# Operation, Maintenance and Monitoring of Comprehensive Remedial Actions

December 14, 2010

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DEP Western Region Office

Springfield, MA

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| Criteria | Regulatory Milestone | | | |
|---|---|---|---|---|
| | **Phase V** | **Remedy Operation Status** | **Class C-1 RAO** | **Class C-2 RAO** |
| Permanent Solution Feasible? | Yes | Yes | **No** | Yes |
| Timeline | 5 years from Tier Class to achieve RAO | **No specific requirement** | Re-evaluate every 5 years | **No specific requirement** |
| Applicability | • Following Phase IV | • Following Phase IV<br>• Active OMM | • Following Phase III, IV, or V | • Following Phase III, IV, or V |
| Performance Standards | • Follow/revise OMM Plan<br>• Submit Status Reports<br>• **Progress toward a Permanent Solution**<br>• Rebound Monitoring | • Follow/revise OMM Plan<br>• Submit Status Reports<br>• **Adequately designed to achieve Permanent Solution**<br>• Eliminate or control each source of OHM<br>• Eliminate any Substantial Hazard<br>• Rebound Monitoring | • OMM and Status Reports, if necessary<br>• Five year periodic review<br>• Eliminate, control, or mitigate any source to extent feasible<br>• Eliminate any Substantial Hazard<br>• Plan of definitive and enterprising steps | • Follow/revise OMM Plan<br>• Submit Status Reports<br>• **Progress toward a Permanent Solution**<br>• Eliminate, control, or mitigate any source to extent feasible<br>• Eliminate any Substantial Hazard<br>• Rebound Monitoring |
| Fees | $800 | $800 | $800 | $800 |
| Permit Required? | Yes | No | No | Yes |

Class C-1 RAO | Phase V | Class C-2 RAO | ROS

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| Permit Required? | Yes | No | No | Yes |

# Active OMM

310 CMR 40.0006

- Active Remedial System
  - Continual or periodic use of on-site or in-situ mechanical or electro-mechanical system
    - RMR
    - Vac truck use?
- Active Remedial Monitoring Program
  - Systematically designed and monitored program of sampling and analyzing environmental media
    - Remedial additives, MNA, Reactive wall (RMR)

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| Permit Required? | Yes | No | No | Yes |

# C-1 OMM Required

310 CMR 40.0881(1)(c)

*Upon completion of Phase IV activities, the requirements of a Class C RAO have been met and* ***Post-Class C operation, maintenance and/or monitoring*** ***of the remedial action*** *is* ***necessary to ensure*** *that the* ***conditions upon which the Class C RAO is based*** *are maintained.*

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| Timeline | 5 years from Tier Class to achieve RAO | No specific requirement | Re-evaluate every 5 years | No specific requirement |
| Applicability | • Following Phase IV | • Following Phase IV<br>• Active OMM | • Following Phase III or Phase IV | • Following Phase IV |
| Performance Standards | • **Follow/revise OMM Plan**<br>• **Submit Status Reports**<br>• Progress toward a Permanent Solution<br>• **Rebound Monitoring** | • **Follow/revise OMM Plan**<br>• **Submit Status Reports**<br>• Adequately designed to achieve Permanent Solution<br>• Eliminate or control each source of OHM<br>• Eliminate any Substantial Hazard<br>• **Rebound Monitoring** | • OMM and Status Reports, if necessary<br>• Five year periodic review<br>• Eliminate, control, or mitigate any source to extent feasible<br>• Eliminate any Substantial Hazard<br>• Plan of definitive and enterprising steps | • **Follow/revise OMM Plan**<br>• **Submit Status Reports**<br>• Progress toward a Permanent Solution<br>• Eliminate, control, or mitigate any source to extent feasible<br>• Eliminate any Substantial Hazard<br>• **Rebound Monitoring** |
| Fees | $800 | $800 | $800 | $800 |
| Permit Required? | Yes | No | No | Yes |

# OMM Documentation

## 310 CMR 40.0892

- Status Reports
  - Describe type and frequency of OMM activities
  - Describe **significant modifications** to OMM Plan
  - Document and **evaluate** performance of remedial action since prior Status Report
    - Document problems and measures to correct
    - Are remedial goals being achieved?
  - Include RMR for “active” O & M of CRA
  - Six months from Phase IV Completion Report
    - Exceptions at 310 CMR 40.0892(3)

# Rebound Monitoring

310 CMR 40.0893(6)(d)

Rebound Monitoring is specified under ROS and should be done to evaluate all remedial systems or programs.

- Assess remedy – should have met remedial goals
- Notify the Department (ROS)
  - In next required Status Report
  - Continue to submit Status Reports
  - If system/program resumed, notify us in next Status Report
- Duration – to support RAO

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| Fees | $800 | $800 | $800 | $800 |
| Permit Required? | Yes | **No** | Yes | Yes |

# Which Milestone is the Best?

- It Depends
  - Is a Permanent Solution feasible?
  - How long has the system operated?
  - Is the time to achieve RAO approaching?
  - Is progress measurable and certain?

# Auditing OMM

- Level 2 audits of sites in Phase V, ROS, Class C-1 & C-2 RAOs
- Originally called Remedial System Inspection (RSI) Audits – the focus early on
- Not just sites with “active” remedial actions
  - Passive skimmers, HIT events
  - Post-Class C-1 RAO, monitoring only
- Audited on periodic basis
- Not comprehensive

# OMM Audit File Review Scope

- Current Status Report
- Phase IV RIP and Completion Statement
- OMM Plan search – in Phase IV submittals?
- Earlier Status Reports if changes noted
- Remedial Monitoring Report
  - *Phase III Remedial Action Plan?*
  - *Phase II Report?*

# OMM Audit File Review Goals

- Identify remedial goals
- Understand how remedial system/program is constructed/designed
- Evaluate if remedial action (RA) is performing as designed – effectively achieving remedial goals
- Determine whether all data/information needed to assess RA effectiveness is being obtained/provided

# OMM Audits Process
## Audit Notification

The RP and LSP-of-Record are only given *24 hours notice* that an OMM Audit will be conducted

*Why?*

# OMM Audits
## Site Inspection

With active remedial systems, the auditor will want to:

1. Understand how the system works, firsthand – if complicated, have someone present who's familiar with the system
2. Confirm key operating parameters by taking measurements
   – *Discuss who does this beforehand*

With other RAs: observe conditions of site, monitoring wells, etc.

# OMM Audits
# Post-inspection

- Decisions are finalized after the inspection
- Site observations / LSP comments discussed with supervisor / Section Chief
- Preliminary audit findings may be modified
- Multiple layers of review occur before NOAF is issued.

# OMM Audit Process Documentation

- L2 Audit Pre-Inspection Screening Checklist – used for all RSI audits.
- Remedial System Information Sheet – used for sites with active remedial systems (less "active" technologies also)
- Monitored Natural Attenuation (MNA) Information Sheet – used for sites where MNA is clearly relied on to achieve a Permanent Solution.

** Use recommended **

# OMM Audit Forms

- Sent to all stakeholders as NOAF attachments
- They are essential tools used by auditors to identify compliance issues
- Key OMM issues discussed with LSPs, not cited in NOAF, are typically memorialized on them
- Obtain them from us or develop your own.

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## L2 AUDIT – PRE-INSPECTION SCREENING CHECKLIST

| | | |
|---|---|---|
| Lead RTN: **1-12345** | Town: ANYWHERE | Action Inspected: ☐ Phase V ☐ Class C ☒ **ROS** |
| PRP/OP: Vehicle Maintenance Business (VMB) | | Site Name: Business Maintenance Facility |
| Owner: VMB | | LSP / Consultant: New Consultant |
| Occupant: VMB | | Site Contact / Phone : [property manager], [phone#] |

| Condition | Yes/No | Comments |
|---|---|---|
| **Public Health Concerns** | | |
| > 0.5" NAPL within 15 feet of ground surface | Yes | 0.00 to 0.50 ft. of LNAPL encountered in two wells |
| > 5 mg/l total VOCs <15 ft bgs & w/in 30 ft of school/residence | No | |
| OHM in surficial soil in S-1 area (school/residence/park) | No | |
| Private wells located < 500 feet, or site in Zone II or IWPA | No | |
| Other potential impacts to nearby receptors | No | Potential indoor air impacts identified in Ph. II Report |
| **Environment and Release Characteristics** | | |
| Within 500 feet of surface water, ACEC, and/or wetlands | Yes | Small brook present ~120 feet S and W of site |
| Confirmed contamination of surface water and/or wetlands | No | |
| Multiple sources of contamination | Yes | Leaking diesel fuel and heating oil USTs |
| Media other than soil or groundwater are affected | No | Indoor air impacts (modeled, not measured) & surf. water |
| **Remediation Waste (310 CMR 40.0030)** | | |
| Remediation Waste removed within 120 days | Yes | Recovered LNAPL is placed in 5 gal. buckets during I&M… |
| Remediation Waste has been properly managed | Yes | …event and removed (i.e., it is not stored on-site). |

| Operation, Monitoring and Maintenance | | |
|---|---|---|
| **Phase V / Class C OMM Requirements (310 CMR 40.0890)** | | |
| OMM Plan is on-file, with Ph. IV RIP, per 40.0874(3)(d) | Yes | Last updated in the initial ROS I&M report on 3/30/07 |
| OMM Plan identifies the type and frequency of monitoring | Yes | |
| OMM activities done in accordance with RIP goals & criteria | **No** | Sampling frequency is variable/decreasing |
| OMM Plan updated in response to changes in site conditions | **No** | Plan not updated to justify reduced sampling frequency |
| Current I&M report received on time (due every 6 mos.) | **No** | Submittal dates are variable, both early and late. No reports have been received to date during 2010. |
| OMM results are adequately documented, per 40.0892 | Yes | |
| **Additional ROS Requirements (310 CMR 40.0893)** | | |
| Complete ROS submittal was received, per 40.0893(3) | Yes | |
| CRA is designed to achieve a Permanent Solution | **Unknown** | Wells with prior LNAPL and/or GW-1 exceedances are not monitored. Additional ISCO applications may be needed. |
| CRA is properly operated, monitored, and/or maintained | Yes | |
| Each source of OHM has been eliminated or controlled | Yes | |
| All Substantial Hazards have been eliminated | Yes | |
| CRA modified or ROS terminated when required | Yes | |

**Remedial Action Summary:** In-situ chemical oxidation and periodic LNAPL recovery were selected at this site as a Comprehensive Response Action (CRA) to address a release of diesel fuel and No. 2 fuel oil to soil, groundwater, and (originally) surface water. Following the sole injection of PermeOx™ in July 2005, the remedial action, as designed, consists of quarterly gauging and, if warranted, recovery of LNAPL (using a peristaltic pump), and monitoring of VPH and EPH, plus field measurements of DO & ORP. However, based on the information presented in the most recent I&M Report, I&M events appear to have only been conducted on a biannual basis during 2008 and 2009. To date, the OMM Plan has not been updated to justify this change in monitoring frequency.

# REMEDIAL SYSTEM INFORMATION SHEET (RSIS)

Site Name/Location: [RP], 1 Main St., Anywhere RTN: 1-10101

Inspector Name: [Auditor], BWSC-ASM Date: 6/7/08

## SYSTEM INFORMATION

Indicate all that apply: ☐ GW Recovery/Treatment ☒ NAPL Recovery ☒ Oil/H2O Separator ☐ Liq. Ph. GAC
☐ Air Strip ☐ GW Discharge ☐ Remedial Additives ☐ Air/Oxy Sparge ☐ SVE ☐ CATOX ☐ Vap. Ph. GAC

System operating: ☒ YES ☐ NO System operating as designed and at proposed levels: ☒ YES ☐ NO

## O&M INSTRUMENTATION AND DOCUMENTATION *

| System Specifics | Applicable | Present & Working | Comment if not present, not working, or not done. |
|---|---|---|---|
| Logbook present, information current | No | Yes | Last Inspection: 4/22/08 ( 5/10/08 ( ) |
| Overflow/high water shut-off switch | Yes | Yes | Full drum sensors installed on each drum |
| Pressure shut-off switch | No | N/A | |
| Data collection devices (flowmeter, etc.) | No | Yes | Oil level in drum gauged by stick or interface probe |
| Process & Instrumentation Diagram | No | N/A | |
| System secured | Yes | Yes | Each remedial shed is padlocked |
| Posting the name & telephone number of contact in case of system malfunction | Yes | Yes | |
| Wastewater Treatment Plant Operator inspections at regular intervals | No | N/A | |
| Precautions taken to prevent damage by freezing, heat, vehicles & vandals | Yes | Yes | System enclosed; not operated during winter months |

* Possible violations of 310 CMR 40.0041 if not present & working for remedial wastewater generation.

**OPERATION INFORMATION (October 2007 through March 2008)**

| | | | |
|---|---|---|---|
| **Groundwater Treatment** | N/A | | |
| OHM Concentrations (µg/L): | Influent: | Mid-point: | Effluent: |
| System flow rates (gpm): | Design: | Observed: | Average: |
| Total volume NAPL recovered (gal): | | Total volume water recovered (gal): | |
| Discharge meets permit limits? ☐ YES ☐ NO ☐ N/A | | Recent downtime? ☐ YES ☐ NO (If yes, describe below) | |
| **Remedial Additives**: Are downgradient monitoring wells present and in satisfactory condition: ☐ YES ☐ NO ☒ N/A | | | |
| **LNAPL Levels in Recovery Drums** | | **SVE System Flow Rate** (cfm): N/A | |
| Levels observed at inspection:<br>1. MW-601<br>2. MW-104<br>3. MW-101 | Readings:<br>1. 1.5 inches<br>2. 6.0 inches<br>3. 2.0 inches | Notes: | |
| **Air (Off-Gas) Treatment** N/A | **Influent** | **Mid-Point** | **Effluent** |
| From file review (ppmv): [date] | N/A | | |
| Field PID reading (ppmv): | | | |
| Stripper influent pressure ( units ): | | Recent downtime? ☒ YES ☐ NO (If yes, describe below)* | |
| Off-gas treatment devices achieving 95% reduction? ☐ YES ☐ NO ☐ N/A Percent reduction if < 95%: | | | |

**Inspection Summary/Highlights**: Mark, the Sr. Project Manager for this site, was also present during the inspection. The concrete cap appeared to be in good condition, with no significant cracks observed. All three remediation sheds were opened and the product recovery units and drums at each location appeared in good condition. Mark stated that the recovered oil is consolidated into one drum at season's end and a sample of the oil is analyzed for PCBs prior to shipment under a hazardous waste manifest. I discussed the need to replace well MW-104, including a follow-up call to [the RP] the following day, where > 0.5 of LNAPL has historically been measured. John also stated that his company is evaluating whether ROS is still applicable at this site. I also discussed the need to periodically monitor dissolved OHM concentrations in groundwater.

* The product recovery unit & structure at well MW-101 were found damaged on 8/9/07 and subsequently repaired by late Sept. 2007.

# Monitored Natural Attenuation (MNA) Information Sheet

Site Name & Location: Gasoline station, Anywhere RTN: 1-11111

Inspector Name: [Auditor] Date: 1/2/2010

**File Review**

1. Primary disposal site OHM:
   ☒ Petroleum Hydrocarbons ☐ Solvents ☐ PCBs ☐ Metals ☐ Other:

2. Source of the release: ☒ UST ☒ AST ☐ Septic ☐ Surface Spill ☐ Dry Well
   ☐ Source Unknown ☐ Other:

3. Environmental media impacted at the disposal site:
   ☒ Soil ☒ Groundwater ☐ Soil Gas ☐ Other:

4. Environmental media targeted for MNA:
   ☐ Soil ☒ Groundwater ☐ Soil Gas ☐ Other:

5. OHM targeted for MNA:
   ☒ Petroleum Hydrocarbons ☐ Solvents ☐ PCBs ☐ Metals ☐ Other:

6. Has the source of the primary contaminant(s) targeted for MNA been removed, capped, or otherwise controlled?
   ☒ Yes ☐ No ☐ Not Determined Explain: USTs and the UST system have been removed from the site. Over 1,400 tons of petroleum impacted soil have been excavated and removed from the site since 1998.

7. Other ongoing Remedial Action Alternatives:
   ☒ None ☐ Excavation ☐ P&T ☐ AS ☐ SVE ☐ Remedial Additives ☐ Other:

8. Indicate the lines of evidence used as the basis for selecting MNA as a Remedial Action Alternative:

- ☒ Analytical data demonstrates a clear and meaningful trend of decreasing contaminant mass and/or concentration over time at appropriate monitoring points.
- ☐ Hydrogeologic and geochemical data indirectly demonstrate that natural attenuation processes are active at the site, and the rate of the attenuation processes will achieve MCP endpoints (within 5 years).
- ☐ A site-specific study of microorganisms directly demonstrates the occurrence of natural attenuation.
- ☐ No line-of-evidence basis was presented in the information reviewed.

| 9. Identification of nearby receptors: | Location in relation to contaminants: |
|---|---|
| Zone II area | On-site |

10. Are sentinel monitoring points located between the contamination and nearby receptors? ☒ Yes ☐ No

11. MNA monitoring points and monitoring frequency identified in OMM Plan:

The August 2007 Revised OMM Plan identified quarterly monitoring of all on-site wells for VPH and MNA parameters.

12. Analytical tests performed to evaluate progress of MNA:

☒ VPH ☐ EPH ☐ VOCs ☐ SVOCs ☐ CVOCs ☐ PAHs ☐ PCBs ☒ Metals (Fe, Mn)

☒ pH ☒ DO ☒ Temp ☒ ORP ☐ $CO_2$ ☐ TOC ☒ $NO_3$ ☒ $SO_4$ ☐ Plate count

13. Monitoring data shows that the plume is: ☐ expanding ☒ shrinking ☐ static ☐ unclear

Primary contaminant concentrations are: ☐ increasing ☒ decreasing ☐ static ☐ unclear

Secondary contaminant concentrations are: ☐ increasing ☐ decreasing ☐ static ☒ unclear ☒ N/A

Comments: Since the excavation of the UST system, concentrations of benzene above GW-1 standards have been observed in monitoring well MW-16, located across Main Street. However, those concentrations are now decreasing and have not been observed in further downgradient monitoring wells MW-17, MW-18, MW-19, MW-20, or MW-21. Groundwater monitoring for MNA with full parameters is only occurring annually, and not quarterly as proposed in the August 2007 Revised OMM Plan. The most recent ROS Status report, received on 11/10/09, summarizes the monitoring of MNA parameters, but does not present an evaluation of these data supporting whether or not contaminant biodegradation is occurring beyond the fact that primary contaminant concentrations are decreasing.

**Field Inspection** (indicate all that apply)

1. Are the MNA monitoring points present and in useable condition? ☒ Yes ☐ No

   Comments: All site monitoring wells were located

2. Were the receptors observed at and in the vicinity of the site during the inspection consistent with those identified during the file review?

   ☒ Yes ☐ No Comment: _____

3. Have impermeable surfaces been added over or removed from over the plume area? ☒ Yes ☐ No

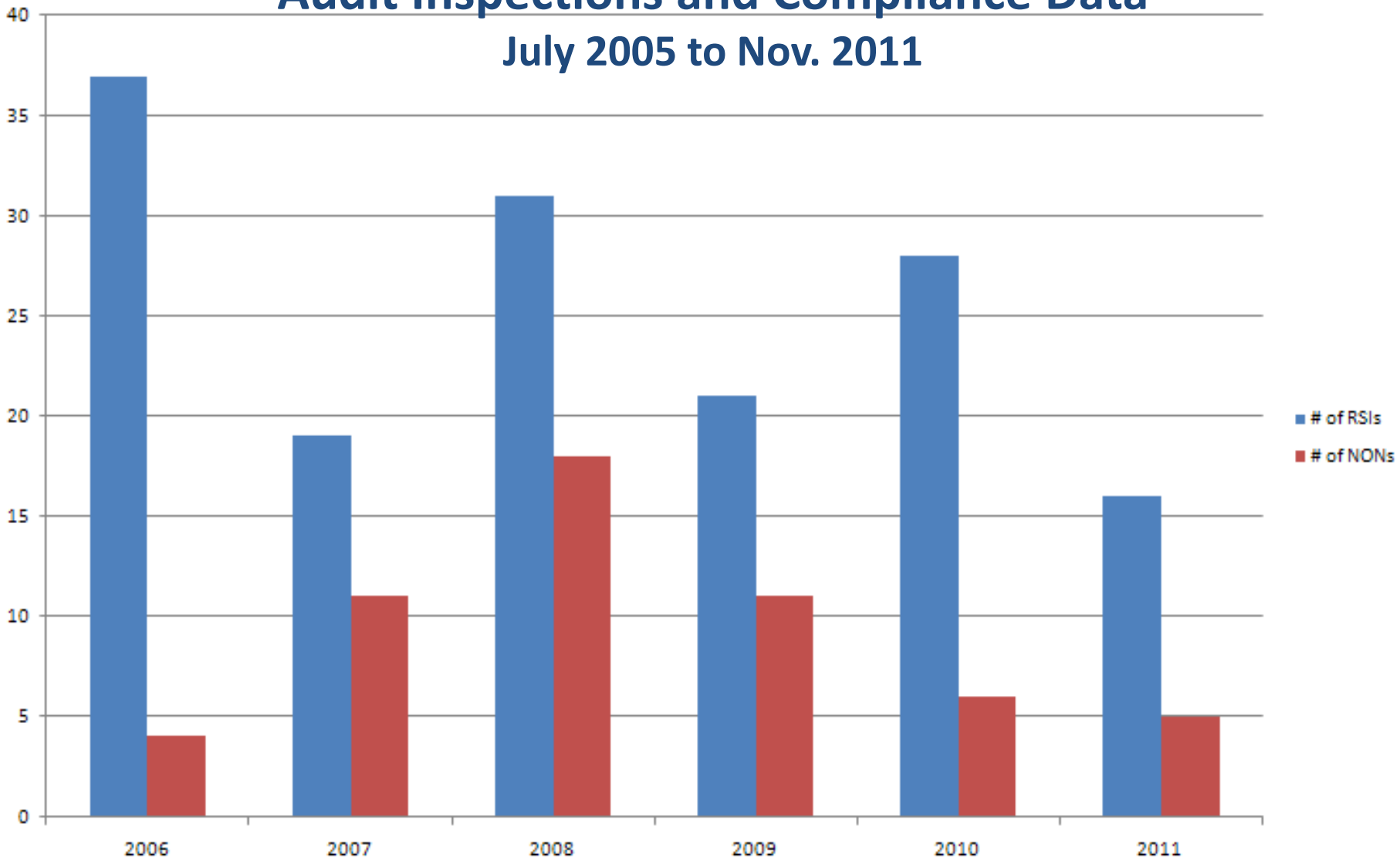
   Comments: The former UST area has been paved since the 2007 audit inspection.

4. Other Comments: Permission to conduct the audit inspection was granted by Allen (Property Manager) by telephone on 12/30/09. The property is currently leased by Joe's Garage and I spoke with Joe (President) during the site inspection. On [date], I had telecommunications with Pete (LSP-of-Record) and Allen (Property Manager), respectively, and recommended that the OMM Plan be revised to be reflective of the actual MNA monitoring plan, and that an evaluation of the MNA data be presented in each ROS submittal to ensure the effectiveness of the comprehensive response action.

*OMM Audits Findings?*

# Audit Inspections and Compliance Data

## July 2005 to Nov. 2011

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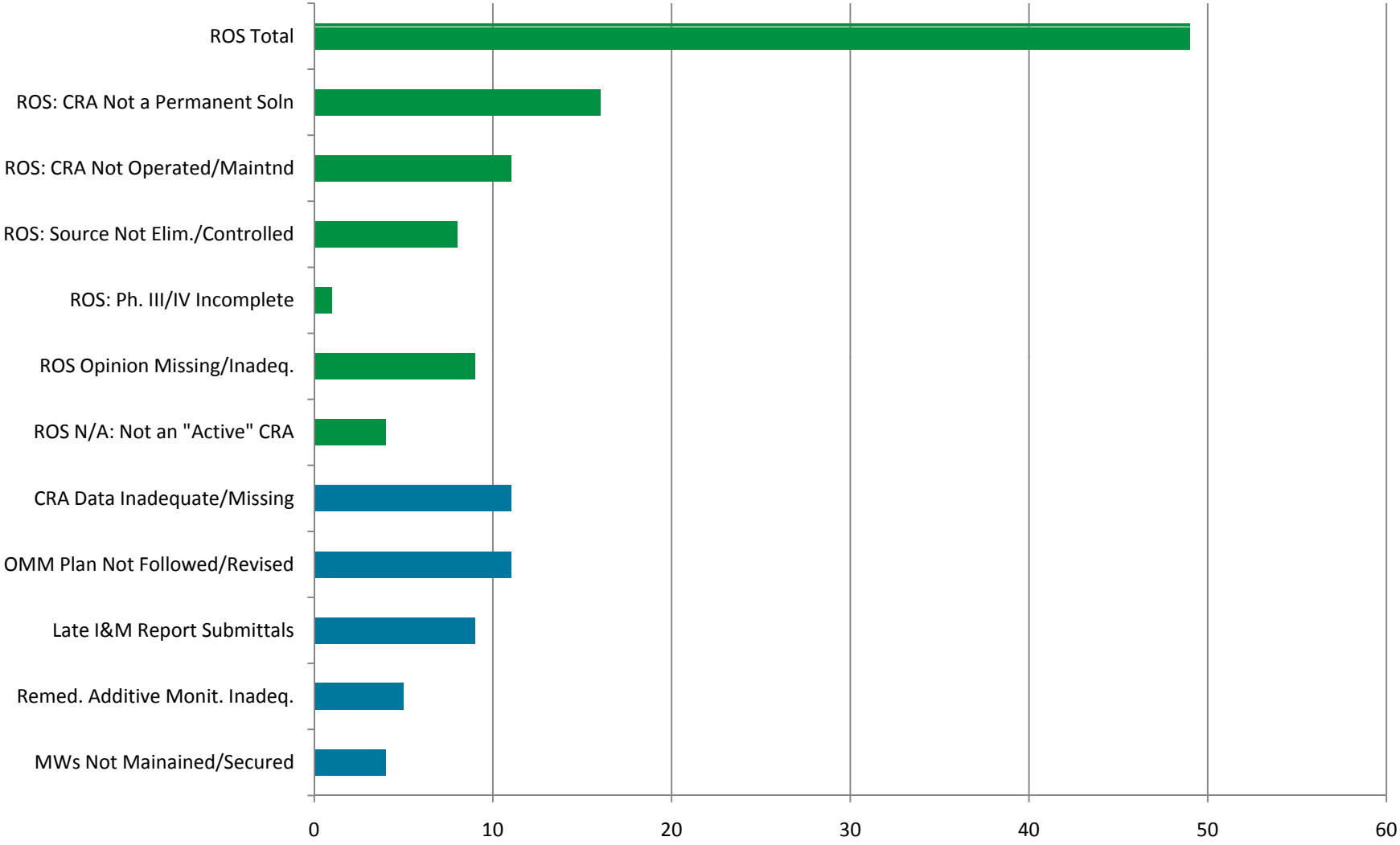
# Major OMM Violations - # of Times Cited

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# Scenario #1

- Setting
  - Vehicle maintenance facility in GW-1 area (no town water)
  - Wetlands/small stream present w/in 120 feet
  - Release observed during USTs removal in 1988
- Source of release
  - Former gasoline and diesel fuel USTs and pump island
- Nature and Extent of Contamination
  - Petroleum hydrocarbons impacting soil and groundwater (surface water initially)
  - Extensive area of LNAPL impacts (now limited to two or three well locations?) and GW-1 exceedances
  - Soil contamination will be addressed with AUL

# Scenario #1 (cont.)

## Regulatory Status

- Remedial goal: GW-1 and GW-3 standards
- MPE/HIT events (CRA) – 2001 to 2004, under ROS
- ROS terminated when CRA changed to ISCO and LNAPL bailing in 2005. ISCO done only once (2005)
- New consultant puts site back into ROS in 2007.
- LNAPL recovered (by peristaltic pump) only when encountered during monitoring events
  - *Passive or active remedial action?*

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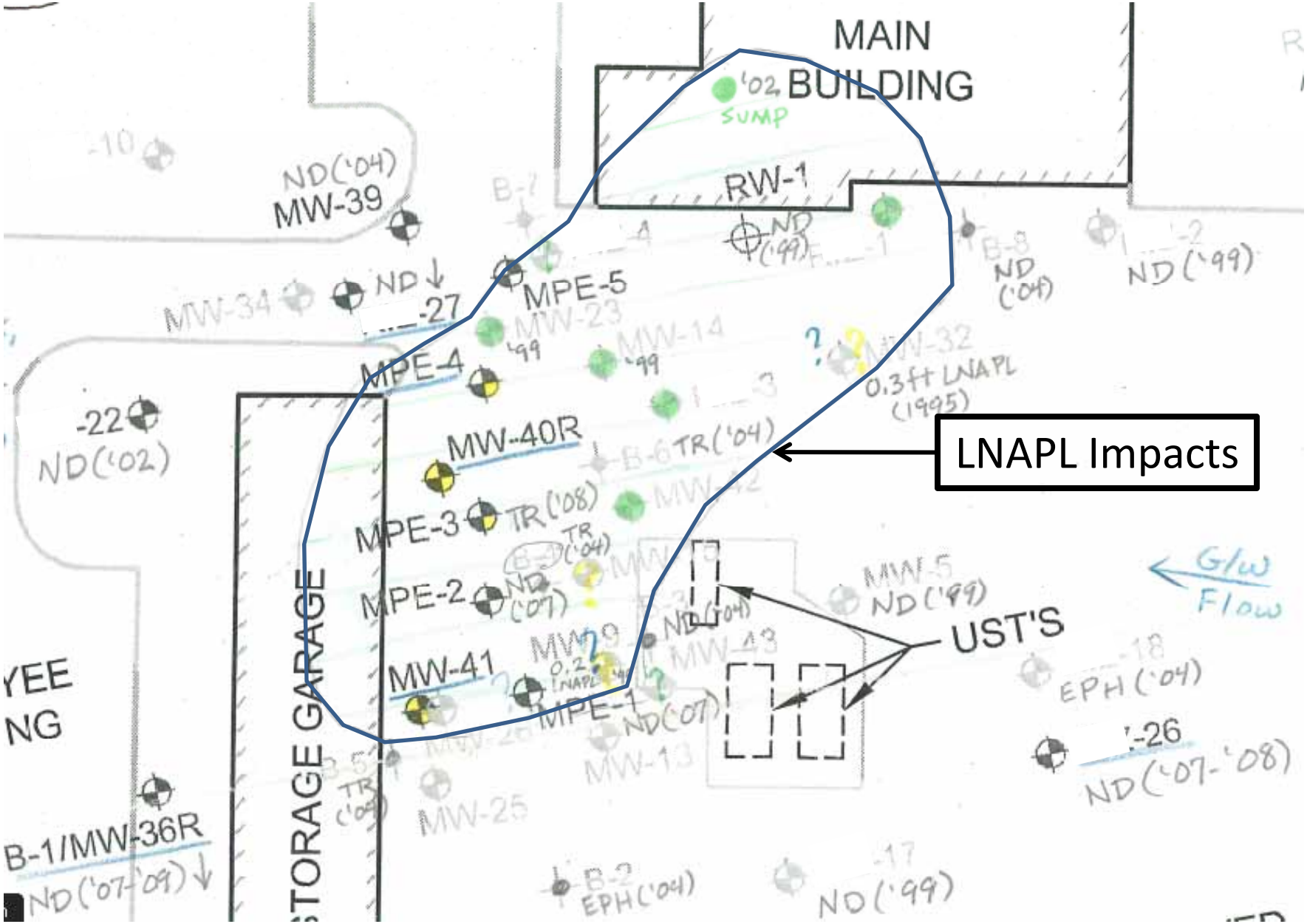


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# Scenario #1 (cont.)

- Background research not done
- CRA focus on LNAPL recovery was understandable (significant progress seen) but not comprehensive
- Achieving GW-1 standards on the back burner

➢ *<u>Question</u>: The site's in ROS. Can it remain there? Quick fix available?*

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# Scenario #1 (cont.)

Audit Findings

- Current OMM Plan is not adequately designed to show how a Permanent Solution will be achieved.
- *(Not cited, but could have been:) Passive LNAPL recovery with (or without) groundwater monitoring does not meet the MCP definition of an active remedial program or monitoring; thus, ROS is not applicable. – rationale used?*

# Questions

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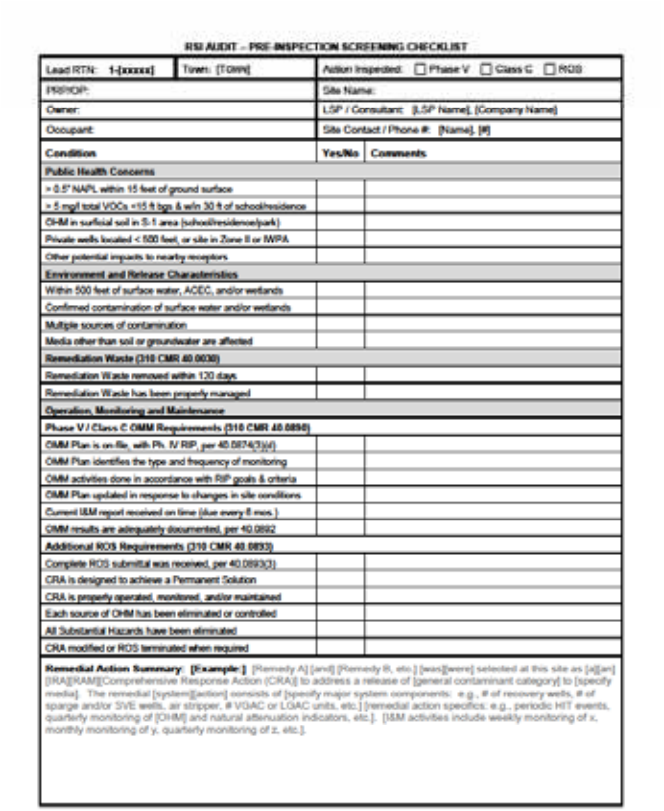

**RSI AUDIT – PRE-INSPECTION SCREENING CHECKLIST**

| | | |
|---|---|---|
| Lead RTN: 1-[xxxxx] | Town: [TOWN] | Action Inspected: ☐ Phase V ☐ Class C ☐ RGS |
| PSF/ROP: | | Site Name: |
| Owner: | | LSP / Consultant: [LSP Name], [Company Name] |
| Occupant: | | Site Contact / Phone #: [Name], [#] |

| Condition | Yes/No | Comments |
|---|---|---|
| **Public Health Concerns** | | |
| > 0.5" NAPL within 15 feet of ground surface | | |
| > 5 mg/l total VOCs <15 ft bgs & w/in 30 ft of school/residence | | |
| Oil-Mi in surficial soil in S-1 area (school/residence/park) | | |
| Private wells located < 500 feet, or site in Zone II or IWPA | | |
| Other potential impacts to nearby receptors | | |
| **Environment and Release Characteristics** | | |
| Within 500 feet of surface water, ACEC, and/or wetlands | | |
| Confirmed contamination of surface water and/or wetlands | | |
| Multiple sources of contamination | | |
| Media other than soil or groundwater are affected | | |
| **Remediation Waste (310 CMR 40.0030)** | | |
| Remediation Waste removed within 120 days | | |
| Remediation Waste has been properly managed | | |
| **Operation, Monitoring and Maintenance** | | |
| **Phase V / Class C OMM Requirements (310 CMR 40.0890)** | | |
| OMM Plan is on-file, with Ph. IV RIP, per 40.0874(3)(d) | | |
| OMM Plan identifies the type and frequency of monitoring | | |
| OMM activities done in accordance with RIP goals & criteria | | |
| OMM Plan updated in response to changes in site conditions | | |
| Current I&M report received on time (due every 6 mos.) | | |
| OMM results are adequately documented, per 40.0892 | | |
| **Additional ROS Requirements (310 CMR 40.0893)** | | |
| Complete ROS submittal was received, per 40.0893(3) | | |
| CRA is designed to achieve a Permanent Solution | | |
| CRA is properly operated, monitored, and/or maintained | | |
| Each source of OHM has been eliminated or controlled | | |
| All Substantial Hazards have been eliminated | | |
| CRA modified or ROS terminated when required | | |

**Remedial Action Summary: [Example:]** [Remedy A] [and] [Remedy B, etc.] [was][were] selected at this site as [a][an] [IRA][RAM][Comprehensive Response Action (CRA)] to address a release of [general contaminant category] to [specify media]. The remedial [system][action] consists of [specify major system components: e.g., # of recovery wells, # of sparge and/or SVE wells, air stripper, # VGAC or LOAC units, etc.] [remedial action specifics: e.g., periodic HIT events, quarterly monitoring of [OHM] and natural attenuation indicators, etc.]. [I&M activities include weekly monitoring of x, monthly monitoring of y, quarterly monitoring of z, etc.].

**REMEDIAL SYSTEM INFORMATION SHEET (RSIS)**

Site Name/Location: _____ RTN: _____

Inspector Name: _____ Date: _____

**SYSTEM INFORMATION**

Indicate all that apply: ☐ GW Recovery/Treatment ☐ NAPL Recovery ☐ Oil/GW Separator ☐ Liq. Ph. GAC ☐ Air Strip ☐ GW Discharge ☐ Remedial Additives ☐ Air/Oxy Sparge ☐ SVE ☐ CATOX ☐ Vap. Ph. GAC

System operating: ☐ YES ☐ NO System operating as designed and at proposed levels: ☐ YES ☐ NO

**O&M INSTRUMENTATION AND DOCUMENTATION ***

| System Specifics | Applicable | Present & Working | Comment if not present, not working, or not done. |
|---|---|---|---|
| Logbook present, information current | | | Last inspection: |
| Overflow/high water shut-off switch | | | |
| Pressure shut-off switch | | | |
| Data collection devices (flow meter, etc.) | | | |
| Process & Instrumentation Diagram | | | |
| System secured | | | |
| Posting the name & telephone number of contact in case of system malfunction | | | |
| Wastewater Treatment Plant Operator inspections at regular intervals | | | |
| Precautions taken to prevent damage by freezing, heat, vehicles & vandals. | | | |

* Possible violations of 310 CMR 40.0041 if not present & working for remedial wastewater generation.

**OPERATION INFORMATION ([month year] to [month year])**

| | | | |
|---|---|---|---|
| **Groundwater Treatment** | | | |
| OHM Concentrations (↓ g/L) | Influent: | Mid-point: | Effluent: |
| System flow rates (gpm) | Design: | Observed: | Average: |
| Total volume NAPL recovered (gal): | | Total volume water recovered: amount gals. | |
| Discharge meets permit limits? ☐ YES ☐ NO ☐ N/A | | Recent downtime? ☐ YES ☐ NO (If yes, describe below) | |
| Remedial Additives: Are downgradient monitoring wells present and in satisfactory condition: ☐ YES ☐ NO ☐ N/A | | | |
| **Sparge System Flow Rate:** units | | **SVE System Flow Rate:** units | |
| Gauges observed at inspection: 1. 2. 3. | Readings: 1. units 2. units 3. units | Notes: | |

| Air (Off-Gas) Treatment | Influent | Mid-Point | Effluent |
|---|---|---|---|
| From file review (ppmv): [date] | | | |
| Field PID reading (ppmv): | | | |
| Stripper influent pressure: units | | Recent downtime? ☐ YES ☐ NO (If yes, describe below) | |
| Off-gas treatment devices achieving 95% reduction? ☐ YES ☐ NO ☐ N/A Percent reduction if < 95%: | | | |

**Inspection Summary/Highlights:**

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

## Monitored Natural Attenuation (MNA) Information Sheet

Site Name & Location: _____ RTN: _____

Inspector Name: _____ Date: _____

**File Review**

1. Primary disposal site OHM:
   ☐ Petroleum Hydrocarbons ☐ Solvents ☐ PCBs ☐ Metals ☐ Other:

2. Source of the release: ☐ UST ☐ AST ☐ Septic ☐ Surface Spill ☐ Dry Well
   ☐ Source Unknown ☐ Other:

3. Environmental media impacted at the disposal site:
   ☐ Soil ☐ Groundwater ☐ Soil Gas ☐ Other:

4. Environmental media targeted for MNA:
   ☐ Soil ☐ Groundwater ☐ Soil Gas ☐ Other:

5. OHM targeted for MNA:
   ☐ Petroleum Hydrocarbons ☐ Solvents ☐ PCBs ☐ Metals ☐ Other:

6. Has the source of the primary contaminant(s) targeted for MNA been removed, capped, or otherwise controlled?
   ☐ Yes ☐ No ☐ Not Determined Explain:

7. Other ongoing Remedial Action Alternatives:
   ☐ None ☐ Excavation ☐ P&T ☐ AS ☐ SVE ☐ Remedial Additives ☐ Other:

8. Indicate the lines of evidence used as the basis for selecting MNA as a Remedial Action Alternative:
   ☐ Analytical data demonstrates a clear and meaningful trend of decreasing contaminant mass and/or concentration over time at appropriate monitoring points.
   ☐ Hydrogeologic and geochemical data indirectly demonstrate that natural attenuation processes are active at the site, and the rate of the attenuation processes will achieve MCP endpoints (within 5 years).
   ☐ A site-specific study of microorganisms directly demonstrates the occurrence of natural attenuation.
   ☐ No line-of-evidence basis was presented in the information reviewed.

9. Identification of nearby receptors:

| Receptor (e.g., residence, water supply well, etc.) | Location in relation to contaminants (e.g., on-site, 500 ft. downgradient, etc.) |
|---|---|
| | |
| | |
| | |

10. Are sentinel monitoring points located between the contamination and nearby receptors? ☐ Yes ☐ No

11. MNA monitoring points and monitoring frequency identified in OMM Plan: _____

12. Analytical tests performed to evaluate progress of MNA:
    ☐ VPH ☐ EPH ☐ VOCs ☐ SVOCs ☐ CVOCs ☐ PAHs ☐ PCBs ☐ Metals (Fe, Mn)
    ☐ pH ☐ DO ☐ Temp ☐ ORP ☐ $CO_2$ ☐ TOC ☐ $NO_3$ ☐ $SO_4$ ☐ Plate count

13. Monitoring data shows that the plume is: ☐ expanding ☐ shrinking ☐ static ☐ unclear
    Primary contaminant concentrations are: ☐ increasing ☐ decreasing ☐ static ☐ unclear
    Secondary contaminant concentrations are: ☐ increasing ☐ decreasing ☐ static ☐ unclear ☐ N/A
    Comments: _____

**Field Inspection** (indicate all that apply)

1. Are the MNA monitoring points present and in useable condition? ☐ Yes ☐ No
   Comments: _____

2. Were the receptors observed at and in the vicinity of the site during the inspection consistent with those identified during the file review?
   ☐ Yes ☐ No Comment: _____

3. Have impermeable surfaces been added over or removed from over the plume area? ☐ Yes ☐ No
   Comments: _____

4. Other Comments:

Completed by: _____ Date: _____

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection