

Prepared by and return to:
Attorney Sherilyn Burnett Young
Rath, Young and Pignatelli, P.C.
One Capital Plaza
Concord, NH 03302-1500

Tax Parcel # S0090219010
EPA Site ID # VAD003109360

14. 15596

M / 10:31

ENVIRONMENTAL COVENANT

This Environmental Covenant is made and entered into as of the 4th day of August, 2014 by **4107 CASTLEWOOD ROAD, LLC**, a SPE for W. F. Holdings, Inc., whose address is 3 East Spit Brook Road, Nashua, New Hampshire 03060, (hereinafter referred to as the "Grantor" or "Owner"), to be indexed as Grantor and Grantee. The **UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION III**, whose address is 1650 Arch Street, Philadelphia, PA 19103 (hereinafter referred to as "EPA" or the "Agency") will be the approving agency.

This Environmental Covenant is executed pursuant to the Virginia Uniform Environmental Covenants Act, §10.1-1238 et seq. of the Code of Virginia ("UECA"). This Environmental Covenant subjects the Property identified in Paragraph 1 to the activity and use limitations in this document.

1. Property Affected. The property affected by this Environmental Covenant is located at 4107 Castlewood Road, Richmond, Virginia 23234 (hereinafter referred to as the "Property") and is further described as:

All of those lots or parcels of land in the City of Richmond, Virginia, and more particularly described as follows:

That certain tract or parcel of land, with improvements and appurtenances, in the City of Richmond, Virginia, on the western line of Castlewood Road and more particularly described with reference to a plat entitled "Map Showing Improvements on a Parcel of Land Situated in the City of Richmond, Virginia, Shown as a Reserved Parcel on a Map of Block A, of the P.C. Warwick Property", made by LaPrade Bros., Civil Engineers & Surveyors, dated August 15, 1975, and revised December 5, 1985, and more particularly described as follows:

Beginning at a rod in the western line of Castlewood Road, which rod is 1097.24 feet southwardly from the intersection of the southern line of Bells Road with the western line

of Castlewood Road; from the point of beginning, S. 2 degrees 29' W. along the western line of Castlewood Road; then to a point at the intersection of the western line of Castlewood Road with the northern property line of Virginia Electric and Power Company; then N. 89 degrees 54' W. along the property line, 738.40 feet to a rod at the intersection of the property line with the eastern right of way line of the Atlantic Coast Line Railroad; then northwardly along the eastern right of way line N. 7 degrees 38' E. 173.42 feet through a rod to another rod in the right of way line; then continuing along such right of way line as it curves to the left along the arc of a circle, the radius of which is 6331.27 feet, a distance of 28.32 feet to a rod at the intersection of the right of way with the southern property line of Southern Adhesives Corporation; then S. 89 degrees 54' E. along the southern property line 720.34 feet to the rod at the point of beginning.

Together with the right, if any, in and to the use of the private road described in Agreement recorded in Deed Book 274, page 50.

Being the same real estate conveyed to Charles J. Keck and Eileen Keck, husband and wife, as tenants by the entirety with the right of survivorship, by Deed from Fergusson Associates, L.L.C., a Virginia limited liability company, dated September 8, 2008 and recorded September 17, 2008 in the Clerk's Office of the Circuit Court of the City of Richmond, Virginia as Instrument No. 080024912.

2. Description of Contamination and Remedy

a. The Administrative Record pertaining to the environmental response project on the Property that is described in this Environmental Covenant is located at:

U.S. Environmental Protection Agency, Region III
 Land and Chemicals Division
 Office of Remediation (3LC20)
 1650 Arch Street, 11th Fl.
 Philadelphia, PA 19103

b. The contamination and remedy relating to the Property, including descriptions of the Property before remedy implementation, contaminants of concern, pathways of exposure, limits on exposure, location and extent of contamination, and the remedy/corrective action undertaken is briefly described herein, and is also described in the Final Decision and Response to Comments ("FDRTC") for J. W. Fergusson & Sons facility ("Facility"), Richmond, Virginia, EPA ID # VAD003109360, dated November 2012, attached hereto as **Exhibit A**.

The Facility operated a rotogravure printing press from 1962 until 2006, in a single story concrete block building on the Property. It is surrounded by a Dominion Virginia Power storage yard, Castlewood Road, a railroad, and commercial developments. The Property is zoned M-1- Light Industrial and is fenced on all sides to restrict access. The Facility is provided water by the City's public water system.

The Facility generated hazardous wastes from its chrome plating operations and chrome stripping operations, including caustic waste from washing equipment in the printing plant, waste solvents and still bottoms. In the western portion of the property, the Facility operated a solvent recovery system which consisted of large granular activated carbon vessels and several above-ground storage tanks for containing recovered solvent and waste water from the carbon stripping steam down process.

The Facility maintained a number of Solid Waste Management Units (SWMUs) consisting of a drum storage area (SWMU 7), underground storage tanks containing raw materials used in the manufacturing processes (SWMUs 8 and 9) and the solvent recovery system (SWMU 6). Investigation of soil and groundwater and remedial activities on the property were completed in accordance with the UST Program, the Virginia Voluntary Remediation Program (VRP) and the RCRA Corrective Action Program (RCRA CA).

Analytical results from sampling of onsite groundwater wells indicate that benzene, vinyl chloride and 1,1-DCE are above the Federal Maximum Contaminant Levels (MCLs). The most recent concentrations of these constituents are 21.5 ppb of benzene in MW-5, 2.63 ppb of vinyl chloride in MW-5, and 7.13 ppb of 1,1-DCE in MW-7. However, stabilization and/or attenuation of these constituents has been observed.

The groundwater flow direction across the Property is generally to the east and southeast. Impacted media is limited to on-site and there has been no observation or indication of migration off-site. Therefore, groundwater associated with the Facility does not discharge to any surface water bodies.

A groundwater monitoring plan has been developed and implemented at the Facility in accordance with a Groundwater Monitoring Plan approved by the Virginia Department of Environmental Quality ("VDEQ"), dated May 31, 2012, see **Exhibit C**, attached. The Groundwater Monitoring Plan requires continued monitoring of the constituents that exceed MCLs. Groundwater monitoring occurs every two years, and the results are reported to the VDEQ and EPA following each monitoring event.

The Final Remedy for the Facility, selected by EPA in the FDRTC, requires the continuation of the groundwater monitoring program under the VDEQ approved Groundwater Monitoring Plan. In addition, because some contaminants remain in the soil and groundwater at the Property at levels which exceed residential use, EPA's Final Remedy also requires the compliance with and maintenance of activity and use limitations set forth in Section 3, below.

3. Activity and Use Limitations

a. The Property is subject to the following activity and use limitations which shall run with the land and become binding on Grantor and any successors, assigns, tenants, agents, employees and other persons under its control, until such time as this covenant may terminate as provided by law:

1. Groundwater at the Property shall not be used for any purpose other than monitoring activities required by VDEQ and EPA, unless it is demonstrated to EPA, in consultation with VDEQ, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the Final Remedy and EPA, in consultation with VDEQ, provides written approval for such use.
2. The Property shall not be used for residential purposes unless it is demonstrated to EPA, in consultation with VDEQ, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the Final Remedy and EPA, in consultation with VDEQ, provides written approval for such use.
3. EPA and VDEQ must provide advance written approval for the installation of new groundwater wells on the Property.
4. The Property will not be used in a way that will adversely affect or interfere with the integrity or protectiveness of the Final Remedy.
5. Owner agrees to allow EPA, state and/or their authorized agents and representatives access to the Property to inspect and evaluate the effectiveness of the Final Remedy and if necessary, to conduct additional remediation to ensure the protection of public health and safety and the environment based upon the Final Remedy selected by EPA in the FDRTC.
6. Owner agrees to provide EPA and VDEQ with a "Certified, True and Correct Copy" of any instrument that conveys any interest in the Property or any portion thereof.
7. Requires that vapor mitigation be utilized in or beneath new, totally enclosed structures designed for occupation within the footprint of the contaminated groundwater plume identified above protective levels, unless it is demonstrated to EPA and VDEQ that it is not necessary to protect human health.
8. All earth moving activities, including excavation, drilling and construction activities, in the SWMUs and/or areas of concern at the Property shall be conducted in accordance with a materials management plan approved by EPA, in consultation with VDEQ, and in such a manner that such activity will not pose a threat to human health and the environment or adversely affect or interfere with the Final Remedy.

b. The geographic coordinate lists defining the boundary of the activity and use restrictions, depicted as a polygon, is set forth in **Exhibit B**, attached.

4. Notice of Limitations in Future Conveyance

Each instrument hereafter conveying any interest in the Property subject to this Environmental Covenant shall contain a notice of the activity and use limitations set forth in this Environmental Covenant and shall provide the recorded location of this Environmental Covenant.

5. Compliance and Use Reporting

a. Compliance with and effectiveness of institutional controls and engineering controls implemented at the facility shall be evaluated every three (3) years and whenever requested in writing by EPA. The evaluation will include, but not be limited to, a review of groundwater and land uses within one mile of the facility property boundary and zoning maps or planning documents that may affect future land use in the impacted area. A report documenting the findings of the evaluation shall be provided to EPA and VDEQ. This documentation shall be signed by a qualified and certified professional engineer who has inspected and investigated compliance with this Environmental Covenant.

b. Compliance with and effectiveness of the proposed remedies at the facility in reducing contaminant concentrations and restoring the groundwater to MCLs shall be evaluated and included in the biennial Groundwater Monitoring Report as required by the approved Groundwater Monitoring Plan. Groundwater results from the Facility shall also be reported in the Groundwater Monitoring Report.

c. In addition, within one (1) month after any of the following events, the then current owner of the Property shall submit to the Agency written documentation describing the following: noncompliance with the activity and use limitations in this Environmental Covenant; transfer of the Property; changes in use of the Property, or filing of applications for building permits for the Property and any proposals for any site work, if such building or proposed site work will affect the contamination on the Property.

6. Access by the Holder and the Agency

In addition to any rights already possessed by the Holder and the Agency, this Environmental Covenant grants to Holder, the Agency and VDEQ a right of reasonable access to the Property in connection with implementation, inspection, or enforcement of this Environmental Covenant.

7. Subordination and Encumbrances

Reserved.

8. Recording, Proof and Notification

a. Within 90 days after the date of the Agency's approval of this Environmental Covenant, the Owner shall record, or cause to be recorded, the Environmental Covenant with the Clerk of the Circuit Court for each locality wherein the Property is located. The Owner shall likewise record, or cause to be recorded, any amendment, assignment, or termination of this

Environmental Covenant with the applicable Clerk(s) of the Circuit Court within 90 days of their execution. Any Environmental Covenant, amendment, assignment or termination recorded outside of these periods shall be invalid and of no force and effect.

b. The Owner shall send a file-stamped copy of this Environmental Covenant and of any amendment, assignment, or termination, to the Agency within 60 days of recording. Within that time period, the Owner also shall send a file-stamped copy to the chief administrative officer of each locality in which the Property is located, any persons who are in possession of the Property who are not the Owners, any signatories to this Environmental Covenant not previously mentioned, and any other parties to whom notice is required pursuant to UECA.

9. Termination or Amendment

This Environmental Covenant is perpetual and runs with the land unless terminated or amended (including assignments) in accordance with UECA.

10. Enforcement of Environmental Covenant

This Environmental Covenant shall be enforced in accordance with § 10.1-1247 of the Code of Virginia.

Balance of page is intentionally left blank. Signatures on following page.

ACKNOWLEDGEMENTS:

GRANTOR

4107 CASTLEWOOD ROAD, LLC,
a SPE for W. F. Holdings, Inc.,

By (signature):

David Worthen

Name (printed):

David Worthen

Title:

Manager of the LLC, and President of W. F. Holdings, Inc.

Date:

8/4/, 2014

STATE OF NEW HAMPSHIRE
COUNTY OF HILLSBOROUGH
CITY OF NASHUA

On this 4th day of August 2014, before me, the undersigned officer, personally appeared David Worthen (Owner and Grantor) who acknowledged himself to be the person whose name is subscribed to this Environmental Covenant, and acknowledged that he freely executed the same for the purposes therein contained.

In witness whereof, I hereunto set my hand and official seal,

Sandra A. Marston
Notary Public

SANDRA A. MARSTON, Notary Public

My commission expires: My Commission Expires November 18, 2014

APPROVED by the U. S. Environmental Protection Agency, Region III

By (signature):

Catherine A. Lbertz

Name (printed):

Catherine A. Lbertz

Title:

Deputy Director, Land and Chemicals Division

Date:

8-20, 2014

SEEN AND RECEIVED by the Virginia Department of Environmental Quality

By (signature):

Jutta Schneider

Name (printed):

Jutta Schneider

Title:

Program Manager, RCRA CA and Groundwater

Date:

August 28, 2014

Prepared by and return to:
Attorney Sherilyn Burnett Young
Rath, Young and Pignatelli, P.C.
One Capital Plaza
Concord, NH 03302-1500

Exhibit A

Final Decision and Response to Comments for J. W. Fergusson & Sons Site,
Richmond, Virginia,

EPA ID # VAD003109360, dated November 2012

PG 0125 SEP -8 2



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III

FINAL DECISION AND RESPONSE TO COMMENTS

J. W. Fergusson & Sons, Inc.
of
Richmond, Virginia
(VAD003109360)

I. FINAL DECISION

The United States Environmental Protection Agency ("EPA") is issuing this Final Decision and Response to Comments ("Final Decision") under the authority of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act ("RCRA") of 1976, and the Hazardous and Solid Waste Amendments ("HSWA") of 1984, 42 U.S.C. Sections 6901 to 6992k, regarding the remedy for the J. W. Fergusson & Sons, Inc. facility (Facility) located at 4107 Castlewood Road, Richmond, Virginia.

On September 24, 2012, EPA issued a Statement of Basis ("SB") in which it described its proposed remedy for the Facility. The SB is hereby incorporated into this Final Decision by reference and made a part hereof as Attachment A. EPA's proposed remedy for the Facility consists of the following two components: 1) performance and maintenance of a groundwater monitoring program; and 2) compliance with and maintenance of existing Institutional Controls (ICs) that restrict certain land and groundwater uses at the Facility.

II. PUBLIC COMMENT PERIOD

On September 26, 2012, EPA published the SB in the Richmond Times-Dispatch newspaper and on EPA Region III's website and announced the commencement of a thirty (30)-day public comment period in which it requested comments from the public on the remedy proposed in the SB. The public comment period ended on October 26, 2012.

III. RESPONSE TO COMMENTS

EPA received no comments on its proposed remedy for the Facility. Consequently, EPA's Final Remedy did not change from the remedy it proposed in the SB.

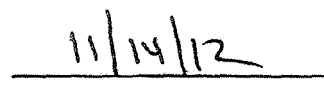
IV. FINAL REMEDY

The Final Remedy, the components of which are explained in detail in the SB, restricts the Facility to non-residential use through compliance with and maintenance of institutional controls, restriction on groundwater use, continued monitoring of groundwater, and a soil management plan to restrict activities in known contaminated areas.

V. DECLARATION

Based on the Administrative Record compiled for the Corrective Action at the J.W. Fergusson & Sons, Inc. facility, EPA has determined that the Final Remedy selected in this Final Decision and Response to Comments is protective of human health and the environment.





Abraham Ferdas, Director
Land & Chemicals Division
U.S EPA Region III

Date



STATEMENT OF BASIS

**J.W. FERGUSSON & SONS, INC.
(VAD003109360)**

September 2012

TABLE OF CONTENTS

I.	Introduction.....	1
II.	Facility Background.....	1
III.	Summary of Environmental Investigation	2
	A. Closure – Container Storage Area.....	2
	B. LUST Program Cleanup Activities.....	2
	C. Environmental Site Assessment	3
	D. Voluntary Remediation Program Cleanup Activities.....	3
	E. RCRA Corrective Action Program Activities.....	4
IV.	Corrective Action Objectives.....	5
	A. Soils.....	5
	B. Groundwater.....	5
V.	Summary of Proposed Remedy	5
	A. Groundwater.....	5
	B. Compliance with and Maintenance of Institutional Controls	5
	C. Implementation.....	7
	D. Reporting Requirements.....	7
VI.	Evaluation of EPA’s Proposed Remedy.....	7
	A. Threshold Criteria.....	7
	B. Balancing/Evaluation Criteria	8
VII.	Public Participation	10

List of Figures

- Figure 1 Site Location Map
- Figure 2 Map of Location of Solid Waste Management Units
- Figure 3 Map of Monitoring Well Locations

I. Introduction

The United States Environmental Protection Agency (EPA) has prepared this Statement of Basis (SB) to solicit public comment on its proposed remedy for the J.W. Fergusson & Sons, Inc. facility located at 4107 Castlewood Road, Richmond, Virginia (Facility or Site). EPA's proposed remedy consists of the following two components: 1) performance and maintenance of a groundwater monitoring program 2) compliance with and maintenance of existing Institutional Controls (ICs) that restrict certain land and groundwater uses at the Facility. This SB highlights key information relied upon by EPA in making its proposed remedy.

The Facility is subject to EPA's Corrective Action Program under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. §§ 6901 et seq. (Corrective Action Program). The Corrective Action Program is designed to ensure that certain facilities subject to RCRA have investigated and cleaned up any releases of hazardous waste and hazardous constituents that have occurred at their property. For unpermitted facilities, EPA retains primary authority in Virginia for the Corrective Action Program.

The Administrative Record (AR) for the Facility contains all documents, including data and quality assurance information, on which EPA's proposed remedy is based. See Section VII, Public Participation, for information on how you may review the AR.

II. Facility Background

The Facility consists of approximately 3.35 acres and is surrounded by a Dominion Virginia Power storage yard, Castlewood Road, a railroad, and commercial developments. The Site is zoned M-1-Light Industrial and is fenced on all sides to restrict access to the Site. A location map is attached as Figure 1.

J.W. Fergusson and Sons, Inc. purchased the Facility in 1962. Prior to this time, the Site was a vacant lot that had not been used in any prior business. The printing operations began in 1964. The Facility was used for that purpose until September 2006 at which time all operations ceased. All manufacturing equipment, process raw materials, and waste materials were removed and transported off-site for reclamation, re-use, or disposal. In addition, all process material tanks and waste tanks were decontaminated and closed in place or removed.

The Facility operated a hazardous waste container storage area with a storage capacity of 2,500 gallons under Interim Status effective November 19, 1980. The Virginia Department of Health (VDH), Division of Solid and Hazardous Waste Management, issued correspondence, dated December 14, 1983, formally requesting the Facility to submit a RCRA Part B Permit Application for management and storage of hazardous waste at the Facility. The VDH was responsible for management of hazardous waste in the Commonwealth prior to the creation of Virginia Department of Environmental Quality (VDEQ) in 1993. The Facility decided to close the container storage area, and subsequently, this area was Certified Clean Closed in accordance with Virginia's Hazardous Waste Management Regulations on October 9, 1984.

The Facility generated hazardous wastes from chrome plating operations and chrome stripping operations, including caustic waste from washing equipment in the printing plant, waste solvents, and still bottoms. Raw materials used at the Site included acetone, toluene, methyl ethyl

ketone (MEK), isopropyl acetate, hexane, alcohols, esters, and ethylene vinyl acetate. The Facility maintained underground storage tanks (USTs) containing raw materials used in the manufacturing process. Additionally, the Facility operated a solvent recovery system that consisted of large granular activated carbon vessels and several above ground storage tanks for containing recovered solvent and waste water from the carbon stripping steam down process.

The Facility was sold to Fergusson Associates LLC in 1996. The Facility has not been occupied or used for any purposes since 2006. Future use of the property is reasonably expected to be industrial based on its location and current zoning status by local jurisdiction (M-1 Light Industrial). Potable water is supplied to the Facility by the City of Richmond Water Supply system.

III. Summary of Environmental Investigation

EPA identified a number of Solid Waste Management Units (SWMUs) at the Facility after reviewing its own files and those maintained by the VDEQ. Environmental investigations and cleanup activities associated with these SWMUs focused on the hazardous waste container storage area (SWMU 4), underground storage tanks containing raw materials used in the manufacturing process (SWMUs 8 and 9), and a solvent recovery system (SWMU 6). A map showing the SWMUs locations is attached as Figure 2. Environmental investigations and cleanup activities were performed in accordance with the VDEQ's Leaking Underground Storage Tank (LUST) Program, the Virginia Voluntary Remediation Program (VRP), and the EPA-authorized Corrective Action program. (The citations to these programs may be found in the Administrative Record.)

A. Closure - Container Storage Area

On July 2, 1984, the VDH received a Closure Plan for the container storage area (SWMU 4; 2,500 gallons storage capacity). The Closure Plan for the container storage area was approved by the VDH on September 20, 1984. VDH received the J.W. Fergusson & Sons, Inc. Certification of Closure by letter dated October 9, 1984. After clean closure approval, the Facility actively operated the same container storage area as a less than 90-day storage area, until the Facility operations were terminated due to foreclosure in September 2006.

B. LUST Program Cleanup Activities

In 1993, releases of toluene and n-propyl acetate occurred from two USTs (SWMU 8) located on the south side of the manufacturing building. In accordance with the LUST Program the Facility investigated the nature and extent of the releases under the oversight of the Virginia Water Control Board (VWCB). Soil results indicated the presence of toluene and acetone below EPA Risk Screening Levels (RSLs) for Residential Soils for direct contact with soils. N-propyl acetate was not detected in soil. No free product was encountered during the investigation. Groundwater results indicated a toluene concentration of 9,125 microgram per liter (ug/L), which is above the drinking water standard of 1,000 ug/L. Drinking water standards are established by maximum contaminant levels (MCLs), promulgated at 40 CFR 141, pursuant to Section 1412 of the Safe Drinking Water Act (SDWA), 42 USC Section 300g-1. For contaminants of concern without an applicable MCL, EPA RSL for tap water was used. Acetone was detected in groundwater at 23.3 ug/l, below its risk-based tap water RSL of 22,000 ug/l and n-propyl acetate

was not detected in groundwater. Subsequently, residual fluids were removed from the USTs, and the USTs were closed in place by filling them with concrete. The area overlying the USTs was surfaced with concrete. Subsequently, VDEQ determined that no further action was necessary in accordance with LUST Program requirements.

In 1998, two 12,000 gallon USTs (SWMU 9), one containing a water/MEK mixture and the other containing isopropyl alcohol, were decommissioned and subsequently closed in place using the same methods as described above. The Facility verified the tank's contents by analyzing residual fluids found in the tanks prior to removing the fluids for disposal. Additionally, the Facility collected soil samples adjacent to the USTs to verify that a release had not occurred. Soil sample results did not indicate the presence of hazardous constituents. Subsequently, the USTs were closed in place by filling them with concrete.

C. Environmental Site Assessment

In 2004, an environmental site assessment (ESA) was conducted by GaiaTech for the Facility. The ESA consisted of advancing seventeen soil borings site-wide. Fourteen of the seventeen borings were converted to temporary piezometers, utilizing direct push technology to sample soil and groundwater. Soil and groundwater samples were collected across the Site and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and eight RCRA metals. Soil results indicated that VOCs and SVOCs were below risk-based residential RSLs for direct contact. Groundwater results collected from within the area associated with SWMU 8 (discussed above) at sample location GP-3 (see Figure 3) did not indicate the presence of toluene and acetone as detected previously during the UST investigations. However, groundwater results associated with the southern (SWMU 8) and western portions (SWMU 6) of the property exceeded applicable MCLs and/or risk-based RSLs for tap water for a number of VOCs, including benzene and 1,1-dichloroethylene (1,1-DCE).

D. Voluntary Remediation Program Cleanup Activities

The Facility further investigated groundwater conditions associated with the western portion of the property from 2004 to 2007 pursuant to VRP requirements. This area of the property was impacted by releases from the Facility's solvent recovery system as discovered during the ESA. Groundwater monitoring wells were installed upgradient and downgradient of the area to characterize groundwater conditions. During this time the Facility stopped manufacturing activities and the solvent recovery system, including manufacturing equipment, were removed from the property. The Facility performed on-going groundwater monitoring from 2005 to 2007. Results of this monitoring indicated that in 2007 primarily benzene, arsenic, and chromium exceeded MCLs. Groundwater results indicate contamination is confined to the Site. The Facility performed a risk assessment under the VRP, which concluded that contamination in the soil and groundwater at the Facility does not present an unacceptable risk to human health or the environment provided that the groundwater beneath the property is not used for any purpose other than environmental monitoring and testing, and provided that the property is not used for residential purposes or for children's facilities, schools or playground purposes. As a result of the risk assessment, the VRP required that the Facility impose a land use restriction on the entire property to ensure current and future use of the property as industrial and impose a property use restriction on the entire property prohibiting the use of the groundwater from beneath the property for purposes other than environmental testing. A Declaration of Restrictive Covenants was signed on March 25, 2008 by the owner of the property detailing the land

restriction. Subsequently, the Facility was issued a "Certification of Satisfactory Completion" in accordance with the VRP in 2008.

E. RCRA Corrective Action Program Activities

In 2010 the Facility conducted limited groundwater monitoring of the existing wells previously installed under the VRP. Results of this monitoring indicated that benzene, vinyl chloride, lead, and arsenic exceeded MCLs. The MCL for benzene is 5 ug/L and for vinyl chloride it is 2 ug/L. Benzene and vinyl chloride in groundwater were observed above MCLs in MW-5 at 21 ug/l and 2.63 ug/l, respectively. Lead in groundwater was observed just above its MCL (15 ug/L) in MW-3 at 16.2 ug/l and arsenic in groundwater was observed above its MCL (10 ug/L) in MW-2 (19.8 ug/l), MW-3 (50 ug/l), and MW-5 (32.5 ug/l). Lead and arsenic were not managed at this Facility and are not associated with identified SWMUs. The lead and arsenic levels were suspected to be elevated due to the high turbidity levels in the shallow wells and the use of bailers in sampling. These groundwater monitoring results are consistent with previous results from 2007. Additionally, the low levels of benzene and vinyl chloride verify that source areas have been removed effectively.

In addition to groundwater, soil sample results for organic and inorganic constituents collected during the previous investigations were re-evaluated using the most current screening criteria, which consisted of risk-based residential and industrial RSLs for direct contact and transfer from soil to groundwater Site screening levels utilizing a dilution attenuation factor of 1. Results of this evaluation indicated that several organic and inorganic constituents exceeded residential RSLs for direct contact. However, except for arsenic in two soil samples, industrial RSLs were not exceeded in soil at the Site. Based on the 2004 ESA data, arsenic exceeded its industrial RSL of 1.6 mg/kg in soil in samples GP-3 (2.5 mg/kg) and GP-8 (9.6 mg/kg). Sample GP-3 was collected from 10 to 12 feet below ground surface, which is below the potentiometric surface of the groundwater table at the Site. Sample GP-8 was collected from 4 to 6 feet below ground surface. It should be noted that based on historical records arsenic was not managed at this Facility. The arsenic concentrations are consistent with regional background concentrations for arsenic in soil.

In 2011 and 2012, the Facility completed additional activities that consisted of installing and sampling of two new groundwater monitoring wells in efforts to show: 1) that previously detected concentrations of inorganics, specifically arsenic and chromium, in groundwater at the Site were most likely influenced by poor groundwater quality conditions (turbidity) at existing site wells and 2) to verify attenuation and/or stability of 1,1-DCE in groundwater within the area of SWMU 8. Results of these activities confirmed that, based on unfiltered groundwater sample results, concentrations of arsenic and chromium were below MCLs, which indicates that inorganics are significantly influenced by turbidity at this Site and that previous results were high due to poor groundwater quality conditions associated with the existing monitoring wells. Lead was not analyzed since there was only one previous exceedance. In addition, sample results indicated that 1,1-DCE in groundwater associated with SWMU 8 had attenuated, but was still present above its MCL of 7ug/l.

Based on the available data for this Facility, it appears that the MCLs for benzene, vinyl chloride, and 1,1-DCE are not met. The most recent concentrations for these constituents include 21.5 ug/l of benzene in MW-5, 2.63 ug/l of vinyl chloride in MW-5, and 7.13 ug/l of 1,1-DCE in MW-7. (duplicate sample 9.94 ug/l). However, stabilization and/or attenuation of these constituents has been observed in review of the historical data. The Facility implemented a

groundwater monitoring program in accordance with a VDEQ approved Groundwater Monitoring Plan, dated May 31, 2012 to continue monitoring constituents that exceed MCLs.

IV. Corrective Action Objectives

A. Soils

EPA has determined that industrial RSLs are protective of human health and the environment for individual contaminants at this Facility provided that the Facility is not used for residential purposes. Therefore, EPA's Corrective Action Objective for Facility soils is to control exposure to the hazardous constituents remaining in soils by requiring the compliance with and maintenance of land use restrictions at the Facility.

B. Groundwater

EPA has determined that MCLs are protective of human health and the environment for individual contaminants at this Facility. EPA's Corrective Action Objectives for Facility groundwater are the following:

1. To control exposure to the hazardous constituents remaining in the groundwater by requiring the compliance with and maintenance of groundwater use restrictions at the Facility as long as groundwater clean-up standards, namely MCLs, are exceeded.
2. To monitor long-term stability of hazardous constituents in groundwater.

<u>Constituent</u>	<u>Cleanup Standard</u>
Benzene	MCL, as listed in 40 CFR Part 141, Subpart G
Vinyl Chloride	MCL, as listed in 40 CFR Part 141, Subpart G
1,1-DCE	MCL, as listed in 40 CFR Part 141, Subpart G

V. Summary of Proposed Remedy

A. Groundwater

The continuation of the groundwater monitoring program under the VDEQ approved groundwater monitoring plan to monitor progress and to confirm long-term stability of hazardous constituents in groundwater until groundwater standards are met.

B. Compliance with and Maintenance of Institutional Controls

ICs are non-engineered instruments such as administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use and inform subsequent purchasers of the environmental conditions at the Facility and of EPA's final remedy for the Facility. Under this proposed remedy, some contaminants remain in the groundwater and

soil at the Facility above levels appropriate for residential uses. Because some contaminants remain in the soil and groundwater at the Facility at levels which exceed residential use, EPA's proposed remedy requires the compliance with and maintenance of land and groundwater use restrictions.

The ICs shall include, but not be limited to, the following land and groundwater use restrictions, access, and reporting requirements:

1. Groundwater at the Facility shall not be used for any purpose other than monitoring activities required by VDEQ and EPA, unless it is demonstrated to EPA, in consultation with VDEQ, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and EPA, in consultation with VDEQ, provides written approval for such use;
2. The Facility property shall not be used for residential purposes unless it is demonstrated to EPA, in consultation with VDEQ, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and EPA, in consultation with VDEQ, provides written approval for such use;
3. EPA and VDEQ must provide advance written approval for the installation of new groundwater wells on the Facility property;
4. The Facility will not be used in a way that will adversely affect or interfere with the integrity or protectiveness of the final remedy;
5. Owner agrees to allow EPA, state, and/or their authorized agents and representatives access to the property to inspect and evaluate the effectiveness of the final remedy and if necessary, to conduct additional remediation to ensure the protection of public health and safety and the environment based upon the final remedy to be selected by EPA in the Final Decision and Response to Comments (FDRTC);
6. Owner agrees to provide EPA and VDEQ with a "Certified, True and Correct Copy" of any instrument that conveys any interest in the Facility property or any portion thereof;
7. Require that vapor mitigation be utilized in or beneath new, totally enclosed structures designed for occupation within the footprint of the contaminated groundwater plume identified above protective levels, unless it is demonstrated to EPA and VDEQ that it is not necessary to protect human health;
8. All earth moving activities, including excavation, drilling and construction activities, in the SWMUs and/or areas of concern at the Facility shall be conducted in accordance with a materials management plan approved by EPA in consultation with VADEQ and in such a manner that such activity will not pose a threat to human health and the environment or adversely affect or interfere with

the final remedy.

C. Implementation

EPA proposes to implement the institutional controls through an enforceable mechanism such as an order, permit or an Environmental Covenant, pursuant to the Virginia Uniform Environmental Covenants Act, Title 10.1, Chapter 12.2, Sections 10.1-1238 through 10.1-1250 of the Code of Virginia. Therefore, EPA does not anticipate any regulatory constraints in implementing its proposed remedy.

D. Reporting Requirements

EPA's proposed remedy includes the following reporting requirements for the J.W. Fergusson & Sons, Inc. Facility:

1. Compliance with and effectiveness of institutional controls and engineering controls implemented at the J.W. Fergusson & Sons, Inc. Facility shall be evaluated every three (3) years. The evaluation will include, but not be limited to, a review of groundwater and land uses within one mile of the Facility property boundary and zoning maps or planning documents that may affect future land use in the impacted area. A report documenting the findings of the evaluation shall be provided to EPA and VDEQ.
2. Compliance with and effectiveness of the proposed remedies at the Facility in reducing contaminant concentrations and restoring the groundwater to MCLs shall be evaluated and included in a biennial Groundwater Monitoring Report as required by the approved Groundwater Monitoring Plan. Groundwater results from the Facility shall also be reported in the Groundwater Monitoring Report.

VI. Evaluation of EPA's Proposed Remedy

This section provides a description of the criteria EPA used to evaluate the proposed remedy consistent with EPA guidance. The criteria are applied in two phases. In the first phase, EPA evaluates three decision threshold criteria as general goals. In the second phase, for those remedies that meet the threshold criteria, EPA then evaluates seven balancing criteria to determine which proposed decision alternative provides the best relative combination of attributes.

A. Threshold Criteria

1. Protect Human Health and the Environment

This proposed remedy protects human health and the environment from exposure to contamination for current and anticipated future land use. Based on the results of previous investigations and cleanup activities all known sources of contamination have been characterized and addressed. Further investigation or engineering controls are not necessary to protect human health or the environment.

The Facility property is currently vacant with the exception of the old manufacturing building, concrete slab, and paved areas and there are no active SWMUs present. Potable water is supplied to the property by the City of Richmond Water Supply System. Groundwater use, for purposes other than environmental testing and residential use of the property are currently restricted via environmental covenant. The Facility is required to maintain these existing restrictions, which will ensure ongoing protection of human health and the environment. The Facility is required to continue the groundwater monitoring program to monitor progress and to confirm containment of hazardous constituents at the Facility.

2. Achieve Media Cleanup Objectives

EPA's proposed remedy meets the appropriate cleanup objectives based on current and reasonably anticipated future land and water resource use. The current use of the property is industrial and the reasonably anticipated future use of the property is industrial based on current zoning status (M-1 Light Industrial) and existing property use restrictions. The property is currently unoccupied and potable water is supplied to the Facility by the City of Richmond. For soil, several constituents in the subsurface were detected above residential screening criteria. However, with the exception of arsenic in two soil samples, constituents were below industrial screening criteria. The arsenic concentrations are within EPA Region 3's acceptable risk range of $10E-6$ to $10E-4$, are consistent with regional background levels, and were also shown to not present an unacceptable risk to human health or the environment based on the results of a human health risk assessment performed pursuant to the VRP. With the existing land use restrictions in place, EPA has determined that media cleanup objectives for soil under an industrial land use scenario have been attained.

For groundwater, benzene, vinyl chloride, and 1,1-DCE are still above media cleanup standards (MCLs). However, there is no current use of the groundwater from beneath the property as a drinking water source. Existing institutional controls restricting the use of groundwater from beneath the property will remain in place and groundwater monitoring will continue until groundwater cleanup standards (MCLs) for these constituents have been met. Groundwater monitoring data will be evaluated periodically to ensure that contaminants continue to decline.

3. Remediating the Source of Releases

In all proposed remedy decisions, EPA seeks to eliminate or reduce further releases of hazardous wastes or hazardous constituents that may pose a threat to human health and the environment. Since 1984, the Facility has removed all potential and/or known sources of releases and remediated impacts from those releases in accordance with various program requirements. In 2006, the Facility permanently closed. At that time, the Facility completed a Facility-wide shutdown that involved the demolition and removal of all manufacturing equipment and related product and waste storage tanks, including the solvent recovery system. No known sources or source areas remain at the Facility.

B. Balancing/Evaluation Criteria

1. Long-Term Effectiveness

The proposed remedy will maintain protection of human health and the environment over

time by controlling exposure to the hazardous constituents remaining in soil and groundwater. EPA's proposed remedy requires on-going compliance with and maintenance of the land use and groundwater use restrictions at the Facility. EPA anticipates that the land use and groundwater use restrictions will be implemented through an enforceable mechanism such as an order, permit, or an environmental covenant to be recorded with the deed for the Facility property. Groundwater at the Facility will be monitored periodically to ensure that contaminant levels continue to decline and do not leave the Facility.

2. Reduction of Toxicity, Mobility, or Volume of the Hazardous Constituents

The reduction of toxicity, mobility and volume of hazardous constituents at the Facility has already been achieved by previous cleanup activities summarized above pursuant to the Virginia Solid and Hazardous Waste Regulations and environmental cleanup programs, LUST, VRP and RCRA Corrective Action.

3. Short-Term Effectiveness

EPA's proposed remedy does not involve any activities, such as construction or excavation that would pose short-term risks to workers, residents, and the environment. In addition, the land use and groundwater use restrictions have already been implemented through an environmental covenant recorded with the deed for the Facility property.

4. Implementability

EPA's proposed remedy is readily implementable. Land use and groundwater use restrictions are already in place for the Facility. A Groundwater Monitoring Plan for continued monitoring of the contaminants in groundwater was approved by the VDEQ on June 11, 2012 and was immediately implemented subsequent to the approval.

5. Cost

EPA's proposed remedy is cost effective. Given that a land use restriction has already been recorded in the title for the Facility property, and that all necessary components of the groundwater monitoring program are in place and are currently operational, the only recurring costs are operation and maintenance (O&M) and reporting costs of the monitoring network. These costs are minimal.

6. Community Acceptance

EPA will evaluate Community acceptance of the proposed remedy during the public comment period and will be described in the Final Decision and Response to Comments.

7. State/Support Agency Acceptance

EPA will evaluate State acceptance of the proposed remedy during the public comment period and will describe the State's position in the Final Decision and Response to Comments.

VII. Public Participation

Before EPA makes a final decision on its proposed remedy for the Facility, the public may participate in the decision selection process by reviewing this SB and documents contained in the Administrative Record (AR) for the Facility. The AR contains all information considered by EPA in reaching this proposed remedy. It is available for public review during normal business hours at:

U.S. EPA Region III
 1650 Arch Street
 Philadelphia, PA 19103
 Contact: Mike Jacobi
 Phone: (215) 814-3435
 Fax: (215) 814-3114
 Email: jacobi.mike@epa.gov

or

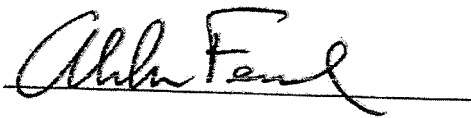
Virginia Department of Environmental Quality
 629 East Main Street
 P.O. Box 1105
 Richmond, Virginia 23218
 Contact: Mr. Brett Fisher
 Phone: (804) 698-4219
 Email: Brett.Fisher@deq.virginia.gov

Interested parties are encouraged to review the AR and comment on EPA's proposed remedy. The public comment period will last thirty (30) calendar days from the date that notice is published in a local newspaper. You may submit comments by mail, fax, or e-mail to Mike Jacobi. EPA will hold a public meeting to discuss this proposed remedy upon request. Requests for a public meeting should be made to Mike Jacobi.

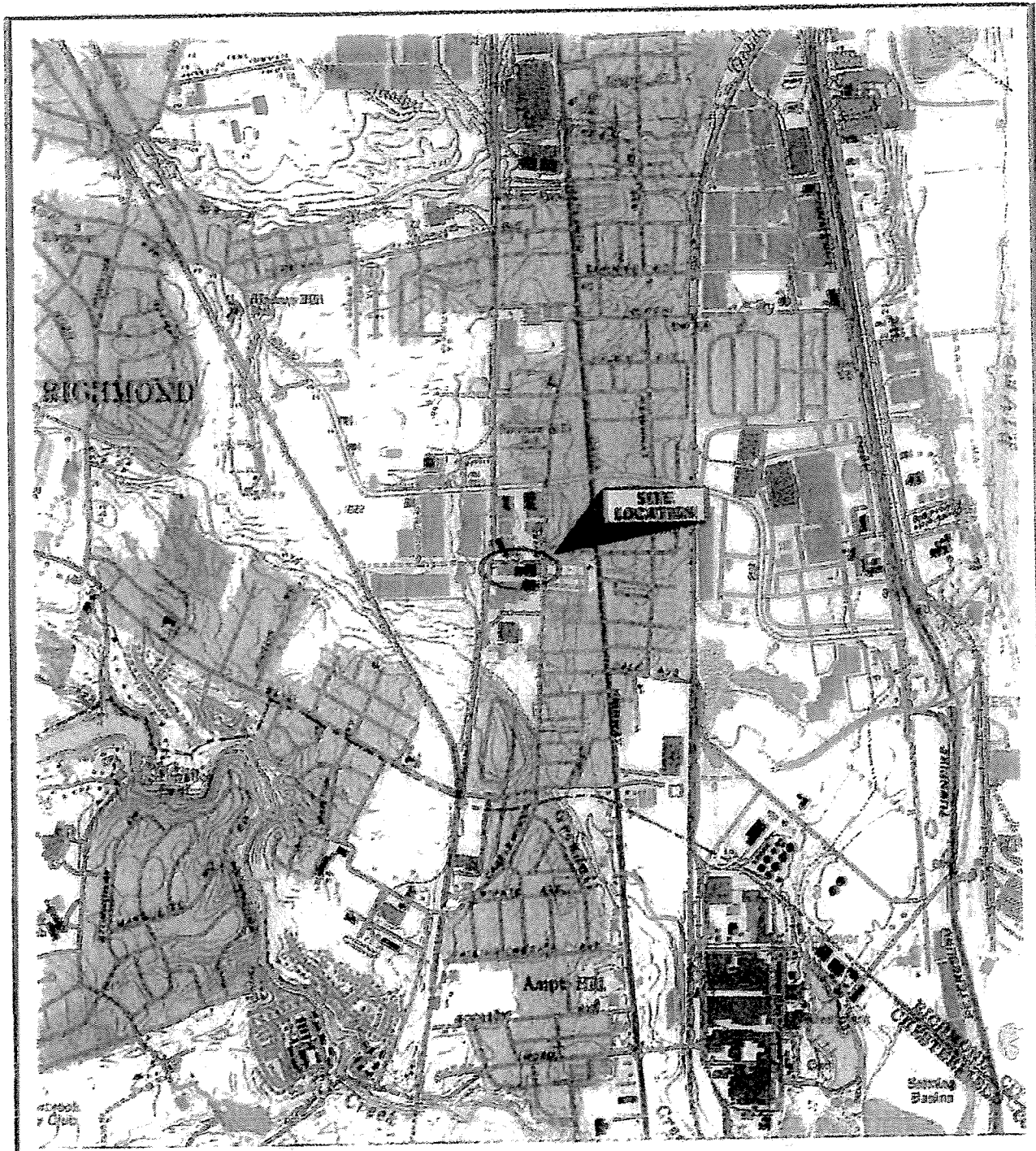
EPA will respond to all relevant comments received during the comment period. If EPA determines that new information warrant a modification to the proposed remedy, EPA will modify the proposed remedy or select other alternatives based on such new information and/or public comments. EPA will announce its final decision and explain the rationale for any changes in a document entitled the Final Decision and Response to Comments (FDRTC). All persons who comment on this proposed remedy will receive a copy of the FDRTC. Others may obtain a copy by contacting Mike Jacobi at the address listed above.

Date:

9/27/12



Abraham Ferdas, Director
 Land and Chemicals Division



SCALE: 1" = 2,000'

Source: USGS Topographic Survey, Drewry's Bluff, Virginia (1959)

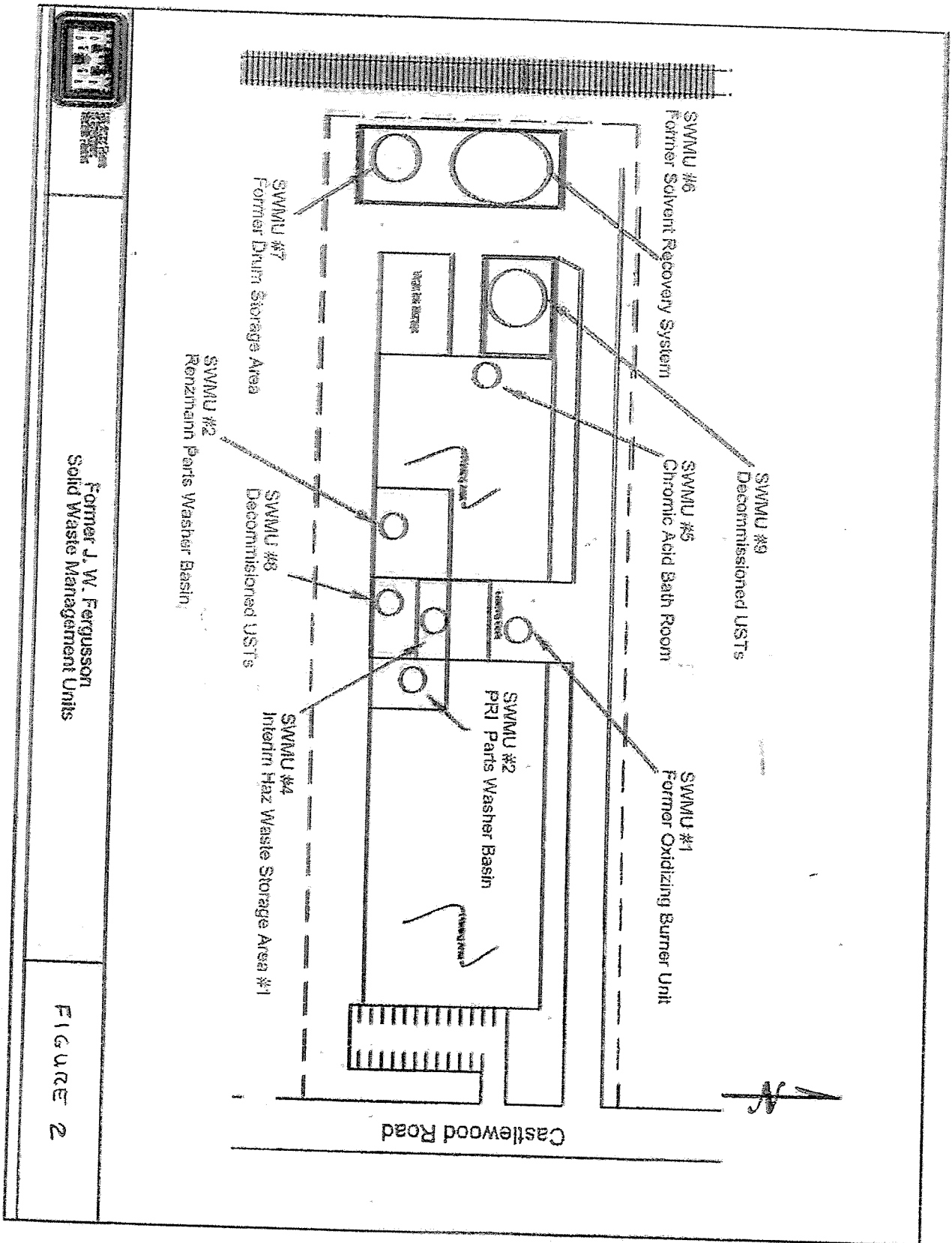
**Former J.W. Fergusson & Sons Site
Richmond, Virginia**

Figure 1

Site Location

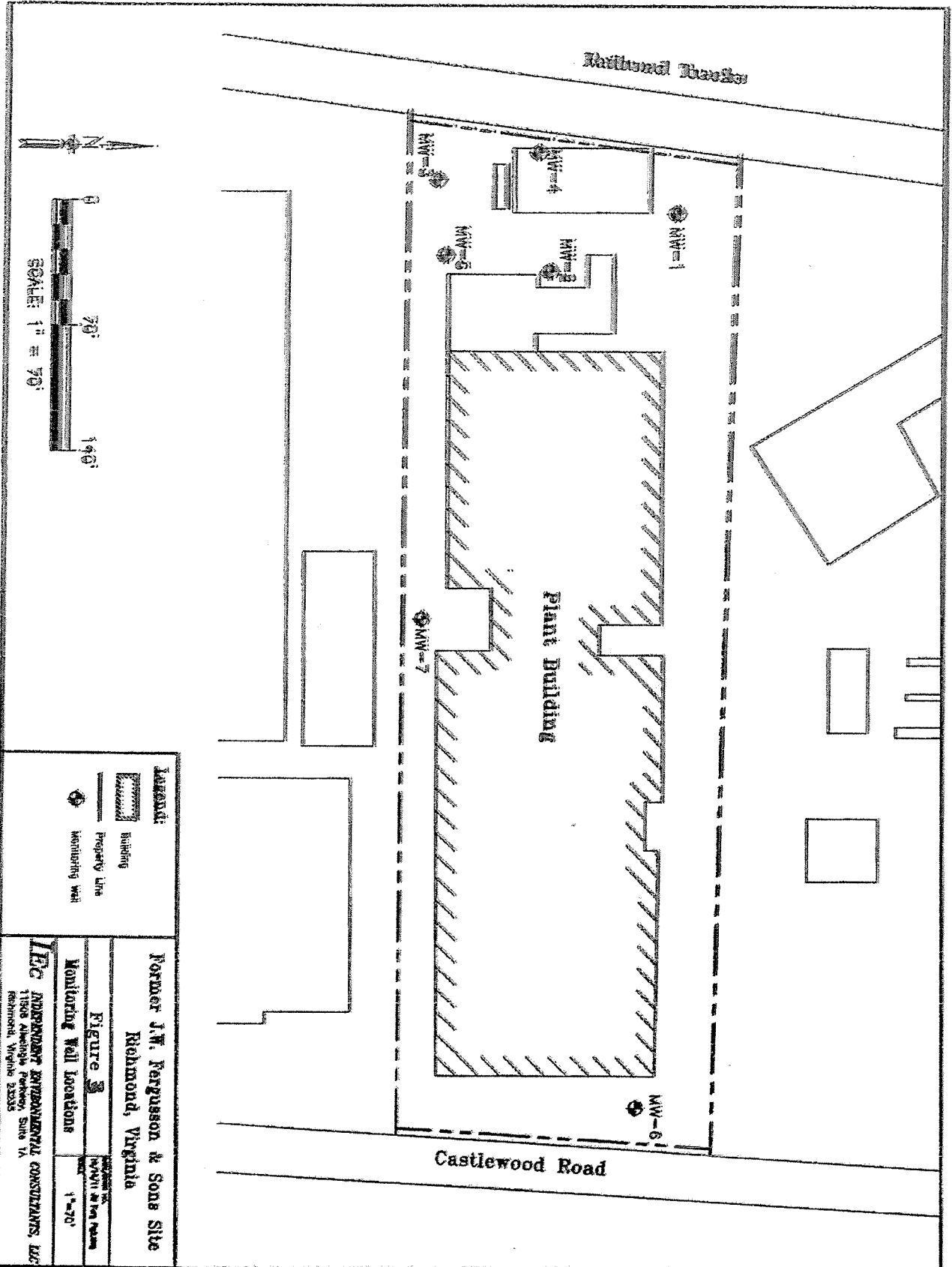
DATE	10/10 - 07-11-09
SCALE	1" = 2,000'

IEC INDEPENDENT ENVIRONMENTAL CONSULTANTS, LLC
11506 Alencing Parkway, Suite 1A
Richmond, Virginia 23235



Former J. W. Fergusson
Solid Waste Management Units

FIGURE 2



SCALE: 1" = 70'

Legend:
 Building
 Property Line
 Monitoring Well

Former J.W. Fergusson & Sons Site
 Richmond, Virginia

FIGURE 3
 Monitoring Well Locations

I/E/C INDEPENDENT ENVIRONMENTAL CONSULTANTS, LLC
 11508 Abernethy Parkway, Suite 1A
 Richmond, Virginia 23235

DATE: 1-70

Exhibit B

Geographic Coordinate List Defining the Boundary of the AUL

Courtland

Castlewood

1 (POB)

5



4


3

2

ID	Latitude	Longitude
1 (POB)	37.4696701	-77.4460904
2	37.4691209	-77.4461199
3	37.4691231	-77.4486642
4	37.4695953	-77.4485852
5	37.4696724	-77.4485725

Exhibit B
Property Boundary Coordinates
4107 Castlewood Road
Richmond, VA 23234

 Property Boundary
 Property Corners

N 



Decimal Degrees, WGS84

PG 0144 SEP-8 3

Exhibit C

VDEQ Approved Groundwater Monitoring Plan, dated May 31, 2012

GROUNDWATER MONITORING PLAN
Former J.W. Fergusson Site
4107 Castlewood Road
Richmond, Virginia

Prepared For:

Former J.W. Fergusson Site
c/o Mr. Channing J. Martin, Esquire
Williams Mullen
200 South 10th Street
P.O. Box 1320
Richmond, Virginia 23218

Prepared By:

IEC **INDEPENDENT ENVIRONMENTAL CONSULTANTS, LLC**

11506 Allecingie Parkway, Suite 1A
Richmond, Virginia 23235
(804) 379-7133 telephone
(804) 379-7172 facsimile

May 31, 2012

Table of Contents

1.0 SAMPLING.....1

1.1 INTRODUCTION.....1

1.2 FIELD METHODS.....1

 1.2.1 Measurement of Static Water Level Elevations.....2

 1.2.2 Calculation of Static Water Level Volumes.....2

 1.2.3 Immiscible Layers.....2

 1.2.4 Well Evacuation.....2

 1.2.5 Equipment.....3

 1.2.6 Sample Containers.....3

 1.2.7 Sample Collection.....4

1.3 FIELD QA/QC PROGRAM.....4

 1.3.1 Trip Blanks.....4

 1.3.2 Equipment Blanks (Rinseate Blanks).....4

 1.3.3 Blank Data Evaluation.....4

1.4 SAMPLE TRANSPORT AND HANDLING.....5

1.5 FIELD LOGBOOK.....6

2.0 LABORATORY ANALYSIS.....7

2.1 INTRODUCTION.....7

2.2 LABORATORY QA/QC.....7

 2.2.1 Internal Quality Control.....7

 2.2.2 Calibration.....7

 2.2.3 Duplicate Samples.....7

3.0 IMPLEMENTATION SCHEDULE.....8

4.0 RECORD KEEPING AND REPORTING.....9

4.1 INTRODUCTION.....9

4.2 GROUNDWATER MONITORING RESULTS.....9

4.3 BIENNIAL REPORT.....9

FIGURES

- Figure 1 - Site Location
- Figure 2- Monitoring Well Locations

TABLES

- Table 1 - Biennial Groundwater Monitoring Program

APPENDICES

- Appendix 1 - Example Groundwater Log
- Appendix 2 - Calculation of Purge Volume

Table of Contents (continued)

Appendix 3 - Example Chain of Custody Form

Appendix 4 - Recommended Sample Containers and Preservatives

1.0 SAMPLING

1.1 INTRODUCTION

This Groundwater Monitoring Plan has been prepared for the Former J.W. Fergusson Site located at 4107 Castlewood Road in Richmond, Virginia ("Facility" or "subject property"). A site location map is provided as Figure 1.

The Facility includes approximately 3.35 acres of land bordered by industrial property on the north (UPACO Adhesives), west (Cavalier Printing Ink Company), and south (Dominion Power). Castlewood Road separates the subject property from a trailer park to the east, and the CSX railroad tracks separate the subject property from the industrial property to the west. Most of the subject property is occupied by a single-story concrete block building constructed in or about 1964. The entire area is served by a public water supply. The Facility has been the subject of numerous environmental investigations.

This Groundwater Monitoring Plan outlines groundwater monitoring required by the Virginia Department of Environmental Quality (DEQ) in connection with completion of Resource Conservation and Recovery Act (RCRA) Corrective Action activities at the Facility.

The constituent 1,1-dichloroethylene was detected in groundwater from well MW-7 at concentrations that exceed the maximum contaminant level (MCL) of 7 ug/l. In well MW-5, benzene exceeded the MCL of 5 ug/l and vinyl chloride exceeded the MCL of 2 ug/l. Monitoring well locations are shown on Figure 2.

1.2 FIELD METHODS

The methods and procedures to be implemented in the field to gather true and representative samples and test data are presented in the following sections. Field procedures are presented in their general order of implementation. Equipment requirements are presented in each section, and quality assurance and recordkeeping requirements are presented in the latter sections. All sampling team members will wear clean gloves during sampling and will change gloves between each well location.

1.2.1 Measurement of Static Water Level Elevations

Preceding the purging of each well, both the static water level (S.W.L.) and the depth to the bottom of the well will be measured to ± 0.01 foot (groundwater elevation relative to mean sea level), referenced to a pre-established, surveyed measurement point clearly marked on the interior wall of the casing. Measurements will be taken using an electronic water level meter. All measurements for each well will be recorded in a Groundwater Log (Appendix I of the Groundwater Monitoring Plan). Measurements which do not correlate with the previous trends will be verified in the field with different measurement technology, if necessary.

1.2.2 Calculation of Static Water Level Volumes

The static water level and the total depth will be used to calculate the volume of stagnant water in the well and provide a check on the integrity of the well (e.g., identify siltation problems), as well as characterize changes in hydraulic conditions that may occur over time. The static water level measuring device will be constructed of inert materials and will be thoroughly decontaminated by rinsing with non-phosphate soap/deionized water solution followed by a rinse of deionized water and thoroughly dried using clean paper towels. All decontamination fluid will be containerized and disposed of in a publicly owned treatment works (POTW) facility, with approval.

1.2.3 Immiscible Layers

Immiscible layers have not been observed and are not anticipated at the Facility. Therefore, the wells will not be tested for the presence of immiscible layers prior to well evacuation and sample collection.

1.2.4 Well Evacuation

The volume of stagnant water in each well will be determined prior to well evacuation during each sampling event based on the static water level, well depth, well diameter, filter pack length, and borehole diameter. A minimum of three volumes of the pore space of the screen filter pack and three volumes of the well casing will be purged prior to sampling, if possible. The volume of stagnant water to be purged will be calculated according to the formulae

presented in Appendix 2 of the Groundwater Monitoring Plan. All purge volume calculations will be recorded in the Groundwater Log shown in Appendix 1 of the Groundwater Monitoring Plan. The following procedures will be used:

- a. A piece of plastic sheeting approximately 4' by 4' will be placed over the concrete apron of the well. A bucket will be placed on top of the sheeting so that spilled purge (and sampling) water will remain on the plastic. When purging (and sampling) is complete, spilled purge water will be containerized.
- b. Wells will be purged until at least three well borehole volumes are removed.
- c. If the wells prove to be low yield, wells will be evacuated to dryness and then will be purged at a rate that will not cause recharge water to be excessively agitated. Dry and low recharge rates will be noted in the field observations.
- d. All purge water will be containerized and disposed of in a publicly owned treatment facility with approval of the POTW. All sampling team members will wear clean gloves during all purging activities and will change gloves between each well location.

1.2.5 Equipment

Fluorocarbon (Teflon) resin bailers with dual check valves, plastic disposal bailers, dedicated submersible pumps, peristaltic pumps with dedicated tubing, or other equipment approved by the Department will be used to evacuate wells and for sample collection. If dedicated purging equipment is used, then no decontamination will be required; however, non-dedicated purging equipment will be disassembled and thoroughly decontaminated by: washing with non-phosphate detergent, rinsing with tap water, rinsing with Type II reagent grade distilled/deionized water, rinsing with isopropanol or methanol, and air drying.

1.2.6 Sample Containers

All samples will be collected using equipment defined in Section 1.2.6. The type of sample containers and sample handling and preservation procedures for the parameters of interest are listed in Appendix 4 of the Groundwater Monitoring Plan.

Containers utilized for sampling will be new pre-cleaned containers or used containers that have been cleaned. Used containers will be cleaned based on the analyte of interest.

1.2.7 Sample Collection

Samples will be collected at least biennially for the constituents listed in Table I.

1.3 FIELD QA/QC PROGRAM

Field Quality Assurance/Quality Control (QA/QC) requires the routine collection and analysis of trip blanks, and equipment blanks if non-dedicated equipment is used, to verify that sample collection and handling process has not affected the quality of the samples.

1.3.1 Trip Blanks

One set of trip blanks for all required analyses will be prepared prior to leaving the laboratory to ensure that the sample containers or handling process has not affected the quality of the samples. Blank containers, preservatives, handling and transport will be identical to those used for water samples. The sampler or lab staff will prepare one set of trip blanks and analyze them for all of the required monitoring parameters and constituents as follows:

- a. Fill one of each type of sample bottle with Type II reagent grade water, transport to the site, handle like a sample, and return to the laboratory for analysis. One set of trip blanks per sampling event will be analyzed for all the required monitoring parameters and constituents.

1.3.2 Equipment Blanks (Rinseate Blanks)

If non-dedicated equipment is used, one set of blanks will be collected for all required parameters and constituents. These samples will be collected to ensure that decontamination procedures are adequate.

1.3.3 Blank Data Evaluation

Any contaminants found in the trip blanks could be attributed to: interaction between the sample and the container, contaminated rinse water, or a handling procedure that alters the sample analysis results. The concentration of any contaminants found in the trip blank will not be used to correct the groundwater data. In the event that elevated parameter concentrations are

found in the trip blanks, the analysis will be flagged for evaluation and possible resampling. If contaminants are found in the blanks, the source of the contamination will be identified and corrected.

Any contamination found in the equipment blank may be the result of cross-contamination or from the decontamination procedure itself. The concentration of any contaminants found in the equipment blank will not be used to correct the groundwater data. In the event that elevated parameter concentrations are found in the equipment blanks, the analysis will be flagged for evaluation and possible resampling. If contaminants are found in the equipment blanks, the source of the contamination will be identified and corrected.

1.4 SAMPLE TRANSPORT AND HANDLING

Sample transport and handling will be strictly controlled to prevent sample contamination. Chain-of-Custody control for all samples will consist of the following:

1. Labels will be placed on individual sample containers at sampling collection indicating the site, time of sampling, date of sampling, well number, and preservation method used for the sample.
2. Sample containers will be individually secured or placed in a secured area in iced coolers and held at 4°C and will remain in the continuous possession of the field technician until transferal as provided by the Chain-of-Custody form (Appendix 3).
3. Chain-of-Custody records and any other documentation accompanying the shipment will be enclosed in a waterproof bag and taped to the inside of the ice chest lid. Each ice chest prepared for shipment will be securely taped shut. Custody seals will be affixed across the joint between the top and bottom of each ice chest.
4. Samples will be packaged and labeled for shipment in compliance with current U.S. Department of Transportation (DOT) regulations. All samples will be shipped priority/overnight via commercial carrier or hand delivered to the analytical laboratory.

5. Samples will arrive at the laboratory via the overnight delivery service or hand delivered within the prescribed holding time. Upon delivery to the laboratory the ice chests will be checked for intact custody seals and the samples will be unpacked and the information on the accompanying Chain-of-Custody records will be examined. If the samples shipped match those described on the Chain-of-Custody form, the laboratory sample coordinator will sign the form and assume responsibility for the samples. If problems are found with the sample shipment, the laboratory sample custodian will sign the form and record the problems in the "remarks" section.
6. Any missing samples, missing sample tags, broken sample bottles or unpreserved samples will be noted on the Chain-of-Custody record. If there are problems with individual samples, the sample custodian will inform the laboratory coordinator of such problems. The laboratory custodian will then contact the consultant who obtained and shipped the samples to determine a viable solution.
7. All information relevant to the samples will be secured at the end of each business day. All samples will be stored in a designated sample storage refrigerator, access to which will be limited to laboratory employees.

1.5 FIELD LOGBOOK

The field technician will keep an up-to-date field logbook documenting information pertaining to the technician's field activities. Appendix 1 of this Groundwater Monitoring Plan provides an example of a Groundwater Log that must be completed for each well sampled.

2.0 LABORATORY ANALYSIS

2.1 INTRODUCTION

The groundwater constituents to be analyzed include organic constituents as listed in Table 1. Table 1 also lists analytical methods and detection limits that will be used in the analysis of groundwater samples. Samples will be collected and analyzed at least biennially for each parameter and constituent listed in Table 1.

2.2 LABORATORY QA/QC

QA/QC procedures will be used at all times. The laboratory shall assure the accuracy and precision of all analytical determinations.

2.2.1 Internal Quality Control

Internal quality control checks will be undertaken regularly to assess the precision and accuracy of analytical procedures. The internal quality control checks will include the use of calibration standards, standard references, duplicate samples and spiked or fortified samples.

2.2.2 Calibration

Calibration standards will be verified against standard reference from an outside source. Calibration curves will be comprised of a minimum of one blank and three standards. Samples will be diluted if necessary to ensure that analytical measurements fall on the linear portion of the calibration curve.

2.2.3 Duplicate Samples

Duplicate samples will be processed at an average frequency of ten percent to assess precision of testing methods, and standard references will be processed monthly to assess accuracy of analytical procedures. Spiked or fortified samples will be carried through all stages of sample preparation and measurement to validate accuracy of the analysis. During the course of analysis, quality control data and sample data will be reviewed to identify questionable data.

3.0 IMPLEMENTATION SCHEDULE

The Groundwater Monitoring Plan will be implemented immediately upon approval of the Virginia DEQ.

Groundwater monitoring shall continue until MCLs have been met for a period of three years, or until such sooner period of time as Virginia DEQ may determine. The Facility may request to remove constituents from the monitoring list upon meeting the MCL for that constituent for a minimum period of three consecutive years. The Facility may request to remove a monitoring well from the monitoring program if MCLs for all monitored constituents at that location have been met for a minimum period of three consecutive years. Considering a biennial monitoring frequency, at least two consecutive monitoring events will meet these conditions.

4.0 RECORD KEEPING AND REPORTING

4.1 INTRODUCTION

Copies of all groundwater analytical results, groundwater reports, groundwater level elevations and the Groundwater Sampling Plan will be maintained until the monitoring required by this Groundwater Monitoring Plan has been completed.

4.2 GROUNDWATER MONITORING RESULTS

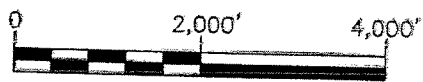
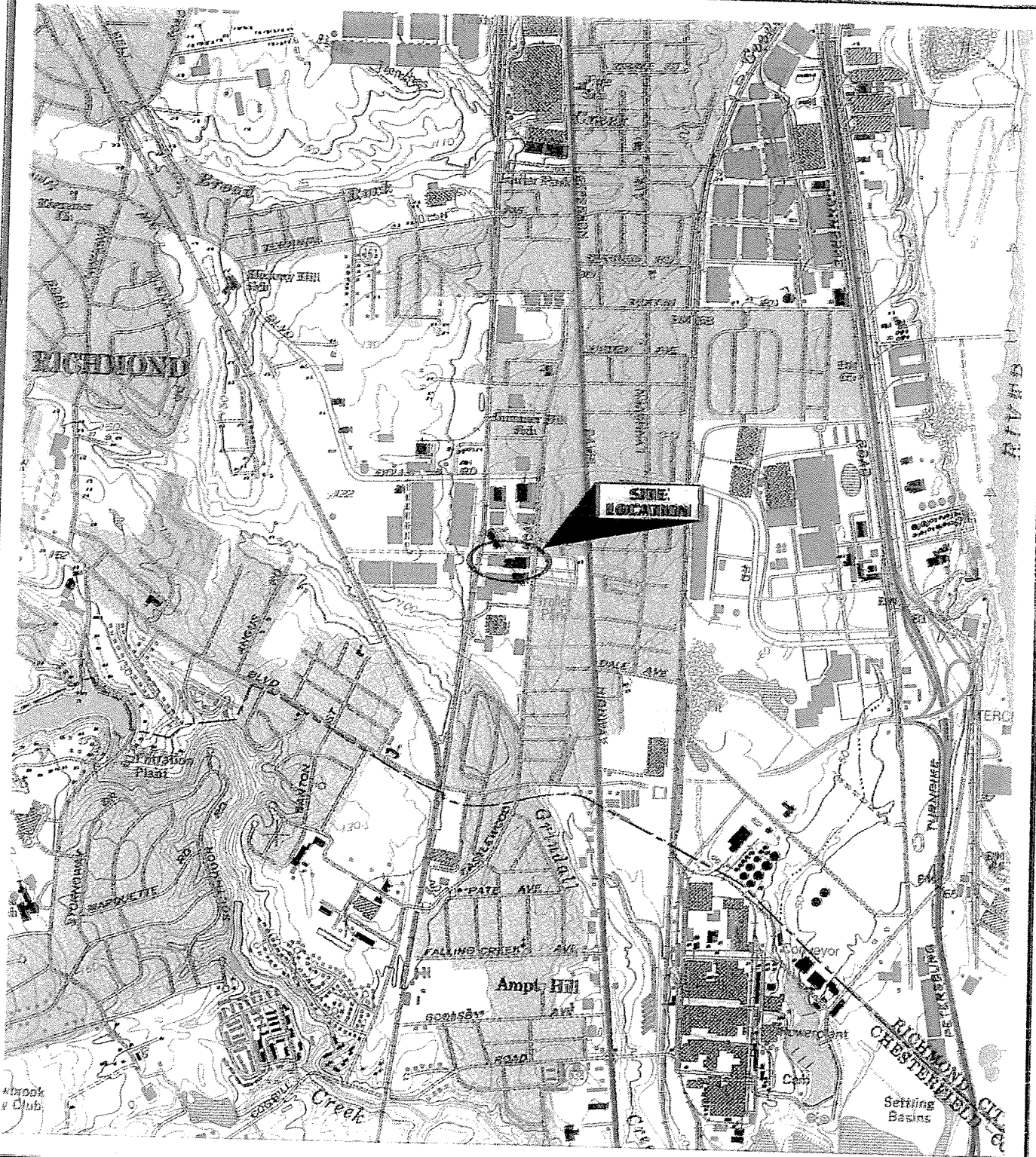
The Facility will report concentrations or values of the constituents listed in Table 1 for each required groundwater monitoring well. The groundwater surface elevation map will be included in this report.

4.3 BIENNIAL REPORT

Until such time as the monitoring required by this Groundwater Monitoring Plan has been completed, the Facility will submit a Biennial Groundwater Monitoring Report to the Virginia DEQ containing:

1. Analytical results compared to MCLs;
2. Static groundwater level elevations; and
3. Potentiometric maps for each sampling event.

Figures



SCALE: 1" = 2,000'

Source: USGS Topographic Survey, Drewry's Bluff, Virginia (1969)

**Former J.W. Fergusson & Sons Site
Richmond, Virginia**

Figure 1

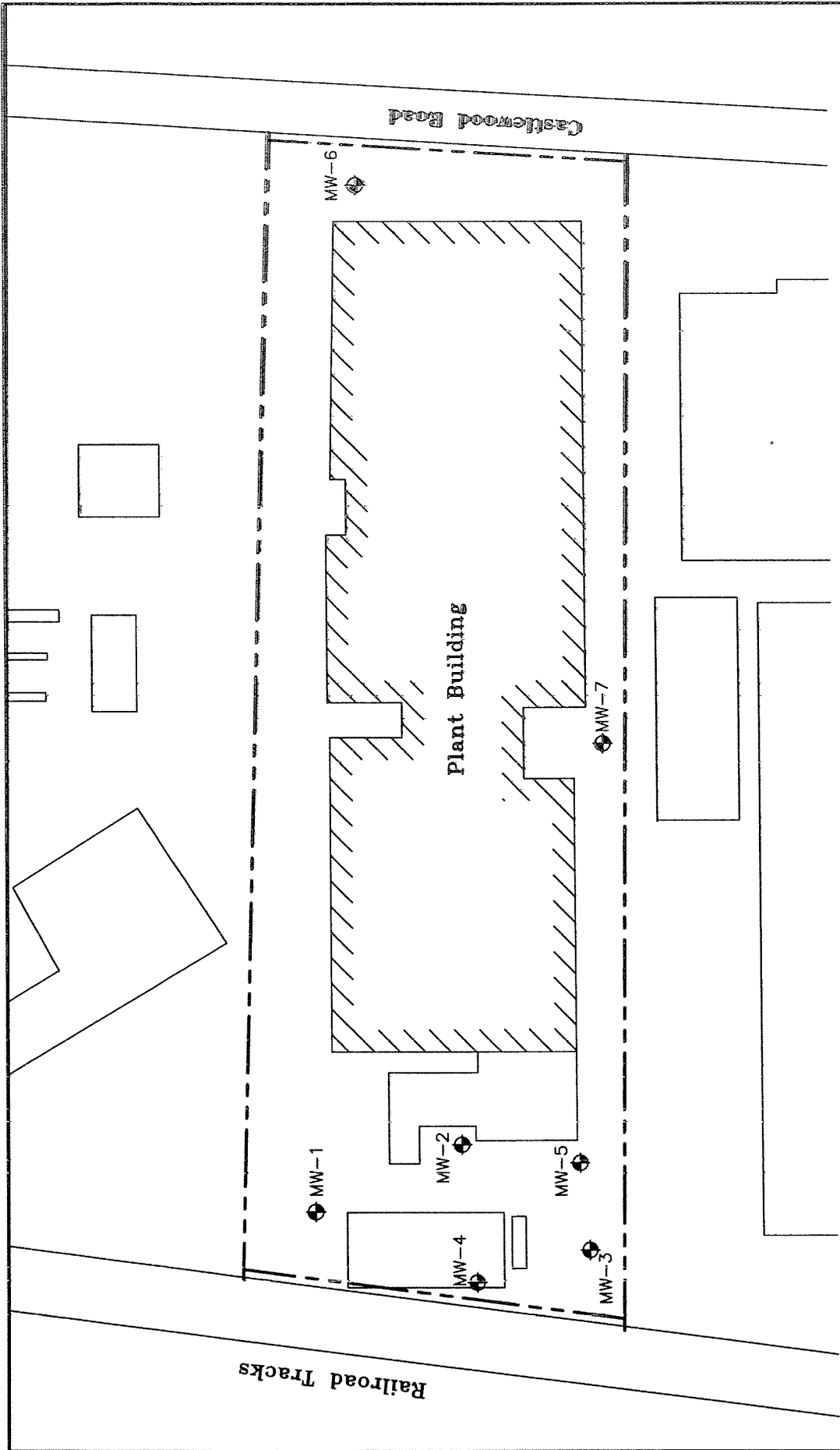
DATE
10/8/10 - OFN-ff.dwg

Site Location

SCALE
1" = 2,000'



INDEPENDENT ENVIRONMENTAL CONSULTANTS, LLC
11506 Allecingie Parkway, Suite 1A
Richmond, Virginia 23235



Legend:

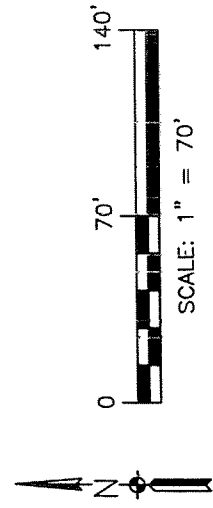
- Building
- Property Line
- Monitoring Well

Former J.W. Fergissson & Sons Site
 Richmond, Virginia

Figure 2
DATE: 10/16/11 BY: PJP/BJG

Monitoring Well Locations
SCALE: 1" = 70'

IEC
 INDEPENDENT ENVIRONMENTAL CONSULTANTS, LLC
 11506 Alleingle Parkway, Suite 1A
 Richmond, Virginia 23235



Tables



Table 1
Biennial Groundwater Monitoring Program
Former J.W. Fergusson Site
Richmond, Virginia

Constituent	Well Number	SW-846 Method	PQL ug/l	MCL ug/l
benzene	MW-5	8260B	1.0	5
vinyl chloride	MW-5	8260B	1.0	2
1,1-dichloroethylene	MW-7	8260B	1.0	7

ug/l - micrograms per liter

PQL - practical quantitation limit

MCL - U.S. EPA maximum contaminant level

Appendix 1
Example Groundwater Log

Groundwater Log Monitoring Well _____

DATE: _____
SAMPLE EVENT: _____
LOCATION: Former J.W. Fergusson Site
WELL NO.: _____
MEASUREMENT TEAM: _____
TIME WELL CASING UNLOCKED: _____
DEPTH TO WATER FROM TOP OF INNER CASING: _____
DEPTH OF WELL FROM TOP INNER CASING: _____
STATIC WATER DEPTH: _____
MEASUREMENT TECHNIQUE: _____

FORMULAE FOR DETERMINING PURGE VOLUME

$$3 \times ((\pi r_b^2 h_s - \pi r_c h_s) \times (0.3(\pi(r_c^2 h_w)))$$

where r_b = radius of boring
 r_c = radius of casing
 h_s = height of sand
 h_w = height of water

PURGE TEAM: _____
PURGE METHOD: _____
PURGE TIME: _____
PURGE VOLUME: _____
PURGE APPEARANCE: _____

COMMENTS: _____

**Appendix 2
Calculation of Purge Volume**

Purge volumes will be calculated using the following methods.

In order to determine the volume of water in the well casing and in the sandpack surrounding the well use the following formulas:

1. Calculate the volume of standing water in the well using (a) or (b):

(a) If water level is above the sand pack:

$$3 \times (\pi r_b^2 h_s - \pi r_c^2 h_s) \times 0.3 + (\pi r_c^2 h_w)$$

(b) If Water below Sand Pack:

$$3 \times (\pi r_b^2 h_w) \times 0.3 + (\pi r_c^2 h_w)$$

where:

r_b = radius of boring

r_c = radius of casing

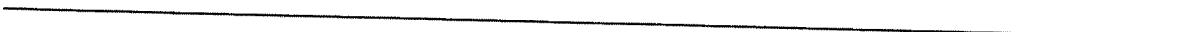
h_s = height of sand

h_w = height of water

This calculation must be based upon 30% filter pack volume. Once the volume to be purged is known, purging can begin. The purge water will be collected, containerized and disposed of in accordance with local, state and federal regulations and laws.

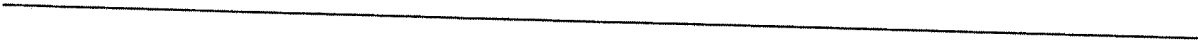
Appendix 3

Example Chain of Custody Form



Appendix 4

Recommended Sample Containers and Preservatives



Recommended Sample Containers and Preservatives

Parameter	Container	Preservative	Max Time	Min. Volume
Groundwater Quality Characteristics				
Volatile Organics	G, T-lined cap/septum	Cool, 4°C; HCl pH<2	14 days	60 ml

NOTES:

^aReferences:

Test Methods for Evaluating Solid Waste – Physical/Chemical Methods, SW-846 (3rd edition, 1986).

^bContainer Types: P = Plastic (polyethylene), G = Glass, T = Fluorocarbon resins,
P = Polypropylene.

^cBased on the requirements for detection monitoring (§ 265.93), the owner/operator must collect a sufficient volume of ground water to allow for the analysis of four separate replicates.

^dShipping containers (cooling chest with ice or ice pack) should be certified as to 4°C at time of sample placement into these containers. Preservation of samples requires that the temperature of collected samples be adjusted to the 4°C after collection. Shipping coolers must be at 4°C and maintained at 4°C upon placement of sample and during shipment.

^eDo not allow any head space in the container.

0170 SEP-8 2

INSTRUMENT #140015596
RECORDED IN THE CLERK'S OFFICE OF
CITY OF RICHMOND ON
SEPTEMBER 8, 2014 AT 10:31AM

EDWARD F. JEWETT, CLERK
RECORDED BY: VEB

RECEIVED

AUG 26 '14

VDEQ - ORP