DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control

Facility Name: **J. W. Fergusson & Sons**
Facility Address: **4107 Castlewood Road**
Richmond, Virginia 23234
Facility EPA ID #: **EPA ID No. VAD003109360**

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

☒ If yes - check here and continue with #2 below.

☐ If no - re-evaluate existing data, or

☐ if data are not available, skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

Facility Background

The J.W. Fergusson and Sons, Inc. facility site is a 79,000 square foot single story, concrete block building which operated a Rotogravure printing facility. The Rotogravure presses utilized significant amounts of toluene and printing inks in the printing processes.

The facility sits on approximately 3.35 acres of land. The site is bounded to the south by a Dominion Virginia Power Storage Yard, to the east by Castlewood Road with a trailer park on the other side of the public thoroughfare, the west by a rail spur and further commercial developments. To the north, the site is bounded by a commercial facility named UPACO Adhesives. UPACO performed independent environmental site investigation sampling at the same time as a Phase 1 Site Assessment was performed at the J.W. Fergusson & Sons, Inc facility; however, those results were not available at the time of the EPA's Region III Corrective Action (CA) *RCRA Site Visit Report*, dated December 24, 2008. (See Item No. 2, below, References.)

The site is relatively level with elevations between 100 and 120 feet above sea level.

Approximate geographic coordinates are Latitude: 37° 28' 10" N by Longitude: 77° 26' 47" W.

According to Russell Fergusson III, J. W. Fergusson and Sons, Inc. was a family owned business that spanned over five generations in the City of Richmond. The last operations of the family business were at the J.W. Fergusson and Sons, Inc. site located at 4107 Castlewood Road, Richmond, Virginia.

According to DEQ records, J.W. Fergusson and Sons, Inc. purchased the property in 1962. Prior to this time, the property was a vacant lot that had not been used in any prior business. The printing facility was constructed in 1964. It was used for that purpose until 2006, the date of foreclosure of the business by the lending institution or creditor. The facility ceased all business activity effective September 2006. (See attached Figures.)

The current zoning for the site is M-1-Light Industrial. The proposed reuse of the property is industrial. The site is fenced on all sides which restricts access to the site.

The facility potable water is provided by the City of Richmond public water supply (PWS) system to the facility and nearby vicinity.

There are no drinking water wells on the property or known potable water wells in the nearby vicinity of the facility. There is no irrigation water supply well at the site. Five groundwater monitoring wells are known to exist on the facility site as a result of environmental site investigations under the DEQ's Voluntary Remediation Program (VRP). The available data suggests that ground water is present in the upper sediments at a depth of between 4.5 to 9 feet bgs in the area of the VRP investigation and from 13 to 17 feet bgs over the larger Fergusson property. (See Site Characterization Report (SCR), December 2007, by ENVIRON.) (The SCR provides further description of site subsoils and geology.)

The nearest surface water body is Grindall Creek, which flows to the southeast approximately 1,000 feet south and west of the site. No springs have been identified within one mile of the property. The groundwater flow direction from studies at the site indicates that general direction of groundwater flow is to the east and southeast. (See SCR, December, 2007.)

The facility was issued a pretreatment VPDES Permit issued by the City of Richmond for discharge of industrial and sanitary wastewaters to the City's sanitary sewer system; quarterly wastewater discharge sampling, testing, and reporting was required for the industrial pretreatment wastewaters under issued VPDES Pretreatment Permit.

In addition, the facility was reportedly issued a VPDES Stormwater Permit by the VDEQ, which required both monthly and quarterly inspections, and periodic sampling, testing, and reporting.

At the time of the EPA's CA site visit on April 1, 2008, J.W. Fergusson and Sons, LLC. (the former operating company), was in Chapter 7 Bankruptcy. At that time, all of the industrial manufacturing equipment and office equipment had been liquidated (sold for reuse or salvaged) and were removed from the facility building and facility grounds, except for some furniture in a few small offices and a warehouse storage area. All process raw materials and waste materials had been removed from the facility site and sent off-site for reclamation, re-use or disposal. In addition, all process material tanks and waste tanks and had been decontaminated, removed from the facility site and sent off-site for reclamation, re-use or disposal. The facility was in the final stages of removing equipment related infrastructure, such as air pollution control duct work, etc., as part of the Chapter 7 liquidation process leaving the building virtually empty. (See discussion below under Facility Operations and Facility Ownership History.)

According to RCRA Info, J.W. Fergusson and Sons, Inc. operated a container storage hazardous waste management unit (HWMU) with a storage capacity of 2,500 gallons at the facility site under Interim Status effective November 19, 1980. (The facility was constructed in 1964 and began printing operations in 1964 or 1965.)

The Virginia Department of Health (VDH), Division of Solid and Hazardous Waste Management, sent the facility correspondence, dated December 14, 1983, which formally requested the facility to submit a RCRA Part B Permit Application for management and storage of hazardous waste. RCRA Info indicates that the State received a RCRA Permit Application withdrawal request for the container (drum) storage facility on June 25, 1984, and the facility indicated it intended to operate the container storage area under 40 CFR § 262.34, Accumulation Time, as a less-than 90-day accumulation area as a generator. The administrative record indicates that the VDH received a Closure Plan for the container storage HWMU on July 2, 1984. The public notice of the Closure Plan and the proposed termination of the facility's interim status under RCRA Regulations and the Virginia Hazardous Waste Management Regulations (VHWMR) was issued on July 20, 1984. The Closure Plan for the container storage HWMU was approved by the VDH, effective September 11, 1984. RCRA Info indicates that the EPA received the Closure Certification according to Plan on October 12, 1984, and the closure verification was also on October 12, 1984. The operation of the container storage facility under Interim Status was the primary basis for the facility being subject to RCRA Corrective Action.

After "clean closure" approval of the container storage HWMU, the facility actively operated the same container storage area or HWMU as a large quantity generator (LQG) under 40 CFR§ 262.34, until the facility operations were terminated due to foreclosure by the business creditor approximately in September 2006. (See SWMU No. 4, Hazardous Waste Container Storage Area No. 1, of CA Site Visit Report.)

Information from the Contingency Plans within the detailed administrative record of the CA Site Visit Report indicates that in 1989, the facility had four hazardous waste container storage areas, which were operated as less-than 90-day accumulation areas inside the facility building. In addition, the facility also managed and generated hazardous waste still bottoms from a still inside the building, which was used to recover solvents for reuse at the facility.

It should be noted that the facility generated significant quantities of hazardous waste from chrome plating operations, spent acids from chrome stripping operations, caustic waste from washing equipment in the printing plant, waste solvents, and still bottoms. (See CA Site Visit Report for further details regarding hazardous wastes managed and generated.)

According to RCRA Info and RCRA Biennial Report Information entries, from 1989 through 2003, the facility generated and managed between 122 to 228 tons of hazardous waste every two years. This generated hazardous waste was manifested (shipped off-site under a hazardous waste transporter) to a RCRA Regulated treatment, storage, disposal (TSD) facility for subsequent treatment and disposal according to the RCRA Regulations.

However, RCRA Info indicated that in the Biennial Report Period of 1993, 309 tons of hazardous waste was generated, managed, and manifested or shipped off-site to a RCRA Regulated TSD Facility. This noted increase in hazardous waste generated during the Biennial Report period was reportedly due to the removal of toluene solvent contaminated soil, ignitable waste solvent, and decontamination wastewater from the clean-up or remediation of a release from two underground storage tanks (USTs) at the facility site.

The release of toluene and acetone from the two USTs occurred in an area identified in the CA Site Visit Report as SWMU No. 8, Decommissioned Toluene UST Area. SWMU No. 8 was located near the facility's less-than 90-day container storage area and the facility still. A DEQ Pollution Complaint (#93-1936) was opened for the release of toluene and acetone from this tank to soils and groundwater. A 1996 Site Characterization Report by Environmental Technologies of North America determined that risk due to the levels in the soils and groundwater were low. According to the Site Characterization report, 2007, by ENVIRON, the UST was closed by Earth Tech in 1999. Further in the CA Site Visit Report, Appendix C, indicated that significant quantities of soils contaminated with toluene were excavated, were temporarily stored in containers on-site, and were sent off-site for treatment and disposal.

Site investigation documentation provided by GaiaTech, dated March 8, 2004, also provided test results of sampling of the subsoils and groundwater from a boring and temporary well in the vicinity of the SWMU No. 8. The review of the above data, indicated that remaining COCs in the subsoils in the nearby vicinity of SWMU No. 8 appeared to be sufficient to meet industrial risk-based standards; however, the groundwater in this area marginally exceeded tap water maximum contaminant levels (MCLs) or EPA Region III tap water risk based levels for a few constituents. (See GaiaTech correspondence, dated March 8, 2004, CA Site Visit Report, Appendix C.)

The CA Site Visit Report identified SWMU No. 9, Decommissioned USTs, which was the location of two 12,000 gallon USTs used for storing solvents for use in the printing operations. This unit is a concrete curbed and uncovered area at the northwest corner of the building. (See CA Site Visit Report.) According a completed Site Characterization Report (SCR), dated 2005, these tanks were reported to be closed in place by filling with concrete by Earth Tech in 1999. Site investigation documentation provided by GaiaTech, dated March 8, 2004, provided test results of sampling of the subsoils and groundwater in the vicinity of the SWMU No. 9. The review of the above data indicated that remaining COCs in the subsoils in area of SWMU No. 9 appears to be sufficient to meet industrial risk-based standards; however, the groundwater in this area did exceed tap water maximum contaminant levels (MCLs) or EPA Region III tap water risk based levels for a few constituents. (See GaiaTech correspondence, dated March 8, 2004, CA Site Visit Report, Appendix C.)

According to Fergusson personnel, the USTs in the Area of SWMU No. 8 and 9 were pumped dry and purged of vapors then closed in place by filling with concrete. The area was then covered in concrete. It is uncertain, which DEQ program had overseen the environmental remediation work and investigation work in the area of the SWMU Nos. 8 and 9. The information associated with the closure of the USTs will be further evaluated by the RCRA CA Program and added to the administrative record for this site.

According to RCRA Info, a RCRA facility compliance inspection was held by the DEQ on April 22, 2008. The inspection notes indicated that clean-up and removal of equipment, machinery, material, and supplies was completed, and any hazardous material was removed, to minimize further maintenance or reasonable risk of a release. The facility submitted a revised Form 8700-12, Notification of Regulated Waste Activity Form, and the facility was formally deactivated as a generator of hazardous waste under RCRA effective May 23, 2008.

In addition to the waste management activities noted above, the facility was issued a Title V Air Permit, which was issued by the VDEQ. The Title V Air Permit was reportedly effective from 2002 through November 2007. The Air Permit was reportedly issued for the air emissions from the Rotogravure printing press operations, the air pollution

control equipment, thermal oxidizer, and the solvent recovery system, which treated air emissions from the facility's printing press operations.

According to facility representatives, air emissions from three of the commercial Rotogravure printing presses, Nos. 1, 2, and 6, were collected by APC equipment and subsequently treated in the facility's thermal oxidizer, located in the middle of the facility. Ash from the thermal oxidizer unit fell into a large roll off container in the loading dock area below the unit and was sent off-site for disposal. (See SWMU No. 1 of the CA Site Visit Report.)

The air emissions from three of Gravure Printing Presses, Nos. 3, 4, and 5, were collected by APC equipment and treated by the solvent recovery system, which was located in the rear yard of the facility site. As understood, the solvent recovery system was considered part of the APC equipment under the Air Permit. No exceedances or this permit were noted in the file review. (See SWMU No. 6, Former Solvent Recovery System, of CA Site Visit Report.)

Fergusson Acquisition dba as J.W. Fergusson & Sons, LLC performed a limited Phase II Environmental Investigation through Gaia Tech in February 2004, at the 4107 Castlewood Road site, as part of the sale of the Operational Assets of facility. (See GaiaTech correspondence, dated March 8, 2004, CA Site Visit Report, Appendix C.) GaiaTech installed and sampled a total of 17 borings, including 14 temporary monitoring well points. The 17 boring locations were spaced fairly evenly along the outside perimeter of the facility building and also covered the areas of SWMU No. 6, Former Solvent Recovery System, and SWMU No. 8, Decommissioned Toluene UST Area, and SWMU No. 9, Decommissioned USTs. Each of the soil borings was completed using a Geoprobe sampling unit. Subsurface soil samples were collected between 4 ft increments and field screened for VOCs using a photo-ionization detector (PID). A total of 8 soil samples were collected at sample depths from specific borings based on PID field screening results and 14 groundwater samples were collected and submitted for laboratory analysis. The soils and groundwater samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and RCRA metals. The above investigation identified contamination of the soil and groundwater on the western portion of the property near SWMU No. 6, Former Solvent Recovery System, and some groundwater contamination in the area of SWMU No. 8, Decommissioned Toluene UST Area, and SWMU No. 9, Decommissioned USTs.

A VRP application was prepared and submitted on June 7, 2004, for the entire site, 3.35 acres. J.W. Fergusson & Sons, Inc. dba as Berluk, Inc., was accepted into the DEQs VRP on September 17, 2004. Correspondence from Williams Mullen, dated February 23, 2005, on behalf of the facility amended the VRP Application to only include a 0.28 acre area which is located along the western boundary of the facility in the area of the facility's Solvent Recovery System. (Therefore, the portion of the site evaluated under the VRP was only related with area of releases from the area of SWMU No. 6, Former Solvent Recovery System, and SWMU No. 9, Decommissioned USTs, as identified in the CA Site Visit Report.) (The area of SWMU 8, Decommissioned Toluene UST Area, was not evaluated under the VRP.)

Environ International Corporation (EIC) conducted site investigations from September 2004 to August 2006 to further characterize the previously identified impacts.

In order to characterize the identified impacts, Environ installed five groundwater monitoring wells and collected and analyzed thirteen groundwater samples over time to allow for potential seasonal variations. Six soil samples collected from the impacted area during the Limited Phase II Site Investigation in February 2004 were also used. The sampling locations were chosen to assess the area of potential concern and depicted on Figure 3, ENVIRON Site Map, in the area of SWMU No. 6, Former Solvent Recovery System. Groundwater samples were analyzed for volatile organic compounds (VOCs), and RCRA Conservation Recovery Act (RCRA) metals. Soil samples were analyzed for VOCs, semi-volatile organic compounds (SVOCs) and RCRA metals.

Site Investigation activities identified VOC and RCRA metal impacts to soil and groundwater above the Virginia VRP Tier II (residential use risk criteria) and Tier III (industrial use risk criteria) screening levels. Compounds detected in soil above the Tier II (residential) screening levels were arsenic, selenium, acetone, 1,1-dichloroethene, toluene, 1,2,4-trimethlybenzene, and 1,3,5-trimethlybenzene. The sole compound detected in soil above the Tier III (industrial) screening levels was arsenic. Compounds detected in groundwater above Tier II (residential) screening levels were arsenic, barium, chromium, lead, acetone, benzene, and vinyl chloride. Compounds detected in groundwater above Tier III (industrial) screening levels were chromium and benzene (due to potential exposure of a construction worker to potentially contaminated groundwater in a trench). (The VRP uses the updated EPA Region III Risk-based Concentration Table (RBC) as the basis of the VRP risk criteria and standards.)
(See http://www.deq.state.va.us/vrprisk/.)

Results from these investigations are summarized in a Site Characterization Report (SCR), dated December 2005, and revised SCR, dated February 2007, by ENVIRON International Corporation.

A site-specific risk assessment was conducted and the results were submitted to the DEQ as part of SCR, dated 2007. The SCR evaluation findings and risk assessment results concluded that contamination in the soil and groundwater at the site (in the area evaluated) does not present an unacceptable risk to human health or the environment provided that the groundwater beneath the property site 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 (under the age of 16) daycare facilities, schools, or playground purposes. (Hotels and motels are not prohibited uses of the site.)

A Certificate of Satisfactory Completion of Remediation and Declaration of Restrictive Covenants for the J.W. Fergusson & Sons, Inc. VRP Site (Berluk, Inc.) under the ownership Fergusson Associates, LLC, was issued by the VDEQ's VRP on March 7, 2008. Correspondence from the owner's attorney, dated April 14, 2008, documents that the Declaration of Restrictive Covenants with Metes and Bounds Description were recorded in the Clerk's Office, City of Richmond, Virginia, on April 3, 2008, as instrument No. 08-08913. The above noted Declaration of Restrictive Covenants specifies the use restrictions in order to protect human health and the environment as follows: a) The groundwater beneath the property shall not be used for any purpose other than environmental testing. b) The property shall not be used for residential purposes or for children's (under the age of 16) daycare facilities, schools, or playground purposes (although hotels and motels are not prohibited uses of the site). c) This Declaration is being executed pursuant to the terms and provisions set forth in the DEQ's VRP Certification of Satisfactory Completion of Remediation attached hereto. d) This Declaration of Restrictive Covenants may be modified or release only with the consent of the Director of the Department of Environmental Quality, upon a showing of changed circumstances sufficient to justify the change.

It should be noted that the Declaration of Restrictive Covenants applies to the entire 3.35 +/- acres of the Fergusson Associates, LLC property and not just the 0.28 acres specified under the amended VRP Application.

Facility Operations and Facility Ownership History

According to the CA Site Visit Report, in 1996, J. W. Fergusson and Sons, Inc. established Fergusson Associates LLC as the sole owner of the building and the land of the facility located at 4107 Castlewood Road, Richmond, Virginia. The Corporate name of J.W. Fergusson and Sons, Inc., was maintained as the operating company and owner of the equipment, machinery, materials, licenses, permits, etc. J.W. Fergusson & Sons, Inc leased the 4107 Castlewood Road facility from Fergusson Associates LLC, and assumed responsibility for all past and future business activity, taxes, operating expenses, and environmental permitting, and related O & M, and other environmental issues for the property.

In April 2004, two individuals along with a group of Equity Partners established Fergusson Acquisition LLC, which purchased the operating assets included all manufacturing equipment, office equipment, pollution control

equipment, environmental and other permits, etc., at the facility. The new Company, Fergusson Acquisition LLC, would use the Company name J.W. Fergusson & Sons, LLC, for branding and business continuity purpose.

At the time of the sale of the operating component of the business in 2004, J. W. Fergusson and Sons, Inc. established a Company entitled Berluk, Inc., which was formed to be responsible for the environmental investigations and any environmental indemnity associated with the sale of the J.W. Fergusson and Sons, Inc. operating assets of the Company in 2004. As understood, the Company Berluk is still in existence today.

As a component part of the above sale of J.W. Fergusson and Sons, Inc, the ownership of the building and the land of the facility site were retained by Fergusson Associates, LLC (Fergusson Acquisition LLC assumed the lease and all responsibilities associated with the manufacturing related operations at the 4107 Castlewood Road facility), while the environmental indemnity or responsibility for environmental related costs and liabilities for the past operations at the facility remained under the Company Berluk, Inc.

In September 2006, the financial services lender to Fergusson Acquisition LLC, foreclosed on the secured business loan to the new Company operating under the name J. W. Fergusson and Sons, LLC. In 2006, the financial services lender began a controlled closure of the facility, and took measures to liquidate all of the assets of the Company.

As noted above, at the time of the EPA's CA site visit on April 1, 2008, J.W. Fergusson and Sons, LLC. (the former operating company), was in Chapter 7 Bankruptcy. The facility was in the final stages of removing equipment related infrastructure, such as air pollution control duct work, etc., as part of the Chapter 7 liquidation process leaving the building virtually empty.

In the Spring of 2008, the facility was under contract for the pending sale of the building and the land to a prospective purchaser. The status of the noted pending sale in 2008 is unknown.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	Yes			arsenic, barium, chromium, lead, acetone, benzene, and vinyl chloride
Air (indoors)[2]		No		
Surface Soil (e.g., <2 ft)	Yes			Arsenic, selenium, acetone, 1,1-dichloroethene, toluene, 1,2,4-trimethlybenzene, and 1,3,5-trimethlybenzene.
Surface Water		No		
Sediment		No		
Subsurf. Soil (e.g., >2 ft)	Yes			Arsenic, selenium, acetone, 1,1-dichloroethene, toluene, 1,2,4-trimethlybenzene, and 1,3,5-trimethlybenzene.
Air (outdoors)		No		

☐ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

☒ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

☐ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

See Discussion under Item No. 1, Facility Background.

References:

EPA Region III Corrective Action Program, *Final RCRA Site Visit Report*, December 24, 2008, by U.S. Army Corps. of Engineers

Limited Phase II Site Investigation Letter Report - for J.W. Fergusson & Sons, Inc., dated March 8, 2004, by GaiaTech

Site Characterization Report, Berluk (J.W. Fergusson) Site, 4107 Castlewood Road, Richmond, VA, VRP No. 00392, dated February 27, 2007, by ENVIRON

DEQ, Voluntary Remediation Program (VRP) Administrative Record for J. W. Fergusson & Sons, 4107 Castlewood Road, Richmond, VA, VRP00392

DEQ, VRP Certificate of Satisfactory Completion of Remediation and Declaration of Restrictive Covenants for J. W. Fergusson & Sons, 4107 Castlewood Road, Richmond, VA, VRP00392, dated March 7, 2008, and Certified April 14, 2008.

EPA Risk-Based Concentration Table Screening Levels, dated April 14, 2004, and May 19, 2009.

Footnotes:

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

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3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	No	No	No	**Yes**	No	No	No
Air (indoors)	No	No	No	No	No	No	No
Soil (surface, e.g., <2 ft)	No	No	No	**Yes**	No	No	No
Surface Water	No	No	No	No	No	No	No
Sediment	No	No	No	No	No	No	No
Soil (subsurface e.g., >2 ft)	No	No	No	**Yes**	No	No	No
Air (outdoors)	No	No	No	No	No	No	No

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated" as identified in #2 above.

2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

☐ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

☒ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

☐ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code.

[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

Rationale and Reference(s):

In 2008, all of the industrial manufacturing equipment and office equipment had been liquidated (sold for reuse or salvaged) and were removed from the facility building and facility grounds, except for some furniture in a few small offices and a warehouse storage area. All process raw materials and waste materials had been removed from the facility site and sent off-site for reclamation, re-use or disposal. In addition, all process material tanks and waste tanks and had been decontaminated, removed from the facility site and sent off-site for reclamation, re-use or disposal.

A complete exposure pathway to potentially contaminated surface and subsurface soils and groundwater potentially exists at the facility site for any construction activity that would encroach upon the areas of potential subsoil and groundwater contamination in the Area of SWMU No. 6, Former Solvent Recovery System.

A limited Phase II Environmental Investigation through Gaia Tech in February 2004, identified contamination of the soil and groundwater on the western portion of the property near SWMU No. 6, Former Solvent Recovery System, and some groundwater contamination in the area of SWMU No. 8, Decommissioned Toluene UST Area, and SWMU No. 9, Decommissioned USTs.

Site Investigation activities identified VOC and RCRA metal impacts to soil and groundwater above the Virginia VRP Tier II (residential use risk criteria) and Tier III (industrial use risk criteria) screening levels. Compounds detected in soil above the Tier II (residential) screening levels were arsenic, selenium, acetone, 1,1-dichloroethene, toluene, 1,2,4-trimethlybenzene, and 1,3,5-trimethlybenzene. The sole compound detected in soil above the Tier III (industrial) screening levels was arsenic.

Compounds detected in groundwater above Tier II (residential) screening levels were arsenic, barium, chromium, lead, acetone, benzene, and vinyl chloride. Compounds detected in groundwater above Tier III (industrial) screening levels were chromium and benzene (due to potential exposure of a construction worker to potentially contaminated groundwater in a trench). The groundwater data from the SCR, dated February 2007, and the limited Phase II Environmental Investigation Report from Gaia Tech, dated March 8, 2004, indicates that contaminated groundwater above MCLs and RBCs is limited to the areas of SWMU No. 6, 8, and 9. (SWMU 9 is contiguous to SWMU No. 6.)

The current zoning for the site is M-1-Light Industrial. The proposed reuse of the property is industrial.

The former process areas to the rear of the site where the surface soil and subsoil contamination exists are a gravel surface and not paved. When the site was operational, this provided a direct pathway to the soil. However, workers or trespassers would not be reasonably expected to be exposed to potentially contaminated soils in the vicinity of SWMU No. 6, Former Solvent Recovery System as the soils are covered with gravel and/or concrete.

It should be noted that the City of Richmond provides public water supply (PWS) to the facility and nearby vicinity. There are no drinking water wells on the property or known potable water wells in the nearby vicinity of the facility. There is no irrigation water supply well at the site. Therefore, no groundwater use receptors have been identified at the facility site or nearby vicinity down-gradient of the site.

As J.W. Fergusson operations have been terminated, there are no air emissions that would negatively impact indoor and/or outdoor air quality.

The surface water draining off of the site is conveyed to the James River via the City of Richmond storm water collection system. No evidence of releases of contaminants to the storm water system was observed during the CA site visit nor is surface water discharge of contaminated groundwater anticipated. The nearest surface water body is Grindall Creek, which flows to the southeast approximately 1,000 feet south and west of the site. The James River is located approximately 1.3 miles to the east of the site (Figure 1). The available data suggests that ground water is present in the upper sediments at a depth of between 4.5 to 17 feet and contaminated groundwater is anticipated to attenuate prior to any discharge to surface waters.

See Discussion under Item No. 1, Facility Background, for additional rationale.

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4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

☒ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

☐ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

☐ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

Rationale and Reference(s):

The human health exposures from a complete pathway of exposure to potentially contaminated subsurface soils and shallow groundwater in the area of SWMU No. 6, Former Solvent Recovery System, are not expected to be significant. Compounds detected in groundwater above Tier III (industrial) screening levels were chromium and benzene (due to potential exposure of a construction worker to potentially contaminated groundwater in a trench).

The frequency and/or duration of construction activity in this area is believed to be minimal and; therefore, exposures are not reasonably expected to be significant.

Any subsurface excavation related with construction activities in the area of SWMU No. 6 should be conducted under a Health and Safety Plan to meet OSHA requirements.

In addition, the facility has been issued a VRP Certificate of Satisfactory Completion of Remediation for the area entered into the VRP (Area of SWMU No. 6), which indicates the soil and groundwater is contaminated above residential use risk based criteria and standards. This Certificate includes a Declaration of Restrictive Covenants which has been attached to the Property Title. (See Discussion under Item No. 1, Facility Background, for additional rationale.)

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5. Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

☐ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

☐ If no - (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

☐ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code.

Rationale and Reference(s):

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6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI (event code CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

☒ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at **J. W. Fergusson & Sons** facility, EPA ID # **VAD003109360**, located at **4107 Castlewood Road, Richmond, Virginia, 23234,** under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

☐ NO - "Current Human Exposures" are NOT "Under Control."

☐ IN - More information is needed to make a determination.

Completed by (signature) _____ Date 9/29/09
(print) Richard J. Criqui, Jr., C.P.S.S.
(title) Environmental Engineer Consultant

Supervisor (signature) _____ Date 9/29/09
(print) Durwood Willis
(title) Director, Office of Remediation
DEQ

Locations where References may be found:

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