	Remediation and Redevelopment Division POLICY AND PROCEDURE		DEPARTMENT OF ENVIRONMENTAL QUALITY
Original Effective Date: August 21, 2003 (replaces Remediation and Redevelopment Division, Operational Memo No. 3) Revised Date: November 8, 2013	Subject: Leaking Underground Storage Tank (LUST) Site Classification System		Category: <input type="checkbox"/> Internal/Administrative <input type="checkbox"/> External/Non-Interpretive <input checked="" type="checkbox"/> External/Interpretive
	Program Name: Remediation and Redevelopment Division (RRD) / Part 213		
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A Michigan Department of Environmental Quality (MDEQ) Policy and Procedure cannot establish regulatory requirements for parties outside of the MDEQ. This document provides direction to DEQ staff regarding the implementation of rules and laws administered by the MDEQ. It is merely explanatory; does not affect the rights of, or procedures and practices available to, the public; and does not have the force and effect of law.

PURPOSE:

This document provides guidance on how to classify a LUST site in accordance with the risk-based corrective action (RBCA) process. This guidance supersedes any previous guidance provided by the MDEQ regarding the site classification process for LUST sites.

The RBCA site classification system provides a framework for the (RRD), owner/operators (O/Os) of LUST sites, and qualified underground storage tank consultants (QCs) to classify a site based on the risks that are posed to human health, safety or welfare or the environment and the urgency of need for initial response based on information collected during the site assessment. Site class ranges from Class 1, where there is an immediate threat to the public or environment, to Class 4, where there is no demonstrable long-term threat. The “unknown” classification is reserved for the MDEQ’s internal use only.

AUTHORITY:

Section 21314a of Part 213, Leaking Underground Storage Tanks, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), instructs the MDEQ to classify LUST sites consistent with the process outlined in the Risk Based Corrective Action.

STAKEHOLDER INVOLVEMENT: The Part 213 Amendments Implementation Stakeholder Workgroup provided review and comment on this policy.

DEFINITIONS:

All terms are the same as those defined in Part 213.

POLICY:

The site classification system, attached as Appendix B, is based on the current and projected degree of risk to the public and environment, i.e., immediate, short-term (0 to 2 years), long-term (greater than 2 years), or no demonstrable long-term threat. The classification system identifies example exposure pathways and example site scenarios representative of the degree of risk. Sites should be evaluated for all potential exposure pathways. The classification selected represents the greatest risk, i.e. if the evaluation identifies any conditions in class 1,

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then class 1 is selected. Site evaluations may not be limited to these scenarios. The listed initial response/corrective actions represent potential responses to the associated exposure pathways and scenarios and may not be appropriate for all sites. Initial response actions should be consistent with the conditions of a specific site. As more information becomes available, or after response actions have been initiated to abate a risk, the site may be reclassified.

If a site has not been classified by the O/O or QC, or the site classification assigned by the O/O or QC does not represent the risks posed by the site based on available data, the RRD will assign it an appropriate site classification until the RRD is presented with evidence that either a higher or a lower site classification is more appropriate. If there is not enough information to assign a site classification, the RRD will classify the site as "unknown".

Site classification or re-classification requires risk based analysis using Part 213, and the referenced American Society For Testing and Materials (ASTM) standards E1739-95, E2081-00, and E2531-06.

REFERENCES:

ASTM. 2010. *Standard Guide for Risk Based Corrective Action Applied at Petroleum Release Sites*. ASTM E1739-95 (Reapproved 2010). ASTM International, West Conshohocken, PA. (<http://www.astm.org/Standards/E1739.htm>)

ASTM. 2010. *Standard Guide for Risk Based Corrective Action*. ASTM E2081-00 (Reapproved 2010). ASTM International, West Conshohocken, PA. (<http://www.astm.org/Standards/E2081.htm>)

ASTM. 2006. *Standard Guide for Development of Conceptual Site Models and Remediation Strategies for Light Nonaqueous-Phase Liquids Released to the Subsurface*. ASTM E2531-06. ASTM International, West Conshohocken, PA. (<http://www.astm.org/Standards/E2531.htm>)

OSHA 29 CFR Part 1910.1000 *Occupational Safety and Health Standards, Subpart Z, Toxic and Hazardous Substances, 1910.1000 Tables Z-1, and Z-2 Limits for Air Contaminants - Permissible Exposure Limits (PELs)*. (http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992)

Part 31, *Water Resources Protection*, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, Add. 1995, Act 70, Imd. Eff. June 5, 1995;-- Am. 1999, Act 106, Imd. Eff. July 7, 1999,

Part 201, *Environmental Remediation*, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. (Cleanup Criteria, September 28, 2012.) (http://www.michigan.gov/deg/0,1607,7-135-3311_4109_9846_30022-251790--,00.html)

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Part 213, Leaking Underground Storage Tanks, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

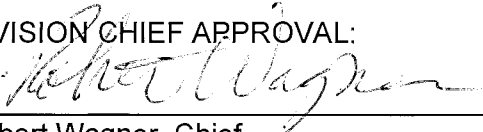
(http://www.michigan.gov/deq/0,1607,7-135-3311_4109_4215---,00.html)

APPENDICES:

A. Acronyms

B. Site Classification Table

DIVISION CHIEF APPROVAL:



Robert Wagner, Chief
Remediation and Redevelopment Division

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Appendix A – Acronyms

ASTM – American Society For Testing and Materials

CSM – Conceptual Site Model

MDEQ – Michigan Department of Environmental Quality

FESL – Flammability and Explosivity Level

IAC – Indoor Air Criteria

LEL – Lower Explosive Limit

LUST – Leaking Underground Storage Tank

MIOSHA – Michigan Occupational Safety and Health Act

NAPL – Non-aqueous Phase Liquid

NREPA – Natural Resources and Environmental Protection Act

PEL – Permissible Exposure Limit

QC – Qualified Consultant

RBCA – Risk-Based Corrective Action

RBSL – Risk Based Screening Level

RRD – Remediation and Redevelopment Division

APPENDIX B

CLASS 1

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<p><u>SITE</u></p>	<p>General Scenario:</p> <p>Existing or immediate exposure or threat to human health, safety, environment, or sensitive environmental receptor.</p>	<p>General Immediate Response:</p> <p>Immediately notify the local units of government; e.g., fire department, local health department, the Department of Environmental Quality (DEQ), and all affected and potentially affected parties; e.g., property owners, tenants, easement holders, and utility authorities. Implement initial response actions immediately to abate the risks to all applicable receptors. Follow Part 213 reporting and interim response/corrective action requirements, including conducting Risk-Based Corrective Action (RBCA) evaluations to determine or confirm risks to receptors. Reevaluate and reclassify site as appropriate based on continually increased knowledge of site contamination or changed risks to receptors resulting from implementation of corrective actions.</p>
<p><u>Exposure Pathway</u></p>	<p align="center"><u>Scenario</u></p>	<p align="center"><u>Initial Response/Corrective Actions Examples</u></p>
<p>Evaluate Pathways in Relation to NAPL</p>	<p>Presence of migrating non-aqueous phase liquid (NAPL). Presence of acute risks due to direct contact or inhalation exposures to mobile or residual NAPL.</p>	<p>Take action to prevent further release of the regulated substance into the environment. Prevent further NAPL migration by appropriate containment measures, institute NAPL recovery as required to eliminate acute exposures or conditions and restrict area access. Evaluate all pathways in relation to the presence of NAPL.</p>
<p>Fire/Explosion</p>	<p>Explosive vapor levels are present in a residence or other building. Explosive levels are present when vapor concentrations are greater than 25 percent of the Lower Explosive Limit (LEL) for any regulated substance or a mixture of regulated substances.</p>	<p>Evacuate occupants; begin abatement measures such as subsurface ventilation, or building pressurization. Identify the source of the vapors and begin corrective actions to abate the source; e.g., empty leaking underground storage tank (LUST) systems, recover mobile NAPL, treat or remove contaminated soil and/or groundwater.</p>
	<p>Explosive vapor levels are present in subsurface utility system(s), but no buildings or residences are impacted.</p>	<p>Evacuate immediate vicinity; begin abatement measures such as ventilation. Identify the source of the vapors and begin corrective actions to abate the source; e.g., empty LUST systems, recover mobile NAPL, treat or remove contaminated soil and/or groundwater.</p>

Drinking Water Ingestion	A public or private water supply well, public water supply line or public surface water intake is contaminated or immediately threatened.	Notify user(s), provide alternate water supply, hydraulically control contaminated water, or install point-of-use water treatment.
Direct Contact	Contaminant concentrations in exposed soil exceed direct contact Risk Based Screening Levels (RBSLs).	Remove, cover, or reliably restrict access to the contaminated media.
Inhalation	Concentrations of vapors that could cause acute health effects are at levels above Michigan Occupational Safety and Health Act (MIOSHA) Permissible Exposure Limits (PELs) for any commercial building. (MIOSHA PELs can be viewed at www.michigan.gov/mioshastandards .)	Evacuate occupants and/or begin abatement measures such as subsurface ventilation, or building pressurization. Prevent further vapor migration into buildings or residences.
	Concentrations of vapors that could cause acute health effects are at levels above MIOSHA PELs in subsurface utility system(s), or construction trenches, but no buildings or residences are impacted. (MIOSHA PELs can be viewed at www.michigan.gov/mioshastandards .)	Begin ventilating subsurface utilities or trenches. Prevent further vapor migration into these areas by identifying and eliminating the source of the vapors.
	Ambient vapor or particulate concentrations exceed the acute exposure levels. (MIOSHA PELs can be viewed at www.michigan.gov/mioshastandards .)	Install vapor barrier (e.g., capping, foams, etc.), remove source, or reliably restrict access to affected area.
	Evaluation of soil gas or indoor air indicates the presence of an immediate risk in an occupied structure. (Part 213 RBSLs or the DEQ Guidance Document for the Vapor Intrusion Pathway may be referenced when evaluating this risk.); or contaminant vapors are present at sufficient concentrations to make the structure uninhabitable as determined by the community health department, local health department, or fire department.	Evacuate occupants immediately and begin ventilating the structure. Prevent further vapor migration into buildings or residences. Conduct corrective actions to reduce the contaminant concentrations to levels where the structure once again is habitable or install an effective vapor barrier(s) to make the structure habitable.
Groundwater/Surface Water Interface (GSI)	Contaminated groundwater is discharging to a surface water body Part 31 Final Acute Values (FAV) or resulting in visible NAPL present on surface water, or is entering a protected stream at concentrations exceeding GSI RBSLs,	Institute containment measures to prevent further migration in or to the surface water body or implement treatment options to address the acute risk. Determine the extent of the effects of the contamination in the surface water body and/or storm sewers to determine if corrective action in surface water body, sediments, or storm sewers is necessary. Notify the local unit of government or appropriate owner of storm sewer if groundwater contamination is entering an MS4 class storm sewer.
Sensitive Environmental Receptors	A sensitive habitat or sensitive resource (e.g., sport fish, economically important species, threatened or endangered species, wetland, etc.) is exposed to contaminated media and measureable or observable harm is occurring or suspected.	Minimize extent of the effects of the contamination by containment measures and implement habitat management to minimize exposure. Prevent further contaminant migration into the sensitive habitat or wetland.

Class 2

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<p><u>SITE</u></p>	<p>General Scenario:</p> <p>Short-term (0-2 years) threat to human health, safety, environment, or sensitive environmental receptors</p>	<p>General Immediate Response:</p> <p>As appropriate, notify the local units of government; e.g., fire department, local health department, the Department of Environmental Quality (DEQ), and all affected and potentially affected parties; e.g., property owners, tenants, easement holders, and utility authorities. As necessary, implement initial response actions to abate the risks to all applicable receptors. Follow Part 213 reporting and interim response/corrective action requirements, including conducting RBCA evaluations to determine or confirm risks to receptors. Reevaluate and reclassify site as appropriate based on continually increased knowledge of site contamination or changed risks to receptors resulting from implementation of corrective actions.</p>
<p><u>Exposure Pathway</u></p>	<p><u>Scenario</u></p>	<p><u>Initial Response/Corrective Actions Examples</u></p>
<p>Evaluate Pathways in Relation to NAPL</p>	<p>Presence of mobile or residual NAPL where an unacceptable exposure may occur within two years based on the risk-based corrective action (RBCA) conceptual site model (CSM).</p>	<p>Evaluate all pathways in relation to the presence of NAPL. Conduct a NAPL recoverability analysis and determine whether removal is necessary to abate an unacceptable risk (Sections 21308a(1)(b)(xviii), 21309a(2)(a), and 21311a(1)(c)(iii)).</p>
<p>Fire/Explosion</p>	<p>There is the potential for explosive vapor levels to accumulate in a residence, other building, or utility systems. A potential for explosive conditions exists when vapor concentrations are greater than 10 – 25 percent of the LEL and/or groundwater concentrations are at levels that are potentially flammable or explosive.</p>	<p>Assess the potential for vapor migration, through monitoring and modeling, and if necessary, remove the source or install vapor migration barriers. Part 213 Flammability and Explosivity Screening Levels may be referenced when conducting this evaluation.</p>
<p>Drinking Water Ingestion</p>	<p>A non-potable water supply well is contaminated or immediately threatened, e.g. irrigation wells, non-contact cooling water, stab wells for filling pools or other outside uses, etc.</p>	<p>Notify the owner and user(s), evaluate the need to abandon the well, install point-of-use water treatment, hydraulically control contaminated water, or provide an alternate water supply.</p>
	<p>Groundwater is contaminated above drinking water RBSLs and a public or private water supply well is producing from the contaminated aquifer and is located within two years groundwater travel time from the known extent of chemical(s) of concern.</p>	<p>Implement appropriate corrective actions to prevent impact to the water supply well. Monitor water quality in monitoring wells and potentially impacted water supply well that is at risk.</p>

	Groundwater is contaminated above drinking water RBSLs and a public or private water supply well producing from a different aquifer is located within the known extent of chemicals of concern.	Monitor the quality of the water supply wells. Determine if the contaminant plume is within the capture zone of the water supply. Evaluate if control is necessary to prevent vertical migration to the supply well. Implement appropriate corrective actions to prevent impact to the water supply well.
Direct Contact	Soil contamination exceeds the direct contact RBSLs, and is present at the surface or near surface depths that could be encountered by the public or by construction or landscaping activities.	Reliably restrict access to the soil, treat or remove contaminated soil. Determine if other exposure pathways are affected and follow initial response and corrective actions. Determine whether land use restrictions are feasible and appropriate during the RBCA evaluation.
Inhalation	Concentrations of vapors that may pose a chronic health risk are present immediately beneath or directly adjacent to an occupied building.	Conduct appropriate vapor investigations. The DEQ Guidance Document for the Vapor Intrusion Pathway may be used as a possible reference when evaluating the risks posed by the vapors. Monitor indoor air vapor concentrations. Limit exposure to vapors. Remove or treat the source and/or install engineering controls (e.g., positive pressure ventilation, seal basements and other subsurface structures) as a vapor barrier.
	Groundwater contamination is found in a sump or is in contact with the building foundation and may pose a chronic health risk	Compare groundwater concentrations to ground water vapor intrusion screening levels and determine if there's a risk to indoor air inhalation. Limit exposure to vapors. Conduct appropriate vapor investigations. If vapor investigation determines it is necessary, remove or treat the source and/or install engineering controls (e.g., positive pressure ventilation, seal basements and other subsurface structures) as a vapor barrier. Monitor indoor air vapor concentrations.
	Contaminated media beneath or directly adjacent to an occupied structure exceeds either the soil or groundwater volatilization to indoor air inhalation RBSLs, and there is a potential for vapor concentrations to accumulate which may pose a chronic health risk.	Limit exposure to vapors. Conduct appropriate vapor investigations. If vapor investigation determines it is necessary, remove or treat the source and/or install engineering controls (e.g., positive pressure ventilation, seal basements and other subsurface structures) as a vapor barrier. Monitor indoor air vapor concentrations.
	Ambient vapors are present and can potentially result in an acute exposure due to the presence or potential presence of human receptors.	Conduct appropriate vapor investigations. Evaluate the need for a vapor barrier (e.g., capping), install other engineering controls, or remove or treat the source. Monitor the ambient air vapor concentrations.
Groundwater/Surface Water Interface (GSI)	The groundwater contaminant plume exceeds GSI RBSLs and the leading edge of the contaminated groundwater plume is located within two years groundwater travel time of a surface water body or the plume is entering a storm sewer and/or drainageway and the contamination will reach the outfall of the storm sewer and/or drainageway within two years travel time.	Evaluate options for complying with GSI, (e.g., a venting groundwater mixing zone, intercept and treat the contaminated plume; conduct an in-situ treatment of the plume, etc.), before it reaches the surface water body or the outfall of the storm sewer or drainageway. Assure compliance with Part 31 of the NREPA. Notify the local unit of government or appropriate owner of storm sewer if groundwater contamination is entering an MS4 class storm sewer.

<p>Sensitive Environmental Receptors</p>	<p>The leading edge of the groundwater contaminant plume is located within two years groundwater travel time distance of a sensitive habitat or resources (e.g., sport fish, economically important species, threatened or endangered species, wetlands, etc.).</p>	<p>Intercept and treat, or treat in-situ, the contaminant plume before it reaches the sensitive habitat or resources.</p>
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Class 3

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<p>SITE</p>	<p>General Scenario:</p> <p>Long-term (>2 years) threat to human health, safety, environment, or sensitive environmental receptors.</p>	<p>General Immediate Response:</p> <p>As appropriate, notify the local units of government; e.g., fire department, local health department, the Department of Environmental Quality (DEQ), and all affected and potentially affected parties; e.g., property owners, tenants, easement holders, and utility authorities. As necessary, implement initial response actions to abate the risks to all applicable receptors. Follow Part 213 reporting and interim response/corrective action requirements, including conducting RBCA evaluations to determine or confirm risks to receptors. Reevaluate and reclassify site as appropriate based on continually increased knowledge of site contamination or changed risks to receptors resulting from implementation of corrective actions.</p>
<p><u>Exposure Pathway</u></p>	<p align="center"><u>Scenario</u></p>	<p align="center"><u>Interim Response/Corrective Actions</u></p>
<p>Evaluate Pathways in Relation to NAPL</p>	<p>Mobile or residual NAPL is present and an unacceptable exposure may occur in greater than two years based on the RBCA CSM.</p>	<p>Evaluate all pathways in relation to the presence of NAPL. Conduct a NAPL recoverability analysis and determine whether removal is necessary to abate an unacceptable risk (Sections 21308a(1)(b)(xviii), 21309a(2)(a), and 21311a(1)(c)(iii)).</p>
<p>Fire/Explosion</p>	<p>Vapor concentrations are less than 10 percent of the LEL and/or groundwater concentrations are at levels that are unlikely to become potentially flammable or explosive.</p>	<p>Continue to monitor vapor (% LEL), and groundwater concentration. Determine if corrective actions such as building ventilation or pressurization is required to abate the risk of exposure pathways. Part 213 Flammability and Explosivity Screening Levels may be referenced for when conducting this evaluation.</p>

Drinking Water Ingestion	Soil is contaminated above the leaching to groundwater RBSLs or groundwater is contaminated above drinking water RBSLs; and potable wells, or non-potable water supply wells that may result in incidental ingestion or inhalation exposures, are producing from the contaminated aquifer, but are located more than two years groundwater travel time from the known extent of the contaminants of concern.	Monitor groundwater contamination to determine plume stability and degradation (natural attenuation). Assure potential unacceptable exposures, including to non-potable water, are controlled or eliminated.
	Groundwater is contaminated above drinking water RBSLs and non-potable water supply wells, producing from a different aquifer, are located within the known extent of the chemicals of concern.	Monitor non-potable well, define the extent of contamination. Monitor groundwater contamination to determine plume stability and degradation (natural attenuation) and vertical migration.
Direct Contact	Soil exceeding the direct contact RBSLs are located at depths that are not likely to be encountered by construction activities or non-potable water supply well is producing from the contaminated aquifer	Evaluate and implement corrective actions to address direct contact risks, e.g., deed restrictions, remediation of soil and/or groundwater, elimination of non-potable wells, monitored natural attenuation, etc.
Inhalation	Concentrations of contaminants that may pose a chronic health risk are present in soil, groundwater, or air; however the potential for exposure is low.	Evaluate and implement corrective actions, engineering controls, or use restrictions as necessary to eliminate the chronic health risks.
Groundwater/Surface Water Interface (GSI)	The groundwater contaminant plume exceeds GSI RBSLs and the leading edge of the contaminated groundwater plume is located more than two years groundwater travel time from a surface water body or the plume is entering a storm sewer and/or drainage way and the contamination will reach the outfall of the storm sewer and/or drainage way in more than two years.	Determine whether a venting groundwater mixing zone request is feasible and appropriate. Determine whether corrective actions are necessary to intercept and treat the groundwater plume before it reaches the outfall of the storm sewer or drainage way. Assure compliance with Part 31 of the NREPA. Notify the local unit of government or appropriate owner of storm sewer if groundwater contamination is entering a Municipal Separate Storm Sewer System (MS4) class storm sewer.
Sensitive Environmental Receptors	The leading edge of the groundwater contamination is located more than two years groundwater travel time from a sensitive habitat or resources (e.g., sport fish, economically important species, threatened or endangered species, wetlands, etc.).	Determine whether corrective actions are necessary to intercept and treat the groundwater plume before it reaches the sensitive habitat or resources.

Class 4

SITE	No demonstrable long term risks. All chemicals of concern are below all RBSLs or all appropriate institutional controls/deed restrictions are in place to prevent exposure to the contaminants of concern.	All appropriate corrective actions have been completed. Follow Part 213 reporting requirements.
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Class Unknown

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SITE	General Scenario: A confirmed release has been reported but the risks posed by the release are unknown.	General Immediate Response: All exposure pathways must be evaluated.
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