DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name:	**J.G. Wilson**
Facility Address:	**120 Jefferson Street, Chesapeake, Virginia**
Facility EPA ID #:	**VAR000000125**

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, 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?

   __X__ 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 "Migration of Contaminated Groundwater Under Control" EI
A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "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 "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

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).

2. Is **groundwater** known or reasonably suspected to be "**contaminated**" [1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

   _X_ If yes – continue after identifying key contaminants, citing appropriate "levels", and referencing supporting documentation.

   ____ If no – skip to #8 and enter "YE" status code, after citing appropriate "levels", and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

   _____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):
Two constituents of concern reported in groundwater above appropriate standards are arsenic and lead. Nitrates have also been measured on the northern portion of the site at levels exceeding EPA's Maximum Contaminant Levels (MCLs); no nitrogen based constituents were ever managed at this site including ammonia, nitrite, or nitrate. Table 1 is a listing of historical groundwater monitoring data collected for the groundwater quality assessment. (Arsenic MCL = 10 ug/l; Lead Action Level = 15 ug/l).

The data included as Table 1 was collected to define groundwater quality over time and reported in a Groundwater Monitoring Report (November 2008). Exceedances of groundwater MCLs or Action Levels for arsenic and lead have occurred throughout the site at various concentrations.

Table 1:

Well ID	Date	Turbidity (NTU)[1]	Arsenic (ug/L)[2]	Lead (ug/L)	Ammonia (ug/L)[3]	Nitrate (ug/L)[4]
MW-1	3/22/2005	<0.5	**11**	10	440	170
	1/16/2008	Monitoring	Well	Destroyed		
MW-15	4/2/2008	<0.5	**38**	**245**	1230	<100
	7/10/2008	295	<10	<10	160	1000
MW-2	3/22/2005	<0.5	**46**	**30**	390	560
	1/16/2008	<0.5	<10	<10	230	460
	4/2/2008	78	<10	<10	220	750
	7/10/2008	98	<10	<10	120	1200
MW-3	3/22/2005	<0.5	<10	<10	1100	46000
	1/16/2008	<0.5	<10	11	8190	26300
	4/2/2008	<0.5	<10	<10	7380	24400
	7/10/2008	229	<10	<10	9180	25600
MW-4	3/22/2005	<.05	**31**	**120**	230	780
	1/16/2008	614	**279**	**2380**	480	780
	4/2/2008	335	<10	**18**	<100	3950
	7/10/2008	479	**54**	**190**	<100	200
MW-5/MW-12	3/22/2005	80.1	**24**	<10	260000	46

Well ID	Date	Turbidity (NTU)[1]	Arsenic (ug/L)[2]	Lead (ug/L)	Ammonia (ug/L)[3]	Nitrate (ug/L)[4]
	1/16/2008	186	**52**	**70**	139000	170
	4/2/2008	274	**35**	11	80300	490
	7/10/2008	82	**33**	<10	<100	<100
MW-6	3/22/2005	778	<10	**36**	910	1300
	1/16/2008	<0.5	**69**	**556**	<100	640
	4/2/2008	434	<10	<10	160	<100
	7/10/2008	420	<10	<10	260	<100
MW-7	3/22/2005	338	<10	**15**	560	51
	1/16/2008	Monitoring	Well	Destroyed		
MW-13	4/2/2008	<0.5	<10	**260**	590	100
	7/10/2008	<0.5	**38**	**239**	460	<100
MW-8	1/16/2008	105	<10	<10	<100	<100
	4/2/2008	143	<10	<10	170	<100
	7/10/2008	160	<10	<10	120	<100
MW-9/**MW-14**	1/16/2008	Monitoring	Well	Destroyed		
	4/2/2008	<0.5	**83**	**379**	470	<100
	7/10/2008	<0.5	38	42	770	<100
MW-10	1/16/2008	18	<10	<10	171000	9520
	4/2/2008	185	<10	<10	83500	15500
	7/10/2008	284	**13**	**25**	55100	10300
MW-11	1/28/2008	241	**30**	**34**	16400	<100
	4/2/2008	Monitoring	Well	Damaged		
	7/10/2008	<0.5	**18**	<10	5280	400

[1] Turbidity measured in Nephelometric Turbidity Units (NTU).
[2] Total Arsenic and Lead measured via method 6010B in micrograms per liter (ug/L)
[3] Ammonia measured via method 350.1 in micrograms per liter (ug/L)
[4] Nitrate measured via method 300.0 in micrograms per liter (ug/L)

References:
GROUNDWATER MONITORING REPORT– November 24, 2008
PHASE II WORK PLAN– May 2009
EPA Primary National Drinking Water Standards (MCL)

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 appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

[2] Region III Risk-based Concentrations (RBCs) are used when a Maximum Contaminant Levels (MCLs) are not applicable. .

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

__X__ If yes – continue after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2]).

_____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) – skip to #8 and enter "NO" status code, after providing an explanation.

____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Groundwater on-site has been reported to flow towards the Southern Branch of the Elizabeth River, most recently from the north to southeast and from the southeast towards the northwest (Figure No. 2). The historical data presented in Table 1 suggests a stable plume as concentrations do not increase over time and in most monitoring locations are observed to decrease. Additionally, downgradient wells (MW-11 and MW-8) report low concentrations to no detections. During the period from October 23, 2007, through November 3, 2007, the facility owner, Truxton Development, completed the excavation of 10,708 tons of soil containing elevated lead and arsenic from the site. The soil was disposed at a local landfill. With the excavation of all onsite contaminated soil to the water table, it is expected that COC concentrations will continue to decline.

Footnotes:

[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

_____ If yes – continue after identifying potentially affected surface water bodies

__X__ If no – skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies

_____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

While potentiometric groundwater surface maps have been presented suggesting two different flow paths, both illustrate that all groundwater from on-site discharges to the Southern Branch of the Elizabeth River. Elevated upgradient contaminant concentrations appear to attenuate to below water quality standards prior to discharge. The most recent concentrations in the two downgradient wells, MW-8 and MW-11, are either below or slightly above the MCL for a single constituent. Additionally, concentrations are below or slightly above chronic saltwater criteria, 36 ug/l for arsenic and 9.3 ug/l for lead. This demonstrated attenuation reported from site wells allows the reasonable conclusion that groundwater discharges to the Elizabeth River at levels below the MCL and surface water quality criteria.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

____ If yes – skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

____ If no – (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

_____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Footnotes:

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

_____ If yes – continue after either:

(1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and ecosystems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR

(2) providing or referencing an interim-assessment[5], appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination..

_____ If no – (the discharge of "contaminated" groundwater into surface water is potentially significant) continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of <u>each</u> contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

_____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Footnotes:

[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

   __X__ If yes – continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

   _____ If no – enter "NO" status code in #8. skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies

   _____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

The facility is prepared to implement the final remedy consisting of ongoing groundwater monitoring of the existing network for lead and arsenic. Additionally, two monitoring wells are proposed – one adjacent to Poindexter Street and another adjacent to the Southern Branch of the Elizabeth River.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), 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).

__X__ YE – Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the **J. G. Wilson Inc.** facility, **EPA ID # VAR000000125**, located in **Chesapeake, Virginia**. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

_____ NO – Unacceptable migration of contaminated groundwater is observed or expected.

_____ IN – More information is needed to make a determination.

Completed by		Erich Weissbart	Date	9/1/09
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	(Title)	Environmental Engineer Senior		

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Locations where References may be found:

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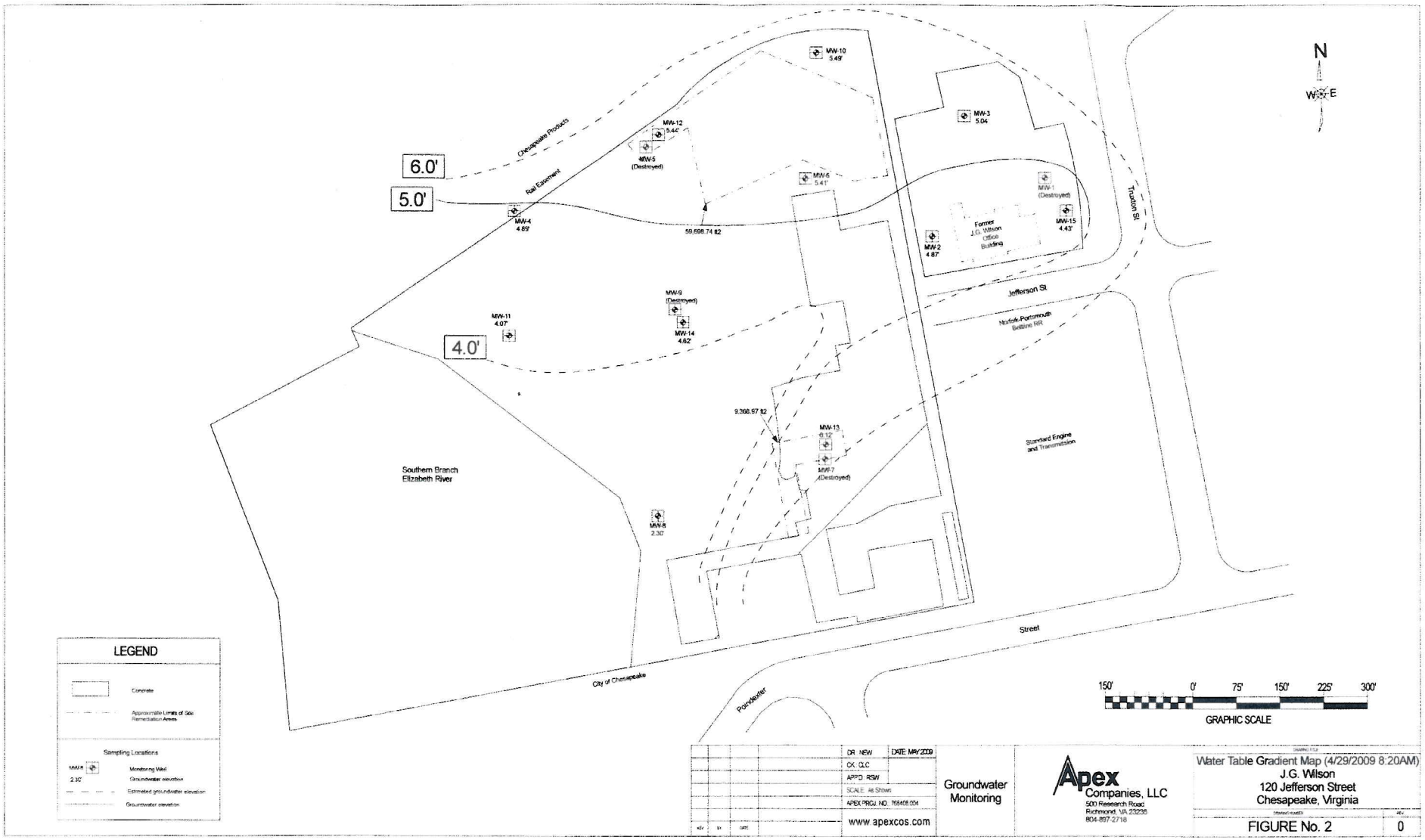

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DRAWING TITLE

Water Table Gradient Map (4/29/2009 8:20AM)
J.G. Wilson
120 Jefferson Street
Chesapeake, Virginia

DRAWING NUMBER: FIGURE No. 2

REV: 0