DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRAInfo code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name: **Triumvirate Environmental, Inc. (former Chemical Waste Disposal)**
Facility Address: **42-14 19th Avenue, Astoria, New York 11105-1082**
Facility EPA ID #: **NYD0077444263**

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 #8 and enter"IN@ (more information needed) status code.

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

BACKGROUND

Triumvirate Environmental, Inc. which was formally Chemical Waste Disposal Corporation (CWD) is located at 42-14 19th Avenue in Astoria, Queens, New York. The site has been in continuous operation as a

commercial hazardous waste storage facility since 1964. Past treatment operations (1964-1983) included running several distillation units for the purpose of recycling spent chlorinated and non-chlorinated solvents. Tetrachloroethylene, trichloroethylene, and acetone were the primary solvents distilled and reclaimed. Spillage of chlorinated and non-chlorinated solvents in the vicinity of the reclamation units, and discharges to the old dry well, are believed to be the major sources of contamination to soils and groundwater.

Triumvirate currently provides temporary storage for hazardous waste, PCB waste, and solid waste that it collects from various generators around the area and then transports offsite for treatment, recycling, and/or disposal. The facility is approximately 13,500 square feet, and consists of two buildings. The outer courtyard area, where the majority of the past distillation process and spillage is believed to have occurred, is now a completely enclosed warehouse (outer warehouse) with a new concrete pad. The outer warehouse is used for loading and unloading waste materials, and contains several newly constructed hazardous waste storage units. All waste transported to the facility is off-loaded indoors in a special designated area, and carted around to the outer warehouse and interior storage areas. These storage areas are equipped with secondary containment structures, to protect against potential spills. Figure 1 shows the current layout of the facility.

Geology and Hydrology

The facility sits on reclaimed tidal wetlands that were filled in from 1891 to 1957 with dredge spoils, construction debris, excavation material from other sites, and solid waste. Both the unsaturated and saturated soils are composed of this fill material, which extends from about 14.5 to 19.5 feet below grade in the area underneath the site, and to 12 to 16 feet offsite. Underlying the fill is a Holocene tidal flat of organic silt, peat, fine sand layer with a thickness of 1 to 4 feet which may act as a confining layer. Below that is a silt/clay layer with a thickness of 5 to 13 feet. The tidal flat is underlain by approximately 50 feet of glacial sand, below which lies 50 more feet of clay. Given that most of the buildings in this area have been constructed on piles, and deep sewers have been installed along adjacent streets, some penetration of these confining layers has probably occurred. The groundwater table underneath the site is about 5 to 8.5 feet below the surface.

The groundwater in the area generally flows in a northeasterly direction. However, the groundwater appears to be influenced by the 20-30 foot topographic elevation located to the east-northeast of the site, which may facilitate the recharge of the shallow water system and thereby influence the gradient in this area. The elevation appears to divert groundwater flow towards the north. The close proximity of the site to Bowery Bay and the Rikers Island channel, and the possibility of tidal influence in the area, are other factors impacting the level and direction of groundwater under the site. Figure 2 shows the locations for most of the groundwater monitoring wells installed on- and off-site, and the direction of groundwater flow.

No groundwater in the area is used for drinking purposes, the nearest residential property is approximately 800 feet southwest (up gradient) of the facility.

References:

Cleanup Approach and Progress:

Several subsurface investigations were conducted by CWD at the facility prior to the most recent Phases I and II of the RCRA Facility Investigations (RFIs). The pre-RFI investigations, involving a soil gas survey, soil borings, and monitoring wells at and around the facility, confirmed the presence of subsurface soil and groundwater contamination. The two RFIs were conducted to define the nature and extent of contamination resulting from previous activities at the site. These investigations included sampling from new and existing monitoring wells, soil borings and characterization of both the groundwater hydrogeologic conditions and the physical properties of site soils. Groundwater and

soil samples were analyzed for volatile and semi-volatile organic compounds, PCBs, pesticides and inorganic compounds.

To determine which media (soil, groundwater, etc.) contain contamination at levels of concern, the RFI analytical data was compared to the New York State Department of Environmental Conservation (NYSDEC) Environmental Standards, Criteria, and Guidance Values (SCGs). NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1) and NYS Sanitary Code Part 703.5 guidance values for the groundwater, drinking water and surface water at the site. The Department used the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 "Soil Cleanup Guidelines for the Protection of Groundwater and Background Conditions and Risk-Based Remediation Criteria" for SCGs for soils.

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:

Numerous site-specific chlorinated and non-chlorinated volatile organic constituents (VOCs), exceeding NYSDEC SCGs, were detected in the groundwater. Based upon all available data, the following table (Table 1) lists a typical cross section of VOCs, their most recent concentrations and recommended groundwater protection concentrations. Results of earlier phases of RFI can be found in the RFI reports, dated January 1995 and February 1996. More recent monitoring results can be found in the groundwater monitoring report dated July 2005

Table 1

[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).

CONTAMINANT	RANGE FOR CONTAMINANTS IN GROUND- WATER (μg/l)	GROUNDWATER PROTECTION CONCENTRATION (μg/l)
Benzene	ND TO 7700	0.7
Chloroform	ND TO 14,000	7.0
cis-1,2-Dichloroethene	ND TO 300,000	5.0
Tetrachloroethene (PCE)	ND TO 130,000	5.0
Toluene	ND TO 12,000	5.0
1,1,1-Trichloeoethane (TCA)	ND TO 12,000	5.0
Trichloroethene (TCE)	ND TO 98,000	5.0
Vinyl Chloride	ND TO 570	2.0
Xylene	ND TO 12,700	5.0

REFERENCE: Groundwater Monitoring Report July 2005

Groundwater:

Lower contaminant concentrations across the street, down gradient of the site, suggest that sewer and utility lines could be providing preferential pathways for the contaminated groundwater, preventing it from following its natural gradient.

Significant groundwater concentrations of PCBs were also detected in one onsite well and two wells located immediately adjacent to the facility off-site. Concentrations ranged from 78 to 290 ug/L, well above the standard of 0.01 ug/L. PCBs were not found in up gradient wells nor in down gradient wells located across the street from the site.

Although DNAPL (dense non-aqueous phase liquid) was not observed during sampling, it is believed to have collected on top of the tidal flat, as evidenced by comparing the concentrations of select volatile organic constituents with their corresponding pure phase water solubility.

RATIONALE: Groundwater monitoring data collected under the site=s Part 373 Permit indicate exceedances of New York State Groundwater Quality Standards (Part 703).

KEY CONTAMINANTS: As shown in Table 1

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within Aexisting area of contaminated groundwater@[2] as defined by the monitoring

[2] Aexisting area of contaminated groundwater@ is an area (with horizontal and vertical dimensions) that has

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 Aexisting area of groundwater contamination@[2]).

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

_____ If unknown - skip to #8 and enter AIN@ status code.

Rationale:

The groundwater from the site flows northward, there are storm sewers in 19th Avenue which appear to be capturing the contamination. Monitoring wells on the north side of 19th Avenue are not exhibiting the chemical signature from Triumvirate although these wells do show petroleum contamination which is believed to be from other sources.

Sewer sampling immediately upgradient of Triumvirate reveals little to no contamination and sampling immediately downgradient shows exceedances of groundwater standards. The sampling at the outflow of the sewer into Bowery Bay which is part of the East River indicates that standards are being met likely due to the large amount of dilution taking place. Groundwater in this area is not used for drinking water, it is possible that vapors from the groundwater may be having an impact on indoor in adjacent structures but only limited sampling has been performed to date.

4. Does Acontaminated@ groundwater **discharge** into **surface water** bodies?

__X__ If yes - continue after identifying potentially affected surface water bodies.

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

_____ If unknown - skip to #8 and enter AIN@ status code.

Rationale:

The storm sewer discharges into Bowery Bay which is part of the East River.

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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 Acontamination@ that can and will be sampled/tested in the future to physically verify that all Acontaminated@ groundwater remains within this area, and that the further migration of Acontaminated@ 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.

REFERENCES: Groundwater RCRA Facility Investigation

5. Is the **discharge** of Acontaminated@ groundwater into surface water likely to be A**insignificant**@ (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater Alevel,@ 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)?

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__X__ If yes - skip to #7 (and enter AYE@ status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of <u>key</u> contaminants discharged above their groundwater Alevel,@ the value of the appropriate Alevel(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 Acontaminated@ 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 Alevel,@ the value of the appropriate Alevel(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 Alevels,@ 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 - enter AIN@ status code in #8.

<u>Rationale:</u>

See # 3 above.

<u>References:</u>

6. Can the **discharge** of Acontaminated@ groundwater into surface water be shown to be **Acurrently 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])?

__X__ 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 eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR

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

[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.

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 Alevels,@ 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 Acontaminated@ groundwater can not be shown to be **Acurrently acceptable@**) - skip to #8 and enter ANO@ status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown - skip to 8 and enter AIN@ status code.

Rationale:

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 Aexisting 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 Aexisting area of groundwater contamination.@

_____ If no - enter ANO@ status code in #8.

_____ If unknown - enter AIN@ status code in #8.

Rationale:

The site=s NYSDEC Part 373 permit and Groundwater Monitoring Plan require ongoing long-term monitoring at this site at appropriate locations to continue to monitor groundwater plumes.

8. Check the appropriate RCRAINFO 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

[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.

documentation as well as a map of the facility).

X YE - Yes, AMigration 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 AMigration of Contaminated Groundwater@ is AUnder Control@ at the **Triumvirate** facility , EPA ID # **NYD0077444263** ,located at **42-14 19th Avenue, Astoria, New York.** Specifically, this determination indicates that the migration of Acontaminated@ groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the Aexisting 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: _____ Date: 9-28-2005
Keith H. Gronwald
Senior Engineering Geologist

Supervisor: _____ Date: 9-28-2005
Denise M. Radtke
Associate Engineering Geologist

Director: Original signed by: _____ Date: 9-28-2005
Edwin Dassatti, P.E.
Bureau of Hazardous Waste and Radiation Management
Division of Solid and Hazardous Materials

Locations where References may be found:

NYSDEC, 625 Broadway, Albany, NY

Contact telephone and e-mail numbers:

(name) Keith H. Gronwald
(phone #) (518) 402-8594
(e-mail) khgronwa@gw.dec.state.ny.us