

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: Lyncott Corporation Landfill
Facility Address: Road 1, Route 1554 New Milford, Pennsylvania 18834
Facility EPA ID #: PAD 060506805

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?

 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 "Current Human Exposures Under Controls" 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).

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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)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale/Key Contaminants</u>
Groundwater	<u>X</u>	<u> </u>	<u> </u>	<u>See rationale below.</u>
Air (indoors) ²	<u> </u>	<u>X</u>	<u> </u>	<u>See rationale below.</u>
Surface Soil (e.g., <2 ft)	<u>X</u>	<u> </u>	<u> </u>	<u>See rationale below.</u>
Surface Water	<u>X</u>	<u> </u>	<u> </u>	<u>See rationale below.</u>
Sediment	<u>X</u>	<u> </u>	<u> </u>	<u>See rationale below.</u>
Subsurface Soil (e.g., >2 ft)	<u>X</u>	<u> </u>	<u> </u>	<u>See rationale below.</u>
Air (outdoors)	<u> </u>	<u>X</u>	<u> </u>	<u>See rationale below.</u>

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

X 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):

Reference: Final Environmental Indicator Inspection Report Lyncott Corporation (URS, September 2009).

1. Groundwater:

On-site groundwater in the eastern portion of the Lyncott site has been extensively investigated for both organic and inorganic constituents via installation and sampling of over 60 monitoring wells since 1979. Review of groundwater chemistry data collected since 1992 for the shallow bedrock wells shows that samples were analyzed for both dissolved and total inorganic constituents.

The remaining bedrock wells continue to monitor the Sanitary Landfill (SWMU #3) where dissolved arsenic (W18, WR07), iron (W16, W17, W18, and W19), and manganese (W16, W17, W18, W19, and W20) are present above the current Maximum Concentration Limit (MCL) National Drinking Water Standard and the Pennsylvania Groundwater Medium-Specific Concentration (MSC) for Used Aquifer. Additionally, total lead (P05, WT21, and WR07) remains present above the MCL National Drinking Water Standard and the PA Groundwater MSC for Used Aquifer.

A linear regression analysis for all contaminants of concern in W21, which monitored the IBM Pad (SWMU #6),

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.

were acceptable for approved termination by PADEP therefore this well has not been sampled since 2004.

Recommendations in the Interim RCRA Facility Assessment (RFA) Report included the installation of monitoring wells near the Drum Storage Barns (SWMU #8) to determine groundwater flow and to ensure that the existing monitoring well system is adequate. Spring #4, located downgradient from the former storage barns, was sampled until June 1989. Analytical results indicate the one-time presence of arsenic (0.014 mg/l – 10/22/81) and mercury (0.075 mg/l – 4/14/81). Both analytes' concentrations were above the current MCL National Drinking Water Standard and the Pennsylvania Groundwater MSC for a Used Aquifer. However, the subsequent 4 and 8 sampling rounds were non-detect for mercury and arsenic, respectively. Following drum and soil removal, soil samples were obtained from each of the barn floors. No sample results exceed the current PA Soil-to-Groundwater MSC for Used Aquifers. Therefore, there is no reason to believe that the groundwater in this part of the Site has been impacted.

The closest municipal water source is the New Milford Municipal Authority (NMMA), which is over one-half mile northeast of the Site. A detailed Site-specific geologic/hydrogeologic study titled the Groundwater Site Assessment Evaluation (GSAE) was performed to assess the groundwater monitoring program. Results indicate that the dominant bedrock groundwater movement is by fracture flow toward the south-southeast on the south side of the bedrock ridge. A local perched water table exists in the eastern part of the site represented by seasonal springs. Permeability in the bedrock is low with eventual discharge into Meylert Creek via an unnamed surface stream located along the southern site boundary. Therefore, there is no reason to believe that the municipal water source has been impacted.

Residents adjacent to the Site appear to be serviced by springs and private groundwater wells. Two rounds of residential groundwater and spring sampling occurred in 1982 and 1984. No concentrations above the drinking water standards were present in these samples.

2. Indoor Air:

There are currently three structures at the Lyncott facility: two construction trailers and a metal maintenance building. One construction trailer is located west of the former Vault #1 (SWMU #1) and is not habitable. The administration office (the other construction trailer) is located at the entrance to the Facility west of the former Drum Storage Barns (SWMU #8). While the current frequency of use for this trailer is not known, it is not a residential structure. Both construction trailers are temporary structures which are not on a concrete slab and are not in contact with the ground. The metal maintenance shed, located at the Facility entrance, has a dirt floor and is used to store a tractor, tires and other materials. Because neither current structure is an "inhabited building" as defined in the EPA November 2002 OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) the indoor air criteria are not applicable.

3. Surface Soils (0-2 feet):

On-site soils have been investigated for a limited breadth of organic constituents and metals via sample collection which was undertaken during SWMU closure activities conducted from 1981 through 1989. A brief synopsis of the soils data collected at the Site is provided below:

SWMU Area	Soils Investigation Information
#1 - Vault #1 with Sedimentation Pond #1	Based on lead and arsenic analytical results collected during excavation, the bottom of Vault #1 was excavated to depths of one to six feet below the beginning ground surface elevation on May 15, 1988. No analytical results were located.
#2 - Sludge Storage Area	Following the removal of the pad, a composite soil sample was collected and analyzed for arsenic, barium, total chromium, chloride and sulfate which were all below the residential MSCs for inorganic regulated substances for 1-15 feet bgs.
#3 - Municipal Solid Waste Disposal Area	The sanitary landfill was closed in 1979. No waste has been removed and no soil sample data was located in conjunction with this SWMU.
SWMU Area	Soils Investigation Information
#4 - Vault #2 Area	Test pits were dug prior to locating Vault #2. Arsenic and chromium were above the

	Residential MSCs for inorganic regulated substances (1-15 feet bgs) in eight and two samples, respectively. Although Vault #2 was never constructed the area was used as a sludge staging area.
#5 - Vault #3 with Sedimentation Pond #3	Soil samples collected from the Vault #3 cover indicate that arsenic in one sample collected at a depth of 48" is above the Threshold Limit Value (TLV) established in the 1984 "Stipulation of Parties" stemming from the PA Closure Order.
#6 – IBM Stabilized Sludge Area	Four test pits were dug for integrity inspection of SWMU #6. Soil samples collected from two of the test pits contained cadmium, chromium, lead, and mercury above the TLV in both samples. The IBM pad has been closed with waste in place.
#7 – McGraw Edison Storage Pad	Analytical results from a test pit (WC-7, 1982) and soil sample (SS-7, 1987) indicate that arsenic was above the Residential MSCs for inorganic regulated substances for 1-15 feet bgs in the test pit sample. The soil sample results show that cadmium and selenium are about the TLV but below the Residential MSCs for inorganic regulated substances for 1-15 feet bgs. Waste and soil were removed in 1981.
#8 – Drum Storage Area	Soil samples collected following the removal of dirt from the storage barn floors contained arsenic above the Residential MSCs for inorganic regulated substances for 1-15 feet bgs in three of the four samples. All other analytes were within acceptable limits.

Historic "sediment samples" were collected as part of the closure of Sedimentation pond #1 and Sedimentation pond #3. Since EPA considers sediment loose particles of sand, clay, silt, and other substances that settle at the bottom of a water body, these ponds have been removed and samples were taken below grade, and then minimum backfill and grading occurred as per the closure plan, EPA considers these results as surface samples under current conditions. Final closure of Sedimentation Pond #1 occurred in late 1986 with confirmatory soil samples collected from the pond and ditch on October 22 and 23, 1986. Sedimentation pond #1 was sampled in 1982 and 1987. Analytical results from 1982 indicate arsenic above Residential MSC in two samples 3 feet bgs. Analytical results from 1987 showed arsenic above the Residential MSC. Cadmium, chromium, lead, and selenium were above the site TLV. Sedimentation pond #3 was ordered closed in 1985 by PADER along with the closure of Vault #3. Sedimentation pond #3 was sampled in 1982 and 1987 also. Sediment samples collected in 1982 from Sedimentation Pond #3 show all analytes below MSCs. Additional post-remediation sediment samples were collected by Versar on April 30, 1987 as part of the RFA. Review of this data indicates that cadmium and selenium were present above the TLVs.

4. Sediment:

Post-remediation sediment samples were collected by Versar on April 30, 1987 as part of the RFA. Review of this data indicates that arsenic was present above the Pennsylvania Direct Contact MSC for Residential Soil (0-15 feet bgs). Cadmium, chromium, lead and selenium were present above the previously negotiated threshold values based on background values as determined per the Closure Plan.

5. Surface Water:

The nearest identified surface water body is the Meylert Creek which is located approximately ½-mile east of the Lyncott facility. An unnamed tributary to the Meylert Creek is located in the southeast corner of the facility. Site drainage merges with Meylert Creek and flows northward to the Martins Creek which merges with the Salt Lick Creek and on to the Susquehanna River. A tributary to the Meylert Creek is located along the southern boundary of the Site topographically downgradient from existing and former SWMUs.

Surface water samples were collected during RFA field sampling in 1987. Surface water sample results were compared to the Pennsylvania Code 93.7 Specific Waster Quality Criteria (SWQC), the Groundwater MSCs for Used Aquifer Residential and Non-Residential and the Human Health Criteria specified in Pennsylvania Code Title 25 Chapter 16.51, "Water Quality Criteria for Toxic Substances" (first adopted March 1989, last amended November 2000). Analytical results indicate manganese above the MSC in five of the six samples. Zinc was above the LSWC in four samples and in the duplicate sample. Lead was above the LSWC in one sample. Arsenic was reported above the SWQC and the MSC in the duplicate sample due to a suspected quantification error by the laboratory. Also a storm runoff sample was collected in March 1986 by CWM that revealed concentrations of arsenic (12,000 ppb) and manganese (1,700 ppb) in the Vault #1

sedimentation pond drainage.

Stream data samples were collected since 2001 in three sample locations. Results were compared to the SWQC, the Groundwater MSCs for Used Aquifer Residential and Non-Residential and the Human Health Criteria specified in Pennsylvania Code Title 25 Chapter 16.51, "Water Quality Criteria for Toxic Substances" (first adopted March 1989, last amended November 2000). Comparison of surface water data to MSC and SWQC criteria indicate exceedances of total iron in 2005, 2006, 2007, and 2008 sample data. Total and dissolved manganese was also detected above MSCs in the most downgradient sample point in 2005 but was below PA SWQC criteria.

In 2004, procedures provided in Act 2 guidelines were used to calculate and model the impact of the diffuse discharge of groundwater containing arsenic and manganese to the stream. According to projections of in-stream manganese concentrations presented in documents reviewed, the average of the Site-Specific standards for manganese (4.071 mg/l) will not unduly impact the surface water stream to the south of the Sanitary Landfill. Similarly, the arsenic present in the groundwater north of the bedrock ridge (WR07) was above the Act 2 MSC and Site-Specific standard.

Lyncott holds no NPDES permits and thus there is no known direct discharge to the surface water. Leachate generated on-site is collected in a leachate collection tank located at the southeast corner of the Municipal landfill (SWMU #3) which is pumped periodically and transported to a treatment facility. According to site personnel, on-site storm water is allowed to drain via infiltration and runoff.

6. Subsurface Soil (>2 feet):

Subsurface soils that have been removed and sampled are presented below:

Vault #1 with Sedimentation Pond (SWMU #1): The total amount of material excavated included 12,741 cubic yards of soil from the Vault and 955 cubic yards of soil from the sedimentation pond and drainage ditch which were hauled to an authorized off-site disposal facility. According to contour maps reviewed, Vault #1 was excavated to depths of one to six feet below the initial ground surface. Analytical results of confirmatory soil samples were not included in the documents reviewed. Because the concentrations of individual organic constituents in these soils were not located, it is unknown whether they meet current cleanup standards for soils.

Sludge Storage Area (SWMU #2): Approximately 4,236 cubic yards of waste sludge and soil was removed and disposed off-site at an approved facility. A composite soil sample was created by taking soil at three locations from the floor of the pad area approximately three inches below the grade and analyzed for arsenic, barium, total chromium, chloride and sulfates. All results were below Residential MSCs for the inorganic regulated substances analyzed for 1-15 feet bgs. Following an agreement between PADER and CWM the sludge storage pad was decontaminated, the remaining berms around the sludge storage pad were leveled, and the sludge storage area was returned to original grade using borrow soils.

Municipal Solid Waste Disposal Area (SWMU #3): No subsurface soil samples are known to have been collected from this SWMU.

Vault #2 Area (SWMU #4): Subsurface soil sampling occurred in August 1982 as part of the location process for Vault #2. Test pits were dug and subsurface soil samples were collected. Arsenic and chromium were above the Residential MSCs for inorganic regulated substances (1-15 feet bgs) in eight samples for arsenic and two samples for chromium.

Vault #3 with Sedimentation Pond #3 (SWMU #5): Approximately 60,000 tons of waste and contaminated soil was removed from Vault #3 in late 1985. Documentation from PADER indicates that confirmatory soil samples were collected however, final analytical results for Vault #3 or the sedimentation pond were not located. Additional post-remediation sediment samples were collected by Versar on April 30, 1987 as part of the RFA. Review of this data indicates that cadmium and selenium were present above the previously negotiated threshold values based on background values as determined per the Closure Plan.

IBM Stabilized Sludge Area (SWMU #6): The dimensions of this area are 250 by 270 feet with an average depth of 9 feet above the bottom of the cut with a compacted earth bottom. No waste removal actions are planned for this SWMU. The

IBM pad has been closed with waste in place.

McGraw Edison Storage Pad (SWMU #7): In the spring of 1981, the McGraw Edison Storage Pad, berm and 120 tons of waste were removed and stockpiled on the IBM Stabilization Sludge Area until off-site removal in 1982. This included the removal of 1-1/2 feet of underlying clay. This waste was then transported to an approved disposal facility during the remediation of the Sludge Storage Pad (SWMU #2). Analytical results from a test pit (WC7, 1982) and soil sample (SS-7, 1987) indicate that arsenic was above the Residential MSCs for inorganic regulated substances for 1-15 feet bgs in the test pit sample. The soil sample results show that cadmium and selenium are above the TLV but below the Residential MSCs for inorganic regulated substances for 1-15 feet bgs. The McGraw Edison Storage Pad is considered to “have been closed and remediated such that the Department is satisfied that groundwater and surface water will not be adversely impacted by the former location of” the McGraw Edison pad.

7. Outdoor Air:

The Lyncott facility includes a vented municipal waste landfill. The landfill opened and was closed prior to PADEP regulations. Therefore, PADEP is not requiring any kind of gas collection system or monitoring. The landfill is small and was only operated for 1-2 years and not likely to have sufficient volume to create a potential outdoor air concern from gas emissions. Therefore, EPA does not reasonably suspect the outdoor air media to be contaminated above appropriately protective risk-based levels.

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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	Daycare	Construction	Trespassers	Recreation	Food³
Groundwater	No	No	No	Yes			No
Air (indoors)							
Soil (surface, e.g., <2 ft)	No	No	No	Yes	Yes	No	No
Surface Water	No	No			Yes	No	No
Sediment	No	No			yes	No	No
Soil (subsurface e.g., >2 ft)				Yes			No
Air (outdoors)							

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strikeout 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.

X _____ 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.

Rationale and Reference(s):

A complete exposure pathway between construction workers to surface soil, subsurface soil, and groundwater is possible considering existing soil contamination above residential MSCs and that groundwater was observed at 5 to 6 feet below the ground surface. An F-14 oil and gas well pad notification was received by the PADEP and reported to the EPA on January 6, 2011. Since complete details were not included it is not known exactly what site work is required for an oil and gas well pad. However, EPA assumes that potential grading/excavation greater than 5 feet is possible and maintains that a potential exposure exists.

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

A complete exposure pathway between trespassers to surface soil, sediments, and surface water is possible considering existing contamination above residential MSCs. While this exposure is unlikely considering the facility area where hazardous waste handling/remediation occurred is fenced, an exposure is possible.

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4. Can the exposures from any of the complete pathways identified in #3 be reasonably expected to be **"significant"** (i.e., potentially⁴ "unacceptable" levels) 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)?

 X 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.

Rationale and Reference(s):

Calculations for residential soil MSCs are based on a frequency of 250 days/year and duration of 6 years. Neither the potential exposures for construction workers or trespassers can be expected to last anywhere near that long. Therefore, the EPA does not believe these potential exposures qualify as significant under current property conditions.

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.

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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 a "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 a "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.
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Rationale and Reference(s):
