3	3	23.8	0.51
6	6	23.8	1.03
9	9	23.8	1.04
12	12	23.8	0.37
15	15	23.8	0.65
C-6			
3	3	23.6	0.55
6	6	24	0.88
9	9	23.9	0.8
12	12	24	0.91
15	15	23.9	1.15
18	18	24	1.51
21	21	24	2.63

Segment C Temperature and Depth Profiles along the Kanawha River. Solutia; Nitro, West Virginia.

Segment	Distance from Edge of River Bank (feet)	Temperature (°C)	Depth (feet bws)
C-7			
3	3	23.9	0.38
6	6	23.9	0.82
9	9	23.8	1.11
12	12	23.9	0.95
15	15	24	1.18
18	18	24	2.18
C-8			
3	3	23.9	0.33
6	6	24	0.79
9	9	24	0.83
12	12	24	0.92
15	15	24.1	1.78
18	18	23.9	3.7
C-9			
3	3	23.9	0.92
6	6	23.9	1.53
9	9	24	1.9
12	12	23.9	3.72
15	15	23.9	4.72

Notes:
Measurements taken on September 20, 2001.
bws - below water surface.
°C - degrees Celsius.

Kanawha River Sediment/Water Sampling Events
Flexsys Nitro Plant Facility

Sample #	Date	Time	Latitude	Longitude	Depth (ft.)	Temperature (°C)	pH (S.U.)	Dissolved O_2 (mg/l)	Conductivity (us)	Turbidity (NTU)
ASW-1	9/21/01	1445	n/a	n/a	0.88	23.8	7.92	6.5	0.154	4
ASW-2	9/21/01	1425	38° 26' 22.332"	81° 50' 48.8663"	0.97	23.8	7.87	5.45	0.162	65
ASW-3	9/21/01	1410	38° 26' 23.7421"	81° 50' 47.7572"	2.89	23.9	8.03	5.76	0.162	1
ASW-4	9/21/01	1345	38° 26' 24.8345"	81° 50' 46.5777"	1.25	24	8.01	6.08	0.16	4
ASW-5	9/21/01	1305	n/a	n/a	2.57	23.4	8.02	6.89	0.162	3
BSW-1	9/21/01	1220	38° 26' 32.5951"	81° 50' 39.593"	1.11	23.1	7.87	5.57	0.154	7
BSW-2	9/21/01	1205	38° 26' 33.35957"	81° 50' 38.80742"	1.45	23.1	7.92	5.48	0.154	0
BSW-3	9/21/01	1135	38° 26' 34.04201"	81° 50' 38.19513"	1.74	23.1	7.96	5.13	0.152	13
CSW-1	9/21/01	1110	38° 26' 42.65024"	81° 50' 23.96628"	3.13	22.8	7.89	5.67	0.149	5
CSW-2	9/21/01	1055	38° 26' 43.44686"	81° 50' 22.37399"	3.83	22.7	7.88	5.55	0.146	4
CSW-3	9/21/01	1030	38° 26' 44.22467"	81° 50' 20.47667"	2.23	22.4	7.72	5.72	0.147	5
CSW-4	9/21/01	1015	38° 26' 44.95292"	81° 50' 18.65802"	5.43	22.6	7.66	5.94	0.148	10
CSW-5	9/21/01	950	38° 26' 45.50881"	81° 50' 16.84726"	1.48	22.2	6.7	5.97	0.191	10
ASW-1	10/16/01	1315	38° 26'	81° 50'	0.81	18.3	7.3	8.59	0.211	9
ASW-2	10/16/01	1305	38° 26' 22.288"	81° 50' 48.736"	0.87	18.2	7.14	8.09	0.215	6
ASW-3	10/16/01	1300	38° 26' 23.609"	81° 50' 47.895"	2.1	18.5	7.17	7.73	0.211	6
ASW-4	10/16/01	1250	38° 26' 24.961"	81° 50' 47.895"	1.45	18.1	7.46	7.55	0.22	21
ASW-5	10/16/01	1220	38° 26' 26.274"	81° 50' 45.543"	2.15	18.2	7.21	7.93	0.218	14
BSW-1	10/16/01	1155	38° 26' 32.712"	81° 50' 39.560"	0.87	17.9	7.24	7.56	0.23	8
BSW-2	10/16/01	1145	38° 26' 33.380"	81° 50' 38.840"	0.93	17.6	7.19	7.95	0.227	106
BSW-3	10/16/01	1130	38° 26' 34.191"	81° 50' 38.002"	0.9	n/a	7.41	7.59	0.218	56
CSW-1	10/16/01	1105	38° 26' 42.708"	81° 50' 23.966"	2.12	18.4	7.24	8.23	0.216	8
CSW-2	10/16/01	1055	38° 26' 43.493"	81° 50' 22.212"	2.08	18.3	7.15	8.31	0.219	25
CSW-3	10/16/01	1045	38° 26' 44.273"	81° 50' 20.556"	1.58	17.9	7.25	8.29	0.218	7
CSW-4	10/16/01	1030	38° 26' 44.927"	81° 50' 18.651"	1.21	18.1	6.88	8.04	0.225	44
CSW-5	10/16/01	1015	38° 26' 45.552"	81° 50' 16.907"	0.92	18	5.85	8.27	0.216	68
Union PSD	10/16/01	1120	38° 26' 39.932"	81° 50' 27.850"	1.91	18.4	7.44	7.62	0.22	4
BG-1	10/16/01	1325	38° 26' 10.872"	81° 50' 55.516"	2.44	19.2	7.46	8.82	0.409	4
BG-2	10/16/01	1340	38° 26' 10.138"	81° 50' 55.707"	1.99	18.6	7.43	8.62	0.209	5

ATTACHMENT IV

Monitoring Well Locational Information

SOLUTIA, INC. Monitoring Well Location Conversion Table

Well Number	NAD 83 State Plane Coordinates		Elevation	NAD 1983 Coordinates	
	Northing	Easting		Latitude	Longitude
TB-1	527430.35422	1728671.95327	593.07	38.44545975	81.83741876
TB-3	527469.13260	1728579.21216	592.90	38.44556393	81.83774379
TD-1	527515.97534	1728730.44197	592.20	38.44569631	81.83721724
TD-3	527562.87323	1728622.18065	590.92	38.44582240	81.83759673
TD-5	527583.01180	1728548.05996	589.49	38.44587586	81.83785616
WT-1	526816.02700	1729528.28831	590.33	38.44379406	81.83440951
WT-2	526339.22808	1729281.37596	590.13	38.44247873	81.83525659
WT-3	527047.43849	1728847.77106	590.67	38.44441266	81.83679281
WT-4A	527430.43694	1728807.06388	591.82	38.44546308	81.83694701
WT-4B	527422.38690	1728803.54402	592.06	38.44544113	81.83695905
WT-5A	572777.16258	1729007.11619	589.99	38.56998352	81.83767958
WT-5B	527769.61982	1728999.18851	589.93	38.44639945	81.83628689
WT-6	527631.46495	1729258.07218	589.09	38.44602650	81.83537862
WT-7A	527633.59359	1728649.82946	589.25	38.44601727	81.83750242
WT-7B	527646.76394	1728669.94932	589.16	38.44605394	81.83743258
WT-7C	527644.56391	1728667.88935	589.12	38.44604784	81.83743971
WT-8A	527781.42479	1729802.75181	589.42	38.44645174	81.83348154
WT-8B	527777.24484	1729804.21192	589.31	38.44644030	81.83347631
WT-8C	527773.10489	1729806.54200	587.13	38.44642899	81.83346804
WT-9A	526982.80707	1729298.86425	599.71	38.44424636	81.83521578
WT-9B	526986.25694	1729292.36416	598.61	38.44425568	81.83523859
WT-9C	526989.59680	1729284.93407	599.53	38.44426466	81.83526463
WT-10A	526382.13587	1729168.18468	590.13	38.44259375	81.83565314
WT-10B	526384.11580	1729164.34464	590.09	38.44259909	81.83566661
WT-10C	526386.24572	1729160.25458	590.30	38.44260484	81.83568096
WT-11A	527009.07580	1729769.60583	588.60	38.44433013	81.83357301
WT-11B	527011.18569	1729764.27576	588.47	38.44433579	81.83359169
WT-11C	527013.70562	1729759.80571	588.27	38.44434261	81.83360738
WT-13A	527257.34192	1727983.80342	590.82	38.44496758	81.83981600
WT-14A	527413.53960	1728411.41245	593.57	38.44540711	81.83832792
WT-15A	526907.07924	1728336.96139	589.08	38.44401457	81.83857187
MW-1A	523727.42435	1727205.15450	594.37	38.43525539	81.84242265
MW-1B	523722.31431	1727203.06458	594.38	38.43524130	81.84242978
MW-2A	524029.89610	1726268.24476	592.60	38.43606251	81.84570310
MW-2B	524028.50618	1726272.53481	592.84	38.43605880	81.84568808
MW-3A	524444.40322	1725626.74430	598.85	38.43718461	81.84795588
MW-3B	524450.49324	1725628.43421	599.24	38.43720138	81.84795018
MW-4A	524775.00557	1725785.96898	598.56	38.43809641	81.84741056
MW-4B	524770.50555	1725783.77905	598.05	38.43808400	81.84741806
MW-5A	525335.46037	1726096.73016	594.65	38.43964316	81.84634349

SOLUTIA, INC. Monitoring Well Location Conversion Table					
Well Number	NAD 83 State Plane Coordinates		Elevation	NAD 1983 Coordinates	
	Northing	Easting		Latitude	Longitude
MW-5B	525338.53027	1726092.80007	594.91	38.43965149	81.84635731
MW-6A	525750.86539	1726407.34397	591.39	38.44079160	81.84527228
MW-6B	525735.21972	1726406.59390	592.76	38.27185886	81.84527499
MW-7	526312.23279	1726860.52573	594.03	38.44234439	81.84370792
MW-8	525663.32182	1726741.00705	588.30	38.44055956	81.84410457
MW-10	524395.73301	1726673.28988	590.20	38.43707720	81.84430068
MW-11A	524536.02866	1727518.76112	591.13	38.43748355	81.84135345
MW-11B	524533.32864	1727517.38118	591.01	38.43747611	81.84135819
MW-12	524607.53891	1727008.32752	589.80	38.43766718	81.84313774
MW-13	523985.54049	1727027.63898	590.84	38.43595971	81.84305056
MW-14	525414.37048	1727176.15353	589.53	38.43988684	81.84257743
MW-15	525049.64161	1727730.38267	587.96	38.43889915	81.84063091
MW-17A	523864.96457	1726701.34970	591.53	38.43562047	81.84418584
MW-17B	523867.43443	1726694.88962	591.85	38.43562709	81.84420847
MW-18A	524124.88060	1725986.67174	593.20	38.43631627	81.84668913
MW-18B	524127.64051	1725981.89168	592.59	38.43632373	81.84670590
MW-19A	524614.70389	1725679.29144	597.58	38.43765356	81.84777787
MW-19B	524619.65390	1725681.06134	598.17	38.43766720	81.84777185
MW-20A	525118.49745	1725919.80333	596.71	38.43904296	81.84695427
MW-20B	525132.31698	1725895.84298	596.76	38.43908031	81.84703836
MW-21A	525531.38219	1726214.87710	592.65	38.44018410	81.84593726
MW-21B	525535.29224	1726217.87704	594.07	38.44019491	81.84592691
MW-22R	525938.25657	1726489.46090	596.53	38.44130821	81.84499155
MW-23A	524297.50219	1725557.54667	598.82	38.43677950	81.84819277
MW-24A	525663.60467	1726360.53533	594.58	38.44055082	81.84543293
PZ-1	524724.19524	1725762.84980	598.68	38.43795631	81.84748965
PZ-2	524737.19517	1725760.55955	598.78	38.43799195	81.84749806
PZ-3	527814.08032	1729029.91784	589.99	38.44652229	81.83618099
PZ-4	527804.58017	1729020.93798	590.21	38.44649599	81.83621205
TW-1	524729.19511	1725755.66970	598.64	38.43796986	81.84751488
TW-2	527815.11012	1729018.90778	589.48	38.44652509	81.83621947
B-1	526389.62316	1726889.35442	594.98	38.44255762	81.84360973
B-2	526254.42297	1726865.24678	592.87	38.44218577	81.84368960
B-3	526286.10180	1726805.36594	595.14	38.44227126	81.84389967
B-4	526319.29305	1726875.41565	593.82	38.44236415	81.84365616
B-5	526378.71083	1726762.84408	578.92	38.44252449	81.84405108
B-6	526466.19199	1726833.63280	575.66	38.44276648	81.84380671
B-7	526466.62196	1726833.35279	576.72	38.44276765	81.8438077
B-8A	526652.21669	1727104.26060	595.64	38.44328404	81.84268774
B-8B	526661.01685	1727113.75049	595.69	38.44330844	81.84283488

SOLUTIA, INC. Monitoring Well Location Conversion Table

Well Number	NAD 83 State Plane Coordinates		Elevation	NAD 1983 Coordinates	
	Northing	Easting		Latitude	Longitude
B-9	526883.63214	1727420.78777	594.23	38.44392738	81.84176994
R-1	526297.15268	1726853.07596	592.94	38.44230280	81.84373345
R-2	526894.54150	1726853.06505	592.92	38.44394316	81.84375248
EW-1	526335.62251	1726848.35523	593.79	38.44240832	81.84375118
EW-2	526342.73265	1726856.68515	593.57	38.44242805	81.84372230
EW-3	526285.62181	1726806.35595	593.68	38.44227000	81.84389620
EW-4	526259.19242	1726835.38657	592.92	38.44219812	81.84379400
EW-5A	525673.47339	1726293.76485	594.09	38.44057624	81.84566636
EW-5B	525664.61327	1726285.75499	594.09	38.44055171	81.84569404
EW-6A	525337.69060	1726110.15017	594.23	38.43964962	81.84629671
EW-6B	525348.59070	1726116.85000	594.18	38.43967972	81.84627367
EW-7A	525198.60842	1725980.37211	595.16	38.43926446	81.84674537
EW-7B	525199.60870	1725995.37217	595.20	38.43926758	81.84669303
EW-8	524314.66238	1725569.38642	597.02	38.43682692	81.84815198
MW-X1	526116.61793	1726580.35806	594.66	38.44180014	81.84467987
MW-X2	526112.61786	1726577.35810	594.79	38.44178919	81.84469022

OLD

SOLUTIA, INC. Monitoring Well Location Conversion Table				
Well Number	NAD 83 State Plane Coordinates		NAD 1983 Coordinates	
	Northing	Easting	Latitude	Longitude
TB-1	527430.35422	1728671.95327	38.44545975	81.83741876
TB-3	527469.13260	1728579.21216	38.44556393	81.83774379
TD-1	527515.97534	1728730.44197	38.44569631	81.83721724
TD-3	527562.87323	1728622.18065	38.44582240	81.83759673
TD-5	527583.01180	1728548.05996	38.44587586	81.83785616
WT-1	526816.02700	1729528.28831	38.44379406	81.83440951
WT-2	526339.22808	1729281.37596	38.44247873	81.83525659
WT-3	527047.43849	1728847.77106	38.44441266	81.83679281
WT-4A	527430.43694	1728807.06388	38.44546308	81.83694701
WT-4B	527422.38690	1728803.54402	38.44544113	81.83695905
WT-5A	572777.16258	1729007.11619	38.56998352	81.83767958
WT-5B	527769.61982	1728999.18851	38.44639945	81.83628689
WT-6	527631.46495	1729258.07218	38.44602650	81.83537862
WT-7A	527633.59359	1728649.82946	38.44601727	81.83750242
WT-7B	527646.76394	1728669.94932	38.44605394	81.83743258
WT-7C	527644.56391	1728667.88935	38.44604784	81.83743971
WT-8A	527781.42479	1729802.75181	38.44645174	81.83348154
WT-8B	527777.24484	1729804.21192	38.44644030	81.83347631
WT-8C	527773.10489	1729806.54200	38.44642899	81.83346804
WT-9A	526982.80707	1729298.86425	38.44424636	81.83521578
WT-9B	526986.25694	1729292.36416	38.44425568	81.83523859
WT-9C	526989.59680	1729284.93407	38.44426466	81.83526463
WT-10A	526382.13587	1729168.18468	38.44259375	81.83565314
WT-10B	526384.11580	1729164.34464	38.44259909	81.83566661
WT-10C	526386.24572	1729160.25458	38.44260484	81.83568096
WT-11A	527009.07580	1729769.60583	38.44433013	81.83357301
WT-11B	527011.18569	1729764.27576	38.44433579	81.83359169
WT-11C	527013.70562	1729759.80571	38.44434261	81.83360738
WT-13A	527257.34192	1727983.80342	38.44496758	81.83981600
WT-14A	527413.53960	1728411.41245	38.44540711	81.83832792
WT-15A	526907.07924	1728336.96139	38.44401457	81.83857187
MW-1A	523727.42435	1727205.15450	38.43525539	81.84242265
MW-1B	523722.31431	1727203.06458	38.43524130	81.84242978
MW-2A	524029.89610	1726268.24476	38.43606251	81.84570310
MW-2B	524028.50618	1726272.53481	38.43605880	81.84568808
MW-3A	524444.40322	1725626.74430	38.43718461	81.84795588
MW-3B	524450.49324	1725628.43421	38.43720138	81.84795018
MW-4A	524775.00557	1725785.96898	38.43809641	81.84741056
MW-4B	524770.50555	1725783.77905	38.43808400	81.84741806
MW-5A	525335.46037	1726096.73016	38.43964316	81.84634349

010

SOLUTIA, INC. Monitoring Well Location Conversion Table				
Well Number	NAD 83 State Plane Coordinates		NAD 1983 Coordinates	
	Northing	Easting	Latitude	Longitude
MW-5B	525338.53027	1726092.80007	38.43965149	91.84635731
MW-6A	525750.86539	1726407.34397	38.44079160	81.84527228
MW-6B	525735.21972	1726406.59390	38.27185886	81.84527499
MW-7	526312.23279	1726860.52573	38.44234439	81.84370792
MW-8	525663.32182	1726741.00705	38.44055956	81.84410457
MW-10	524395.73301	1726673.28988	38.43707720	81.84430068
MW-11A	524536.02866	1727518.76112	38.43748355	81.84135345
MW-11B	524533.32864	1727517.38118	38.43747611	81.84135819
MW-12	524607.53891	1727008.32752	38.43766718	81.84313774
MW-13	523985.54049	1727027.63898	38.43595971	81.84305056
MW-14	525414.37048	1727176.15353	38.43988684	81.84257743
MW-15				
MW-17A	523864.96457	1726701.34970	38.43562047	81.84418584
MW-17B	523867.43443	1726694.88962	38.43562709	81.84420847
MW-18A	524124.88060	1725986.67174	38.43631627	81.84668913
MW-18B	524127.64051	1725981.89168	38.43632373	81.84670590
MW-19A	524614.70389	1725679.29144	38.43765356	81.84777787
MW-19B	524619.65390	1725681.06134	38.43766720	81.84777185
MW-20A	525118.49745	1725919.80333	38.43904296	81.84695427
MW-20B	525132.31698	1725895.84298	38.43908031	81.84703836
MW-21A	525531.38219	1726214.87710	38.44018410	81.84593726
MW-21B	525535.29224	1726217.87704	38.44019491	81.84592691
MW-22R	525938.25657	1726489.46090	38.44130821	81.84499155
MW-23A	524297.50219	1725557.54667	38.43677950	81.84819277
MW-24A	525663.60467	1726360.53533	38.44055082	81.84543293
PZ-1	524724.19524	1725762.84980	38.43795631	81.84748965
PZ-2	524737.19517	1725760.55955	38.43799195	81.84749806
PZ-3	527814.08032	1729029.91784	38.44652229	81.83618099
PZ-4	527804.58017	1729020.93798	38.44649599	81.83621205
TW-1	524729.19511	1725755.66970	38.43796986	81.84751488
TW-2	527815.11012	1729018.90778	38.44652509	81.83621947
B-1				
B-2	526254.42297	1726865.24678	38.44218577	81.84368960
B-3	526286.10180	1726805.36594	38.44227126	81.84389967
B-4	526319.29305	1726875.41565	38.44236415	81.84365616
B-5	526378.71083	1726762.84408	38.44252449	81.84405108
B-6	526466.19199	1726833.63280	38.44276648	81.84380671
B-7				
B-8A	526652.21669	1727104.26060	38.44328404	81.84268774
B-8B	526661.01685	1727113.75049	38.44330844	81.84283488

010

SOLUTIA, INC. Monitoring Well Location Conversion Table				
Well Number	NAD 83 State Plane Coordinates		NAD 1983 Coordinates	
	Northing	Easting	Latitude	Longitude
B-9	526883.63214	1727420.78777	38.44392738	81.84176994
R-1	526297.15268	1726853.07596	38.44230280	81.84373345
R-2	526894.54150	1726853.06505	38.44394316	81.84375248
EW-1				
EW-2	526342.73265	1726856.68515	38.44242805	81.84372230
EW-3				
EW-4	526259.19242	1726835.38657	38.44219812	81.84379400
EW-5A	525673.47339	1726293.76485	38.44057624	81.84566636
EW-5B	525664.61327	1726285.75499	38.44055171	81.84569404
EW-6A	525337.69060	1726110.15017	38.43964962	81.84629671
EW-6B	525348.59070	1726116.85000	38.43967972	81.84627367
EW-7A				
EW-7B				
EW-8	524314.66238	1725569.38642	38.43682692	81.84815198

Flexsys Plant
Nitro, West Virginia

NPDES Outfall Locations

Outfall Designation	State Plane Coords. (NAD 83)		State Plane Coords. (NAD 27)		UTM (NAD 27)		Lat./Long.		Description
	Northing	Easting	Northing	Easting	Northing	Easting	Latitude	Longitude	
001	527656.539	1728589.303	527611.883	1760040.964	4255425.78	426883.33	38° 26' 46"	81° 50' 16"	Diffuser, treated comingled process, non-process and SW from WWTU.
005	527550.771	1728382.575	527506.119	1759834.236	4255393.56	426820.33	38° 26' 45"	81° 50' 19"	Stormwater from WWTU area.
006	525534.528	1726104.506	525489.914	1757556.14	4254779.22	426126.12	38° 26' 24"	81° 50' 47"	Emergency overflow from Lift Station No. 1. (Future SW/Non-Process Water)
007	524353.657	1725503.309	524309.052	1756954.924	4254419.4	425942.9	38° 26' 12"	81° 50' 55"	Emergency overflow from SW Corner of Facility (Future SW/Non-Process Water)
008	525196.884	1725890.686	525152.274	1757342.315	4254676.34	426060.96	38° 26' 21"	81° 50' 50"	Stormwater from central portion of process area and parking lot. (Oil/Water Seperator)
Union PSD (001)	527045.741	1727531.131	527001.104	1758982.786	4255239.68	426560.87	38° 26' 39"	81° 50' 30"	NPDES WV0037486, Treated municipal sewage outfall.

ATTACHMENT V

Plant Well Status and Proposal

PROPOSED GW WELL REHABILITATION AND ABANDONMENT PLAN

Flexsys Nitro, WV Plant

Wells to be Abandoned and Removed (26 Wells Total)

Well	NAD 83 Coordinates		Surface Elev.	Total Depth	Well Dia.	Comments
	Latitude	Longitude				
P-1	n/a	n/a	592.21	29	1.5	Redundant with WT-10A, 10B, 10C
PZ-1	38.43795631	81.84748965	594.77	43	4	Redundant with MW-4A, 4B
PZ-2	38.43799195	81.84749806	594.87	43	4	Redundant with MW-4A, 4B
PZ-3	38.44652229	81.83618099	589.99	40	4	Redundant with MW-5A, 5B
PZ-4	38.44649599	81.83621205	590.21	40	4	Redundant with MW-5A, 5B
TB-1	38.44545975	81.83741876	593.07	34	2	Redundant with TB-3
TD-1	38.44569631	81.83721724	582.2	34	2	Settlement around well head
TD-3	38.44569631	81.83721724	590.92	31.6	2	Redundant with TD-5
TW-2	38.44652509	81.83621947	589.48	41	4	Redundant with MW-5A, 5B
WT-2	38.44247873	81.83525659	590.13	50	4	Redundant with WT-10A, 10B, 10C
WT-6	38.44602650	81.83537862	589.09	53	2	Abandoned 9/97, digester closure
WT-7A	38.44601727	81.83750242	589.25	33.8	2	Redundant with TD-5
WT-11A	38.44433013	81.83357301	588.6	-	2	Abandoned
WT-11B	38.44433579	81.83359169	588.47	-	2	Abandoned
WT-11C	38.44434261	81.83360738	588.27	-	2	Abandoned
TW-1	38.43796986	81.84751488	595.29	42.75	4	Redundant with MW-4A, 4B
MW-6A	38.44079160	81.84527228	591.39	31	2	Redundant with MW-22R, 24A
MW-6B	38.27185886	81.84527499	592.76	59	2	Redundant with MW-22R, 24A
MW-8 *	38.44055956	81.84410457	588.3	32	2	Interior location at PDA
MW-9	n/a	n/a	-	28	-	Unknown location
MW-12	38.43766718	81.84313774	589.8	28	2	Damaged, abandoned 11/98
MW-19A	38.43765356	81.84777787	597.58	60	2	Redundant with MW-3A, 3B
MW-19B	38.43766720	81.84777185	598.17	37	2	Redundant with MW-3A, 3B
MW-X1	n/a	n/a	594.66	59.24	2	Construction details unknown
MW-X2	n/a	n/a	594.79	42.15	2	Construction details unknown
MW-X3	n/a	n/a	-	20	4	Damaged, broken at ground level

* *Future investigation of PDA area to be completed as per previous discussions and information included in the attached letter with direct push technology.*

Current RCRA Monitoring Wells to Remain (15 Wells Total)

Well	NAD 83 Coordinates		Surface Elev.	Total Depth	Well Dia.	Comments
	Latitude	Longitude				
TD-5	38.44587586	81.83785616	589.49	30.4	2	WWTU, riverbank near outlet 001
WT-13A	38.44496758	81.83981600	590.82	35	4	WWTU, riverbank near old Nitro Dump
WT-14A	38.44540711	81.83832792	593.57	29.6	4	WWTU, 0^2 sparge system
WT-15A	38.44401457	81.83857187	589.08	25	4	WWTU, S boundary with I-64 ROW
MW-1A	38.43525539	81.84242265	594.37	31	2	Upgradient, bldg. 42
MW-1B	38.43524130	81.84242978	594.38	56	2	Upgradient, bldg. 42
MW-5A	38.43964316	81.84634349	594.65	33	2	Riverbank near EW-6A, 6B
MW-5B	38.43965149	91.84635731	594.91	54	2	Riverbank near EW-6A, 6B
MW-7	38.44234439	81.84370792	594.03	32	2	LNPAL Area
MW-14	38.43988684	81.84257743	589.53	29.6	2	NE corner of firewater reservior
MW-20A	38.43904296	81.84695427	596.71	40	2	Riverbank near EW-7A, 7B
MW-20B	38.43908031	81.84703836	596.76	60	2	Riverbank near EW-7A, 7B
MW-22R	38.44130821	81.84499155	596.53	41	4	Riverbank near PDA
MW-23A	38.43677950	81.84819277	598.82	36	4	SW property boundary with GLC
MW-24A	38.44055082	81.84543293	594.58	36	4	EQ tanks near Niran pits

Monitoring Wells to Remain (41 Wells Total)

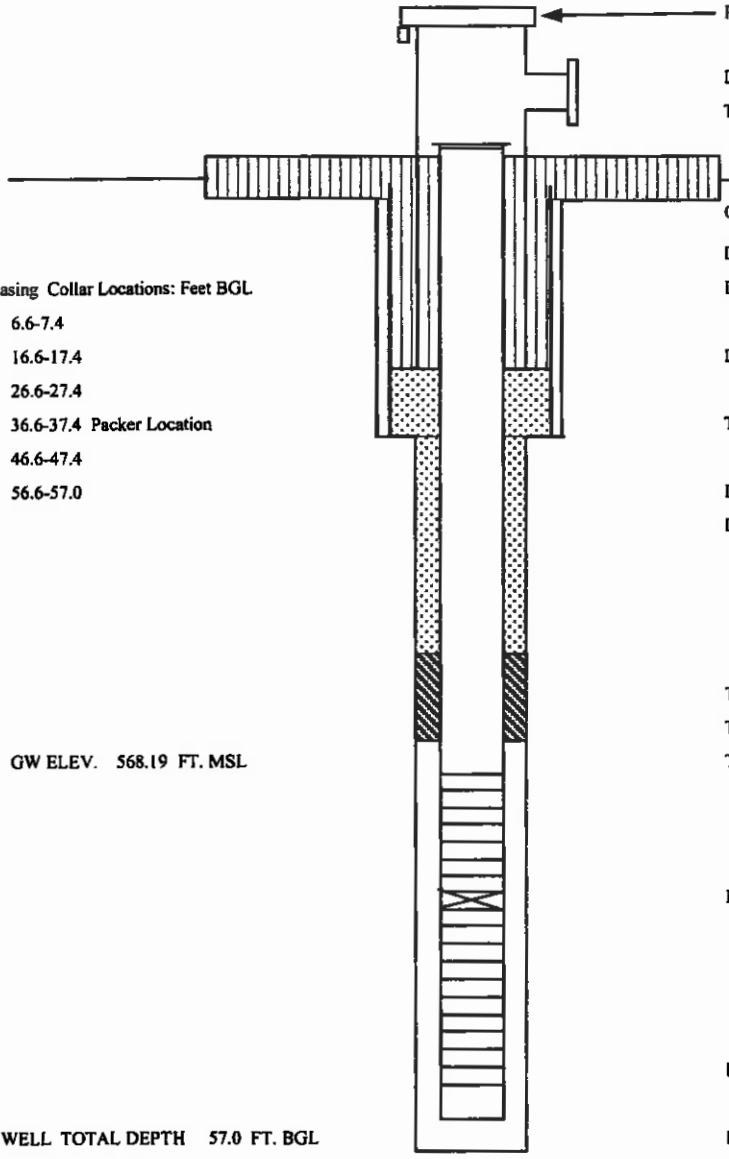
Well	NAD 83 Coordinates		Surface Elev.	Total Depth	Well Dia.	Comments
	Latitude	Longitude				
TB-3	38.44545975	81.83741876	582.9	33.7	2	WWTU, S. of control building
WT-1	38.44379406	81.83440951	590.33	33	2	WWTU, E. boundary w/ Mouldigraph
WT-3	38.44247873	81.83525659	590.67	50	4	WWTU, near liftstation no. 2
WT-4A	38.44546308	81.83694701	591.82	35	4	WWTU, near pH adj. Unit
WT-4B	38.44544113	81.83695905	592.06	54	4	WWTU, near pH adj. Unit
WT-5A	38.56998352	81.83767958	589.99	42	4	WWTU, riverbank near prim. clarifier
WT-5B	38.44639945	81.83628689	589.93	60	4	WWTU, riverbank near prim. clarifier
WT-7B	38.44605394	81.83743258	589.16	33.5	2	WWTU, riverbank near sec. clarifier
WT-7C	38.44604784	81.83743971	589.12	75	2	WWTU, riverbank near sec. Clarifier
WT-8A	38.44645174	81.83348154	589.42	40	2	WWTU, N. boundary w/ Nitro WWTP
WT-8B	38.44644030	81.83347631	589.31	52	2	WWTU, N. boundary w/ Nitro WWTP
WT-8C	38.44642899	81.83346804	587.13	70	2	WWTU, N. boundary w/ Nitro WWTP
WT-9A	38.44424636	81.83521578	599.71	51	2	WWTU, between Emer./EQ basins
WT-9B	38.44425568	81.83523859	598.61	54	2	WWTU, between Emer./EQ basins
WT-9C	38.44426466	81.83526463	599.53	81	2	WWTU, between Emer./EQ basins
WT-10A	38.44259375	81.83565314	590.13	40	2	WWTU, SE corner near I-64 ROW
WT-10B	38.44259909	81.83566661	590.09	55	2	WWTU, SE corner near I-64 ROW
WT-10C	38.44260484	81.83568096	590.3	74	2	WWTU, SE corner near I-64 ROW
MW-2A	38.43606251	81.84570310	592.6	31.65	2	S property boundary, bldg. 31
MW-2B	38.43605880	81.84568808	592.84	56	2	S property boundary, bldg. 31
MW-3A	38.43718461	81.84795588	598.85	36	2	Riverbank, SW plant corner
MW-3B	38.43720138	81.84795018	599.24	62	2	Riverbank, SW plant corner
MW-4A	38.43809641	81.84741056	598.56	37.5	2	Riverbank, near barge dock
MW-4B	38.43808400	81.84741806	598.05	37.5	2	Riverbank, near barge dock
MW-10	38.43707720	81.84430068	590.2	28.6	2	Interior plant well, bldgs. 25, 26
MW-11A	38.43748355	81.84135345	591.13	30	2	Upgradient, near plant entrance
MW-11B	38.43747611	81.84135819	591.01	50	2	Upgradient, near plant entrance
MW-13	38.43595971	81.84305056	590.84	29	2	Interior plant well, bldg. 40
MW-15	n/a	n/a	585.77	21	2	Upgradient, near firewater reservoir
MW-17A	38.43562047	81.84418584	591.53	41	2	S property boundary, bldg. 43
MW-17B	38.43562709	81.84420847	591.85	57	4	S property boundary, bldg. 43
MW-18A	38.43631627	81.84668913	593.2	41	2	S property boundary, bldg. 18
MW-18B	38.43632373	81.84670590	592.59	56	2	S property boundary, bldg. 18
MW-21A	38.44018410	81.84593726	592.65	59	2	Riverbank, outlet 006, EQ tanks
MW-21B	38.44019491	81.84592691	594.07	36	2	Riverbank, outlet 006, EQ tanks
B-5	38.44252449	81.84405108	578.89	14.45	2	Riverbank, LNAPL area
B-6	38.44276648	81.84380671	575.66	11.92	2	Riverbank, LNAPL area
B-7	n/a	n/a	577.37	14.5	2	Riverbank, LNAPL area
B-8A	38.44328404	81.84268774	595.64	41.32	4	Riverbank, AES property
B-8B	38.44330844	81.84283488	595.69	52.17	4	Riverbank, AES property
B-9	38.44392738	81.84176994	594.23	33.07	4	Riverbank, AES property

Extraction Wells to Remain (18 Wells Total)

Well	NAD 83 Coordinates		Surface Elev.	Total Depth	Well Dia.	Comments
	Latitude	Longitude				
EW-1	n/a	n/a	593.67	58.1	6	LNAPL Extraction Well
EW-2	38.44242805	81.84372230	593.43	58.4	6	LNAPL Extraction Well
EW-3	n/a	n/a	593.54	58	6	LNAPL Extraction Well
EW-4	38.44219812	81.84379400	592.81	57.6	6	LNAPL Extraction Well
EW-5A	38.44057624	81.84566636	594.09	42.49	6	TCE Extraction Well
EW-5B	38.44055171	81.84569404	594.87	57.82	6	TCE Extraction Well
EW-6A	38.43964962	81.84629671	594.23	42.19	6	TCE Extraction Well
EW-6B	38.43967972	81.84627367	594.18	59.78	6	TCE Extraction Well
EW-7A	n/a	n/a	595.16	43.36	6	TCE Extraction Well
EW-7B	n/a	n/a	595.2	59.28	6	TCE Extraction Well
EW-8	38.43682692	81.84815198	597.02	41.52	6	TCE Extraction Well
M-1	n/a	n/a	594.91	42.65	8	LNAPL Area
R-1	38.44230280	81.84373345	592.89	50.02	4	LNAPL Area
R-2	38.44394316	81.84375248	592.92	38.62	4	LNAPL Area
B-1	n/a	n/a	594.95	35.51	2	LNAPL Area
B-2	38.44218577	81.84368960	592.83	31.95	2	LNAPL Area
B-3	38.44227126	81.84389967	595.1	33.28	2	LNAPL Area
B-4	38.44236415	81.84365616	593.75	31.89	2	LNAPL Area

POTESTA & ASSOCIATES

RECOVERY WELL INSTALLATION DIAGRAM



PROTECTIVE ALUMINUM WELL COVER

DIA. OF PROTECTIVE COVER:	12.5	IN.
TOP OF PVC RISER ELEV.:	593.79	FT. MSL
GROUND LEVEL ELEV.:	592.77	FT. MSL
DIAMETER OUTER BOREHOLE:	16.0	IN.
DIAMETER OF OUTER CASING:	14.0	IN.
DEPTH OF OUTER CASING:	6.0	FT. BGS
TOP OF GROUT:	3.2	FT. BGS
DIAMETER OF MONIT. TUBING:	6.0	IN.
DIAMETER OF BOREHOLE:	10.5	IN.
TOP OF BENTONITE SEAL:	12.1	FT. BGL
TOP OF SAND PACK:	14.3	FT. BGL
TOP OF SCREEN:	16.8	FT. BGL
PACKER LOCATION	36.6	FT. BGL
BOTTOM OF SCREEN:	56.6	FT. BGL
BOTTOM OF BORE HOLE:	57.0	FT. BGL

Casing Collar Locations: Feet BGL

6.6-7.4

16.6-17.4

26.6-27.4

36.6-37.4 Packer Location

46.6-47.4

56.6-57.0

GW ELEV. 568.19 FT. MSL

WELL TOTAL DEPTH 57.0 FT. BGL

MATERIALS USED:

SAND TYPE & QUANTITY: 33 X 50Lb BAGS OF SILICA SAND

BENTONITE: 1 X 50 lb. BUCKETS OF 1/2" BENTONITE PELLETS

AMOUNT OF CEMENT: 3 X 94lb. BAGS OF PORTLAND CEMENT

GEL IN GROUT: 15 lb.. OF BENTONITE GEL

AMOUNT OF WATER USED: 33 GALLONS

OTHER: #1 MORIE EQUIVILANT SAND USED

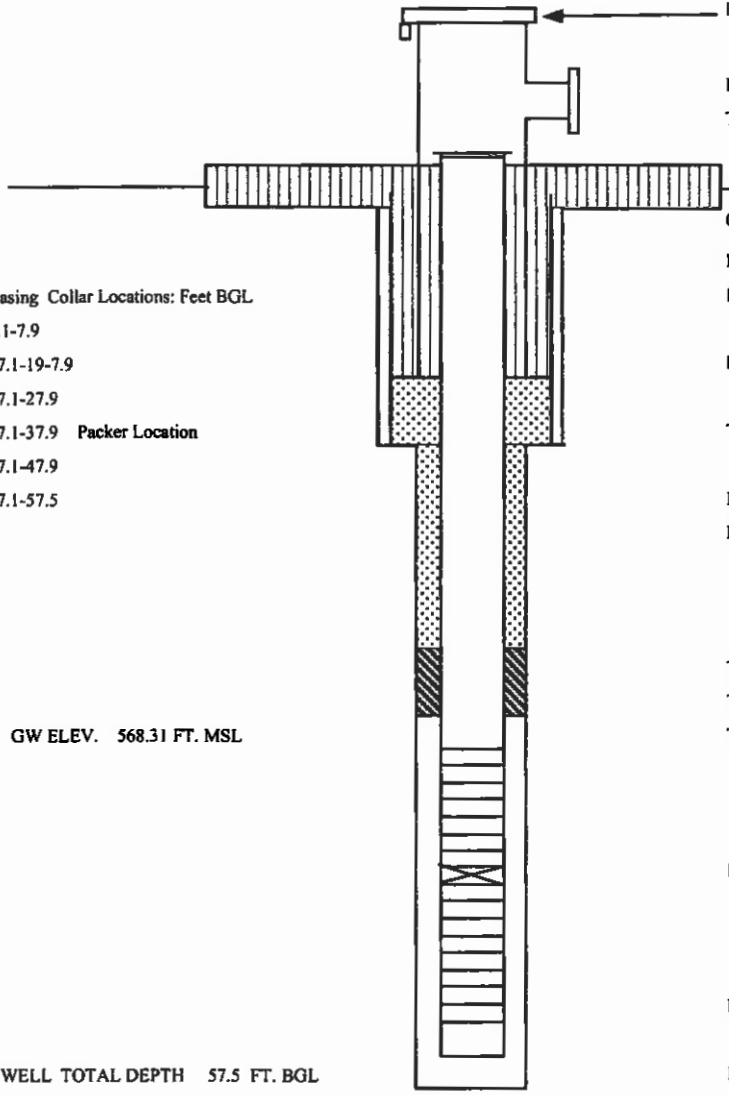
COMPANY:	MONSANTO COMPANY, NITRO, WV.
LOCATION:	LNAPL AREA
MONITORING WELL NO.	**EW-1**
SEA LEVEL ELEVATION:	593.79
INSTALLATION DATE:	12/7/95
GEOLOGIST:	D. N. JUNKER
PROJECT NO.:	95X308

BGL - Below Ground Level MSL - Mean Sea Level All diameters Inside Diameter

Note: Monitored tubing is 6" Johnson PVC riser and V-slot, wire wrapped screen. Screen has 10 slot openings.

POTESTA & ASSOCIATES

RECOVERY WELL INSTALLATION DIAGRAM



PROTECTIVE ALUMINUM WELL COVER

DIA. OF PROTECTIVE COVER:	12.5	IN.
TOP OF PVC RISER ELEV.:	593.57	FT. MSL
GROUND LEVEL ELEV.:	592.4	FT. MSL
DIAMETER OUTER BOREHOLE:	16.0	IN.
DIAMETER OF OUTER CASING:	14.0	IN.
DEPTH OF OUTER CASING:	6.5	FT. BGS
TOP OF GROUT:	5.0	FT. BGS
DIAMETER OF MONIT. TUBING:	6.0	IN.
DIAMETER OF BOREHOLE:	10.5	IN.
TOP OF BENTONITE SEAL:	12.7	FT. BGL
TOP OF SAND PACK:	14.0	FT. BGL
TOP OF SCREEN:	17.0	FT. BGL
PACKER LOCATION	37.1	FT. BGL
BOTTOM OF SCREEN:	57.1	FT. BGL
BOTTOM OF BORE HOLE:	57.5	FT. BGL

Casing Collar Locations: Feet BGL
7.1-7.9
17.1-19-7.9
27.1-27.9
37.1-37.9 Packer Location
47.1-47.9
57.1-57.5

GW ELEV. 568.31 FT. MSL

WELL TOTAL DEPTH 57.5 FT. BGL

MATERIALS USED:

SAND TYPE & QUANTITY: 33 X 50Lb BAGS OF SILICA SAND
BENTONITE: 1 X 50 lb. BUCKETS OF 1/2" BENTONITE PELLETS
AMOUNT OF CEMENT: 3 X 94lb. BAGS OF PORTLAND CEMENT
GEL IN GROUT: 15 lb.. OF BENTONITE GEL
AMOUNT OF WATER USED: 33 GALLONS
OTHER: #1 MORIE EQUIVILANT SAND USED

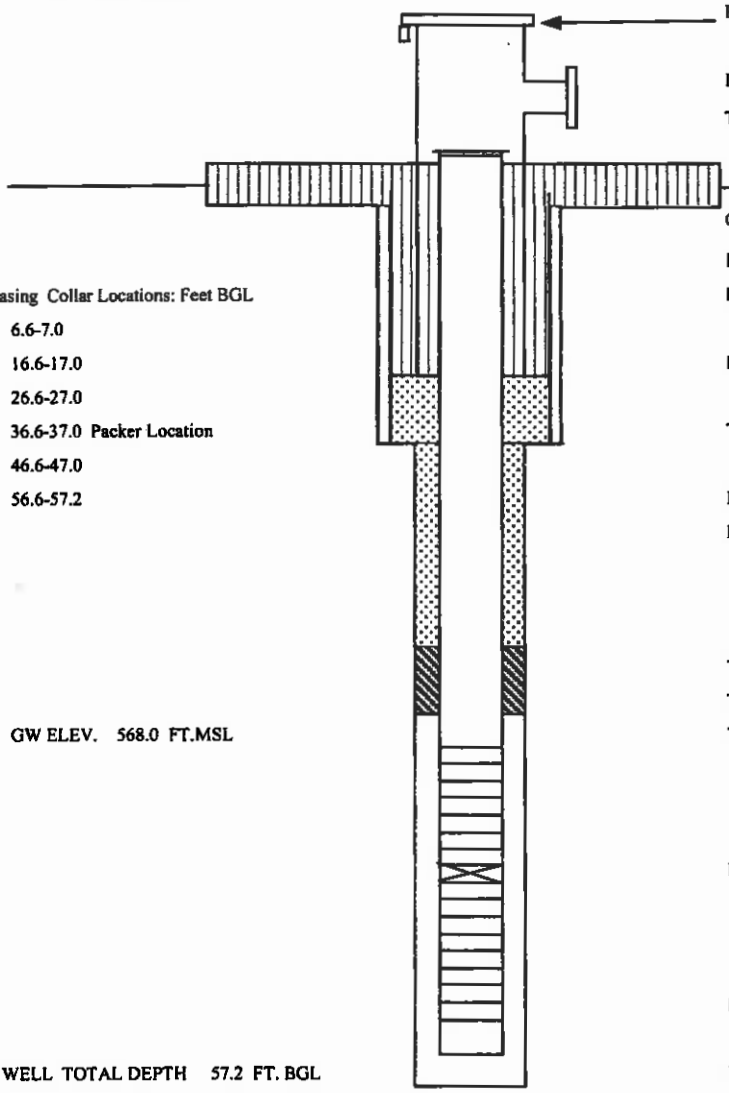
COMPANY:	MONSANTO COMPANY, NITRO, WV.
LOCATION:	LNAPL AREA
MONITORING WELL NO.	**EW-2**
SEA LEVEL ELEVATION:	593.57
INSTALLATION DATE:	12/4/95
GEOLOGIST:	D. N. JUNKER
PROJECT NO.:	95X308

BGL - Below Ground Level MSL - Mean Sea Level All diameters Inside Diameter

Note: Monitored tubing is 6" Johnson PVC riser and V-slot, wire wrapped screen. Screen has 10 slot openings.

POTESTA & ASSOCIATES

RECOVERY WELL INSTALLATION DIAGRAM



PROTECTIVE ALUMINUM WELL COVER

DIA. OF PROTECTIVE COVER:	12.5	IN.
TOP OF PVC RISER ELEV.:	593.68	FT. MSL
GROUND LEVEL ELEV.:	592.9	FT. MSL
DIAMETER OUTER BOREHOLE:	16.0	IN.
DIAMETER OF OUTER CASING:	14.0	IN.
DEPTH OF OUTER CASING:	6.0	FT. BGS
TOP OF GROUT:	4.5	FT. BGS
DIAMETER OF MONIT. TUBING:	6.0	IN.
DIAMETER OF BOREHOLE:	10.5	IN.
TOP OF BENTONITE SEAL:	12.5	FT. BGL
TOP OF SAND PACK:	14.8	FT. BGL
TOP OF SCREEN:	16.9	FT. BGL
PACKER LOCATION	36.6	FT. BGL
BOTTOM OF SCREEN:	56.8	FT. BGL
BOTTOM OF BORE HOLE:	59.0	FT. BGL

Casing Collar Locations: Feet BGL

6.6-7.0

16.6-17.0

26.6-27.0

36.6-37.0 Packer Location

46.6-47.0

56.6-57.2

GW ELEV. 568.0 FT.MSL

WELL TOTAL DEPTH 57.2 FT. BGL

MATERIALS USED:

SAND TYPE & QUANTITY: 36 X 50Lb BAGS OF SILICA SAND

BENTONITE: 1 X 50 lb. BUCKETS OF 1/2" BENTONITE PELLETS

AMOUNT OF CEMENT: 3 X 94lb. BAGS OF PORTLAND CEMENT

GEL IN GROUT: 15 lb.. OF BENTONITE GEL

AMOUNT OF WATER USED: 32 GALLONS

OTHER: #1 MORIE EQUIVILANT SAND USED

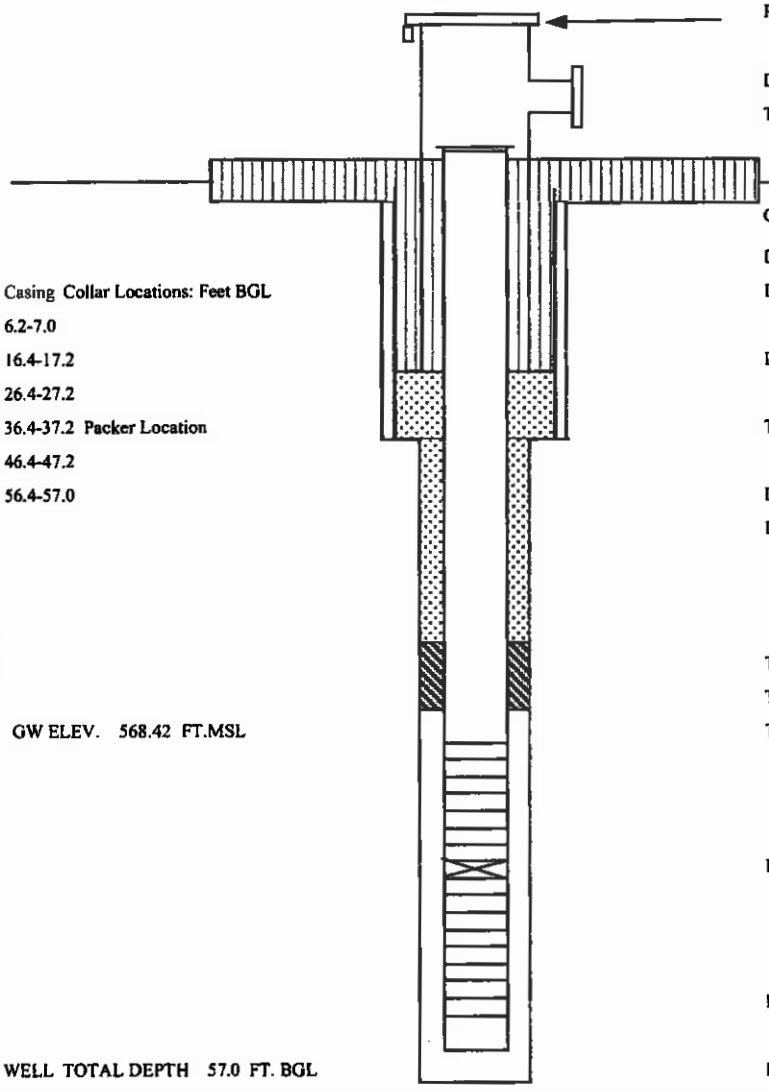
COMPANY:	MONSANTO COMPANY, NITRO, WV.
LOCATION:	LNAPL AREA
MONITORING WELL NO.	**EW-3**
SEA LEVEL ELEVATION:	593.68
INSTALLATION DATE:	12/9/95
GEOLOGIST:	D. N. JUNKER
PROJECT NO.:	95X308

BGL - Below Ground Level MSL - Mean Sea Level All diameters Inside Diameter

Note: Monitored tubing is 6" Johnson PVC riser and V-slot, wire wrapped screen. Screen has 10 slot openings.

POTESTA & ASSOCIATES

RECOVERY WELL INSTALLATION DIAGRAM



PROTECTIVE ALUMINUM WELL COVER

DIA. OF PROTECTIVE COVER:	12.5	IN.
TOP OF PVC RISER ELEV.:	592.92	FT. MSL
GROUND LEVEL ELEV.:	592.3	FT. MSL
DIAMETER OUTER BOREHOLE:	16.0	IN.
DIAMETER OF OUTER CASING:	14.0	IN.
DEPTH OF OUTER CASING:	6.0	FT. BGS
TOP OF GROUT:	3.9	FT. BGS
DIAMETER OF MONIT. TUBING:	6.0	IN.
DIAMETER OF BOREHOLE:	10.5	IN.
TOP OF BENTONITE SEAL:	13.0	FT. BGL
TOP OF SAND PACK:	15.0	FT. BGL
TOP OF SCREEN:	17.0	FT. BGL
PACKER LOCATION	36.4	FT. BGL
BOTTOM OF SCREEN:	56.6	FT. BGL
BOTTOM OF BORE HOLE:	57.5	FT. BGL

Casing Collar Locations: Feet BGL
6.2-7.0
16.4-17.2
26.4-27.2
36.4-37.2 Packer Location
46.4-47.2
56.4-57.0

GW ELEV. 568.42 FT.MSL

WELL TOTAL DEPTH 57.0 FT. BGL

MATERIALS USED:

SAND TYPE & QUANTITY: 33 X 50Lb BAGS OF SILICA SAND
BENTONITE: 1 X 50 lb. BUCKETS OF 1/2" BENTONITE PELLETS
AMOUNT OF CEMENT: 3 X 94lb. BAGS OF PORTLAND CEMENT
GEL IN GROUT: 15 lb.. OF BENTONITE GEL
AMOUNT OF WATER USED: 33 GALLONS
OTHER: #1 MORIE EQUIVILANT SAND USED

COMPANY:	MONSANTO COMPANY, NITRO, WV.
LOCATION:	LNAPL AREA
MONITORING WELL NO.	**EW-4**
SEA LEVEL ELEVATION:	592.92
INSTALLATION DATE:	12/4/95
GEOLOGIST:	D. N. JUNKER
PROJECT NO.:	95X308

BGL - Below Ground Level MSL - Mean Sea Level All diameters Inside Diameter

Note: Monitored tubing is 6" Johnson PVC riser and V-slot, wire wrapped screen. Screen has 10 slot openings.

ATTACHMENT VI

Plant Well Inspection Log, February 2001

PLANT
well inspection Log
2/01

Plant Wide
Monitoring Well Summary

Date: 2/19-2/20/2001

Well	Surface Elev.	2/19-2/20/01 SWL	2/19-2/20/01 SWL Elev.	Total Depth	Well Diameter	Remarks
P-1	592.21	21.27	570.94	29	1.5	
PZ-1	594.77	28.18	566.59	43	4	
PZ-2	594.87	28.61	566.26	43	4	
PZ-3	589.99	22.34	567.65	40	4	Bailer
PZ-4	590.21	23.19	567.02	40	4	Bailer
TB-1	593.07	25.25	567.82	34	2	Hinge broken
TB-3	582.9	25.52	557.38	33.7	2	
TD-1	582.2	24.78	557.42	34	2	
TD-3	590.92	23.77	567.15	31.6	2	Hinge broken
TD-5	589.49	22.46	567.03	30.4	2	Hinge broken
TW-2	589.48	22.55	566.93	41	4	Bailer
WT-1	590.33	19.91	570.42	33	2	
WT-2	590.13	19.08	571.05	50	4	
WT-3	590.67	20.19	570.48	50	4	
WT-4A	591.82	22.49	569.33	35	4	Bailer
WT-4B	592.06	23.04	569.02	54	4	Bailer
WT-5A	589.99	22.91	567.08	42	4	Bailer
WT-5B	589.93	22.62	567.31	60	4	
WT-6	589.09	-	-	53	2	Abandoned 9/97
WT-7A	589.25	22.08	567.17	33.6	2	Bailer
WT-7B	589.16	22.29	566.87	33.5	2	Bailer
WT-7C	589.12	22.24	566.88	75	2	
WT-8A	589.42	20.14	569.28	40	2	Bailer
WT-8B	589.31	19.95	569.36	52	2	
WT-8C	587.13	17.94	571.37	70	2	
WT-9A	599.71	29.25	570.46	51	2	Bailer
WT-9B	598.61	29.6	569.01	54	2	Bailer
WT-9C	599.53	29.23	570.3	81	2	
WT-10A	590.13	19.14	570.99	40	2	Bailer
WT-10B	590.09	19.09	571	55	2	Bailer
WT-10C	590.3	19.3	571	74	2	
WT-11A	588.6	-	-	-	2	Off site, ?abandoned?
WT-11B	588.47	-	-	-	2	Off site, ?abandoned?
WT-11C	588.27	-	-	-	2	Off site, ?abandoned?
WT-13A	590.82	24.03	566.79	35	4	
WT-14A	593.57	26.04	567.53	29.8	4	
WT-15A	589.08	7.3	581.78	25	4	
TW-1	595.29	29.47	565.82	42.75	4	No Hasp or Lock
MW-1A	594.37	21.03	573.34	31	2	Hinge broken
MW-1B	594.38	21.08	573.3	56	2	
MW-2A	592.6	20.67	571.93	31.66	2	Hinge broken
MW-2B	592.84	20.99	571.85	56	2	
MW-3A	598.85	29.39	569.46	36	2	Bailer, Hinge broken, Hasp broken
MW-3B	599.24	29.25	569.98	62	2	
MW-4A	598.56	28.49	570.07	37.5	2	Hinge broken
MW-4B	598.05	28.23	569.82	37.5	2	
MW-5A	594.65	27.19	567.46	33	2	Bailer, Hinge broken
MW-5B	594.91	27.27	567.64	54	2	
MW-6A	591.39	22.64	568.75	31	2	Bailer, Hinge broken
MW-6B	592.76	24.99	567.77	59	2	
MW-7	594.03	27.85	566.18	32	2	
MW-8	588.3	20.24	568.06	32	2	Hinge broken
MW-9	-	-	-	26	-	Location Unkown
MW-10	590.2	18.16	572.04	28.6	2	Hinge broken
MW-11A	591.13	18.59	572.54	30	2	Hinge broken
MW-11B	591.01	18.49	572.52	50	2	
MW-12	589.8	-	-	26	2	Damaged, ?Destroyed?
MW-13	590.84	18.23	572.61	20.16	2	Lid Rusted Shut
MW-14	589.53	17.62	571.91	29.6	2	
MW-15	585.77	15.78	570.78	21	2	Hinge broken
MW-17A	591.53	19.15	572.38	41	2	
MW-17B	591.85	19.4	572.45	57	4	
MW-18A	593.2	21.92	571.28	41	2	
MW-18B	592.59	21.53	571.06	56	2	No lid, No Lock
MW-19A	597.58	27.95	569.63	60	2	
MW-19B	598.17	29.29	568.88	37	2	
MW-20A	596.71	28.81	567.9	40	2	Bailer
MW-20B	596.76	28.72	568.04	60	2	
MW-21A	592.65	26.27	566.38	59	2	
MW-21B	594.07	25.91	568.16	36	2	Bailer
MW-22R	596.53	29.09	567.44	41	4	Bailer, Hasp broken
MW-23A	598.82	28.96	569.86	36	4	
MW-24A	594.58	26.99	567.59	36	4	Bailer
MW-X	594.42	27.69	566.73	63.28	4	
MW-X1	594.66	27.05	567.61	59.24	2	Hasp Broken, No Lock
MW-X2	594.79	28.27	566.52	42.15	2	
B-1	594.95	28.68	566.27	35.51	2	
B-2	592.83	26.4	566.43	31.95	2	
B-3	595.1	28.66	566.44	33.28	2	
B-4	593.75	26.75	567	31.89	2	
B-5	578.89	12.01	566.88	14.45	2	
B-6	575.66	8.89	566.77	11.92	2	
B-7	577.37	10.78	566.59	14.5	2	
B-8A	595.64	28.7	566.94	41.32	4	
B-8B	595.69	28.73	566.96	52.17	4	
B-9	594.23	27.35	566.88	33.07	4	
M-1	594.91	28.14	566.77	42.65	6	
R-1	592.89	25.69	567.2	50.02	4	
R-2	592.92	25.99	566.93	38.62	4	
EW-1	593.67	26.89	566.78	56.1	6	
EW-2	593.43	-	-	58.4	6	Dye Test In Progress
EW-3	593.54	26.38	567.16	58	6	
EW-4	592.61	-	-	57.6	6	Dye Test in Progress
EW-5A	594.09	26.84	567.25	42.49	6	Extraction Well
EW-5B	594.87	26.75	568.12	57.82	6	Extraction Well
EW-6A	594.23	29.56	564.67	42.19	6	Extraction Well
EW-6B	594.18	39.7	554.48	59.78	6	Extraction Well
EW-7A	595.16	29.51	565.65	43.36	6	Extraction Well
EW-7B	595.2	26.86	568.34	59.28	6	Extraction Well
EW-8	597.02	32.04	564.98	41.52	6	Extraction Well
River Elevation	566.72	2/19/01				
	566.7	2/20/01				

ATTACHMENT VII

Dioxin / Furan Soils Database and Map

MAPPING REFERENCE:

BASE MAPPING PREPARED BY PHOTO SCIENCE, INC. FROM AREAL PHOTOGRAPHY DATED 2/17/95. SUBSEQUENT REVISIONS COMPLETED BY FLEXSYS AMERICA L.P.

No.	Date	Revision

01-0081grdcover
CAD File No.

REO
Drawn

CAG
Checked

CAG
Approved

1"=200
Scale:

AUGUST 2002
Date:

01-0081
Project No.

Potesta & Associates, Inc.
ENGINEERS AND ENVIRONMENTAL CONSULTANTS
2300 MacCorkle Ave. SE, Charleston, WV 25304
TEL: (304) 342-1400 FAX: (304) 343-9031
E-Mail Address: potesta@potesta.com.

Owner

SOLUTIA, INC.
FLEXSYS AMERICA L.P.
NITRO, WEST VIRGINIA FACILITY

Title

EXPOSURE CONTROLS OVERLAY
SURFACE FEATURES/COVERINGS

3

Drawing No.

ATTACMENT VIII

RATIONALE FOR "NO-DIG" LIMITS

Flexsys America L.P. Nitro Production Facility
Nitro, West Virginia

The "no-dig" policy currently in effect at the Flexsys Nitro Plant facility was amended in the late 1980's to address potential exposure to plant workers and contract maintenance personnel working within the plant limits. It was entitled "No-Dig" to emphasize the serious nature of digging in these areas and to reiterate that extraordinary precautions are required prior to excavation. The excavation policy was developed in a collaborative effort by Solutia and Flexsys and is routinely reviewed by Flexsys and Solutia environmental safety and health professionals every three years. The policy is reviewed for applicability to the current plant production activities including a review of recent soil environmental information collected within the plant limits.

The excavation policy addresses a number of issues, from geotechnical and stability concerns related to OSHA requirements for trench and open excavations as well as utility verification requirements prior to excavation. The environmental concerns related to the "no-dig" limits do not prevent excavations in these areas. However, excavations within "no-dig" boundaries require development and approval of a specific health and safety plan prior to work beginning. Proper training procedures are required including the review of proper PPE requirements.

The "no-dig" boundary limits were developed and added to the excavation sections of the plant ESH manual in the early to mid 1980's after collection and review of shallow soil samples throughout the plant limits. This work was completed by NUS Corporation working under contract to the United States Environmental Protection Agency, Region III (USEPA). Two studies were conducted. The first was completed in November 1983 and the second in January 1985. These studies included the collection of shallow soil samples (i.e., less than 1 foot), which were collected along an established grid system through the plant area. The study area included both the wastewater treatment area as well as the production areas of the plant. These studies are summarized in the following EPA reports:

> Final Report; TDD No. F3-8306-26, Monsanto Corporation; EPA No. WV-W-04, November 9, 1983.
>
> Final Report; TDD No. F3-8308-31, Monsanto Company; EPA No. WV-029, January 3, 1985.

The soil samples collected during these Site visits were analyzed for 2,3,7,8-TCDD congeners. The data was reviewed and specific areas of concern were identified based upon elevated level of dioxin. Limits of the "no-dig" areas were determined based on the review of this information. All three of the designated "no-dig" areas were utilized in

some phase of the production of 2,4,5-T or the disposal of 2,4,5-T dismantled equipment. Generally, the "no-dig" limits represent areas where 2,3,7,8-TCDD concentrations in the shallow soils exceed of 10 ppb. A Solutia representative is required to review and sign all excavation permit applications. In the event that the excavation is within the limits of a "no-dig" area, the contractor is required to submit a formal Site-specific health and safety plan, and in all cases the required PPE is at a minimum Level C.