INTERIM REMEDIAL MEASURES WORK PLAN

402 and 430 BUFFALO AVENUE SITE

BCP SITE No. C932164

NIAGARA FALLS, NEW YORK

December 2014 0294-013-001

Prepared for:

Merani Hospitality, Inc.

Prepared by:

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

In Association With:

TURNKEY ENVIRONMENTAL RESTORATION, LLC

INTERIM REMEDIAL MEASURES WORK PLAN

402 and 430 Buffalo Avenue Site

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1.0 INTRODUCTION

Benchmark Environmental Engineering and Science, PLLC (Benchmark), in association with TurnKey Environmental Restoration, LLC (TurnKey), referred to herein as Benchmark-TurnKey, has prepared this Interim Remedial Measures (IRM) Work Plan on behalf of Merani Hospitality, Inc. (Merani) to present the proposed scope of work and implementation procedures for completion of Interim Remedial Measures (IRMs) at the Brownfield Cleanup Program (BCP) 402 and 430 Buffalo Avenue Site (Site; C932164), located at 401, 402, and 430 Buffalo Avenue, Niagara Falls, New York (see Figures 1 and 2).

The IRMs will be completed by Merani, and their designated subcontractors, with oversight provided by Benchmark-TurnKey. The work will be completed in general accordance with 6NYCRR Part 375 and New York State Department of Environmental Conservation (NYSDEC) DER-10 guidelines.

1.1 Background and History

The subject property (hereinafter, the "Project Site" or the "Site") subject to the Brownfield Cleanup Agreement (BCA) is comprised of three (3) adjoining parcels totaling 6.2 acres, located in a highly developed mixed use commercial and residential area of the City of Niagara Falls, Niagara County, New York (see Figures 1 and 2).

The Site is bound by 4th Street to the west, 6th Street and Holly Place to the east, a public alleyway from 4th Street the 6th Street to the north, and the Robert Moses State Parkway with the Niagara River beyond to the south. Buffalo Avenue intersects the property from east to west (see Figure 2). Land use surrounding the Site includes commercial and residential properties to the north, Robert Moses Parkway to the south with the Niagara beyond, residential properties to the east, and vacant and residential properties to the west.

The 401 Buffalo Avenue parcel is currently improved with a vacant municipally-condemned former hotel and conference center, parking areas and vegetated/landscaped areas.

The 402 and 430 Buffalo Avenue parcels are currently vacant, though historically were part of the manufacturing facility owned and operated by National Biscuit Co./Shredded Wheat Company. Manufacturing began on Site in at least 1914, and operations included underground storage tanks (USTs) noted as fuel oil. Baking ovens, likely utilizing the noted fuel oil, were located across the manufacturing facility (including both 402 and 430 Buffalo Avenue parcels) for drying raw materials, heating the various

buildings and operations, and baking final products. Additional operations included paper box manufacturing and printing, material handling and shipping equipment, maintenance of manufacturing equipment and vehicles, and use and storage of paint, solvents, thinners, grease and lubricants common among former manufacturing operations. It is also likely that demolition debris from the former factory is located on the vacant Site.

All planned activities detailed in this IRM Work Plan are for the 401 Buffalo Avenue portion of the BCP Site.

1.2 Previous Environmental Investigations

Previous investigations completed on-Site identified recognized environmental conditions (RECs) including:

- NYSDEC Spill No. 1312160 was assigned to the Site related to the vandalism/destruction of three transformers and spilling of approximately 120-gallons of potential PCB-containing transformer oil. The spill is currently open.
- Elevated radiological material was identified in the vicinity of the pool area, with readings as high as 40,000 counts per minute (cpm).
- Leaking oil-containing equipment and oil-contaminated floors, walls, and equipment were noted in the Boiler Room, Maintenance Room, and both elevator control rooms.
- Improper storage and handling of hazardous chemicals, including corrosive boiler chemicals, solvents, lubricants, degreasers, paints, thinners, hydraulic oils and maintenance equipment fuels, pesticides and herbicides, pool and water treatment chemicals;
- Illegal dumping and vandalism; and,
- Universal and e-waste throughout the building.

A Remedial Investigation (RI) Work Plan is being prepared concurrent with this IRM Work Plan to complete the required BCP environmental investigation of the entire BCP Site. This IRM Work Plan is being prepared to address known environmental contamination on the 401 Buffalo Avenue portion of the Site only. Any additional remedial measures will be evaluated based on the findings of the RI and outcomes of the IRMs.

1.3 Project Organization and Responsibilities

The IRM will be completed by remedial construction specialty contractors under contract to Merani and/or Benchmark-TurnKey. The NYSDEC Division of Environmental Remediation will monitor the activities, in consultation with the New York State Department of Health (NYSDOH), to verify that the work is performed in accordance with the BCA, the approved IRM Work Plan, 6NYCRR Part 375, and NYSDEC DER-10 guidance.

2.0 PRE-PREPARATION TASKS

2.1 Underground Utilities Location

Prior to intrusive activities, underground facilities protection organization (Dig Safely New York, UFPO) will be contacted to locate utilities.

2.2 Health and Safety Plan Development

A Health and Safety Plan (HASP) has been prepared in conjunction with the Remedial Investigation Work Plan and will be enforced by the remediation contractor in accordance with the requirements of 29 CFR 1910.120. The Benchmark-TurnKey HASP covers all on-site remedial activities. Benchmark-TurnKey will be responsible for site control and for the health and safety of its authorized site workers. Benchmark-TurnKey's HASP is provided in Appendix A. The remediation contractor will be required to develop a HASP at least as stringent as Benchmark-TurnKey's HASP.

2.3 Mobilization and Site Preparation

The contractor's field operations at the Site may include field trailer(s), heavy equipment and materials to the Property and erecting safety fencing and other temporary controls as described below.

2.4 Temporary Facilities and Controls

Temporary facilities for use during the remedial work may include a construction field trailer and portable toilets. Temporary controls will be employed for protection against off-site migration of soil and safety hazards during construction, including safety fencing, dust suppression, and erosion control as further described below.

2.4.1 Access Controls

Temporary safety construction fencing may be placed around the perimeter of work area(s) to distinguish the work zone and discourage foot or motor traffic in these areas. The fencing will not be removed until the work activities are completed in a given area.

2.4.2 Dust Monitoring and Controls

A Community Air Monitoring Plan (CAMP) will be implemented during demolition and intrusive activities. If community air monitoring indicates the need for dust suppression

or if dust is visually observed leaving the Property, the contractor will apply a water spray across the excavation and surrounding areas, and on-site haul roads as necessary to mitigate airborne dust formation and migration. Potable water will either be obtained from a public hydrant or provided by the on-site water service, if available. Other dust suppression techniques that may be used to supplement the water spray include:

- Hauling materials in properly tarped containers or vehicles.
- Restricting vehicle speeds on-site.
- Hydro-seeding of final grades.

2.4.3 Erosion and Sedimentation Control

Provisions will be made for erosion and sedimentation control at the work perimeter during intrusive activities. A Soil-Fill Management Plan (SFMP), including Master Erosion Control Plan (MECP) has been prepared and incorporated as Appendix B to this Work Plan.

Perimeter erosion controls will be installed prior to demolition activities. Location of the planned erosion control silt fencing is shown on drawing SD101 - Site Demolition and Erosion Control Plan, included in the Figures section.

3.0 DEMOLITION ACTIVITIES

Based on the planned redevelopment of the 401 Buffalo Avenue parcel, the existing 3-story portion of the facility will be demolished, and the 4-story portion of the building will undergoing extensive renovation. Drawing SD101 provides details related to the planned demolition activities.

The existing hotel complex has been condemned for occupancy by the City of Niagara Falls. Extensive damage to the existing structure has resulted from repeated vandalism, including destruction of walls, electrical, lighting, and plumbing systems. Illegal metal scrapping and dumping is apparent within the structure.

Details of the planned demolition activities are described below.

3.1 Notification Documents

Prior to demolition activities, a City of Niagara Falls demolition permit will be acquired, and the required 10-day New York State Department of Labor (NYSDOL) and US Environmental Protection Agency (EPA) demolition notifications will be submitted.

Copies of the demolition permit and 10-day notifications will be provided to the Department.

3.2 Pre-Demolition Activities

3.2.1 Engineering Survey and Chemical Walk-over

Prior to demolition of the 3-story portion of the existing buildings and interior portions of the 4-story structure, an OSHA-required Engineering Survey and Chemical Walk-over will be completed by the demolition contractor. The walkover aims to identify universal wastes, undescribed asbestos containing material (ACM) and any abandoned chemicals that may be present and will require removal/abatement prior to building demolition. Accessible areas will also be visually inspected for areas of staining and/or potential petroleum contamination.

3.2.2 Asbestos Containing Material (ACM)

A pre-demolition asbestos survey has been completed, and friable and non-friable ACM has been identified on-Site. ACM abatement is planned to be completed by licensed-ACM subcontractor in the 4-story portion of the building. Based on the widespread uncontrolled release of ACM, likely caused by the extensive vandalism, the 3-story portion

of the building is planned for controlled demolition. ACM abatement related to the removal of Universal Waste (UW), from the 3-story will be completed. All ACM abatement will be handled by licensed ACM subcontractor, and all ACM demolition material will be handled, recycled, and/or disposed off-site by licensed handlers and disposal/recycling facilities. Disposal documents will be provided to the Department.

3.2.3 Removal of Residual Chemicals, Maintenance Fluids, and Sumps

Prior to demolition activities, sumps, trenches and maintenance areas will be inspected and residual contents removed. Areas will also be inspected for residual chemicals and maintenance fluids, including paints, cleaners, solvents, hydraulic oils, and grease will be collected and consolidated into "lab-pack" or other approved disposal containers. Material will be characterized for off-site disposal and/or recycling.

3.2.4 Universal Waste

Universal Wastes (UWs), including bulbs, mercury-containing equipment (thermometers), and batteries will be identified during the pre-demolition survey, and removed during pre-demolition activities. Universal waste will be collected, handled and recycled/disposed in accordance with Title 40 Part 273 regulations. Recycling/disposal documents will be provided to the Department.

3.3 Transformer Room (Spill 1312160)

Polychlorinated biphenyl (PCB) wipe samples were collected from the transformer room spill area to assess the potential of PCB contamination related to the vandalism of the transformers. Three (3) PCB wipe samples were collected, including one (1) from the interior of an accessible transformer housing (Housing 103) and two (2) concrete floor wipe samples, identified as wipe sample 1 and wipe sample 2.

Laboratory analytical results indicate that the transformer oil was PCB-containing and will require remediation (see Table 1). Based on the analytical results, the National Response Center was notified and Site No. 1102311 was issued for the Site.

In accordance with 40CFR Part 761, PCB wipe sample results indicate that the transformer housings and all oil-contaminated concrete floor will require remediation and be disposed off-site at a permitted facility as bulk PCB waste. An USEPA RCRA Subtitle C Site Identification Form (EPA Form 8700-12) has been submitted.

After receipt of the USEPA Generator ID number, all remaining transformer housings and electrical components, and concrete floor from the transformer room will be removed and disposed off-site. After removal of the concrete floor, a supplemental investigation will be completed to assess if the underlying soil/fill was impacted by the spill. If underlying soil/fill is determined to be impacted with PCBs, the material will be removed and disposed off-site as bulk PCB waste and verification samples will be collected.

3.4 Post-Demolition Radiological Screening Activities

Based on the findings of the pre-demolition Supplemental Investigation (September 2014), areas of potentially elevated radiological material may be present beneath the pool area and 3-story portion of the building.

After demolition of the above grade structure and removal of the slab, a licensed radiological subcontractor will complete a gamma walkover survey of accessible areas beneath the slab and exposed foundation to screen and evaluate potential elevated radiological material (e.g., slag) and delineate potential areas that will require additional assessment and/or remediation.

The radiological subcontractor will also collect radiological waste characterization samples in the pool area and any additional area(s) identified above the approved NYSDEC background levels that are planned to be excavated. All radiological material that is removed from the excavation will be field-screened and handled in accordance with the approved NYSDEC Radiological Material Work Plan, prepared by Greater Radiological Dimensions, Inc. (GRD), a licensed NYSDOH Radioactive Material contractor. Radiological material health and safety and handling protocols are more fully described in the Radiological Material Work Plan, included in Appendix C.

4.0 INTERIM REMEDIAL MEASURES

After completion of the demolition of the 3-story portion of the building, as described above, IRMs will be completed, as necessary, to address the known transformer spill area (Spill No. 1312160) and elevated radiological material in the pool area.

4.1 Soil/Fill Excavation

A PID and visual/olfactory observations will be used to screen soil/fill materials and assist in verifying removal of impacted soil/fill. All excavation work will be directed by an experienced Benchmark-TurnKey professional to remove impacted material. Lateral and vertical excavation will continue, as described above, until suspected source area soils and visually impacted soil/fill is removed, Part 375 Restricted Residential Use SCOs are met, excavation has reached the property line, or NYSDEC agrees that no further excavation is required. A licensed radiological materials contractor will field screen all planned excavation areas prior to removal.

4.1.1 Former Transformer Room (Spill 1312160)

After demolition and removal of the slab, the area of the transformer room will be inspected for evidence of residual petroleum and/or PCB impacts. If impacts are noted below the concrete slab, the impacted soil/fill will be characterized, excavated, and disposed off-site in accordance with this IRM Work Plan, DER-10 and NYSDEC consultation. Post-excavation confirmatory samples will be collected, as described in Section 4.2 below.

Pre-characterization and waste profile approvals will be completed to allow for direct loading and off-site transportation of impacted soil. If disposal transport truck scheduling necessitates stockpiling of excavated soil/fill, the stockpiles will be managed in accordance with the SFMP (see Appendix B).

Excavated contaminated soil/fill, designated for off-site disposal will be transported to a permitted commercial waste disposal facility by licensed haulers permitted to transport contaminated soil/fill. The commercial waste disposal facility will provide waste manifests and disposal receipts, which will be submitted in the RI/IRM/AA Report and Final Engineering Report.

4.1.2 Pool Area

In accordance with the Radiological Material Work Plan, elevated radiological material will be field screened during intrusive activities by GRD or their NYSDOH licensed

radiological subcontractor, to evaluate and segregate any radiological material exceeding the 2 times background level established for the Site, approximately 12,000 counts-per-minute (CPM).

In accordance with the approved radiological work plan, any material determined to exceed the allowable background threshold, will be segregated and stockpiled for radiological waste characterization sampling and off-site disposal.

All excavated material determined to be elevated for radiological material will be handled in accordance with the NYSDEC-approved radiological work plan and associated documents by GRD, Inc. (provided electronically in Appendix C), and/or their direct radiological licensed subcontractors. Any radiological waste material will be shipped off-site and disposed of at a licensed commercial disposal facility. Post-excavation radiological screening, and/or confirmatory samples will be collected, as described in Section 4.2 below and the Radiologic Work Plan (attached).

Documentation of the field screening, waste segregation and characterization, and disposal records will be provided to the Department.

4.2 Post-Excavation Verification Sampling

Post excavation samples will be collected from excavation sidewalls and bottoms to document conditions at the excavation boundaries. Sidewall samples will be collected at a frequency of one sample per 30 linear feet of sidewall and 900 square feet of excavation bottom, or as otherwise approved by the NYSDEC, and analyzed by a NYSDOH ELAP-certified analytical laboratory.

Post-excavation samples will be collected and analyzed in accordance with DER-10 and consultation with the NYSDEC. Samples will be analyzed in accordance with USEPA Methodology with an equivalent Category B deliverables package to facilitate data evaluation by a third-party validation expert. Accelerated turnaround times may be requested for the analytical results to minimize the time that the excavations remain open.

QA samples will be collected to support the verification sample data evaluation. The QA samples will include a minimum of one matrix spike, one matrix spike duplicate, and one blind duplicate per 20 verification samples. Dedicated equipment will be used to avoid the need for equipment blanks.

4.3 Excavation Backfill

Following NYSDEC concurrence that the IRM excavation is complete, the excavation will be backfilled with approved backfill material in accordance with DER-10.

Backfill material may consist of the following materials:

- Gravel, rock, or stone, consisting of virgin material, from a permitted mine or quarry may be imported, without chemical testing, if it meets the requirements of DER-10, or as otherwise approved by NYSDEC.
- Recycled concrete or brick from a NYSDEC-registered construction and demolition debris processing facility may be imported, without chemical testing, if it meets the requirements of DER-10, or as otherwise approved by NYSDEC.
- Imported soil/fill originating from known off-site sources having no evidence of disposal or releases of hazardous substances, hazardous, toxic or radioactive wastes, or petroleum, and which meets the chemical criteria for Commercial Use Sites in DER-10, Appendix 5. No off-site materials meeting the definition of a solid waste as defined in 6NYCRR, Part 360-1.2(a) shall be used as backfill.
- On-site reuse of soil/fill that is placed at least two-feet below the final surface grade, which meets Part 375 Commercial Use SCOs and is free from visual and olfactory evidence of impact.

As indicated above soil/fill material, if imported to the Site, will be subject to characterization requirements in accordance with DER-10 Table 5.4(e)10. Characterization testing will be performed by an independent, NYSDOH ELAP-approved laboratory. An equivalent Category B deliverables package will be furnished with the data to allow data evaluation and preparation of a Data Usability Summary Report by an independent, third party data validation expert. Quality Assurance (QA) samples will be collected to support the data evaluation. The QA samples will include a minimum of one matrix spike, one matrix spike duplicate, and one blind duplicate per 20 verification samples.

4.4 Groundwater Management

Water removed from excavations and surface water run-in to excavations during the impacted soil removal will be handled on-site prior to discharge to the municipal sewer. In general, water removed from excavations will be stored/settled in a portable storage tank, and if deemed necessary, will be pumped through a bag or cartridge filter prior to treatment using granular activated carbon (GAC). Following completion of excavation work, settled solids remaining in the tank and spent filter bags will be disposed of off-site.

If the accumulated waters required treatment, the spent GAC will be characterized and regenerated off-site, or disposed at a permitted disposal facility in accordance with applicable federal and state regulations. The storage tank will be decontaminated via pressure washing. Benchmark-TurnKey or the Site owner will coordinate with the municipal sanitary sewer to obtain any necessary temporary sewer discharge permits.

5.0 BCP SUPPORT DOCUMENTS

5.1 Radiological Material Work Plan

Greater Radiological Dimensions, Inc. (GRD), a licensed NYSDOH Radioactive Material contractor has prepared the Radiological Work Plan, Technical Approach and Radiological Safety Plan, on behalf of Merani, and submitted to NYSDEC for review and approval.

The documents detail the required radiological oversight, monitoring, QA/QC, segregation, disposal, training and health and safety procedures for the project. Copies of the radiological work plan and associated documents are provided electronically in Appendix C.

5.2 Health and Safety Protocols

Benchmark-TurnKey has prepared a Health and Safety Plan (HASP) for use by our employees in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120. The HASP, provided in Appendix A, includes the following site-specific information:

- A hazard assessment.
- Training requirements.
- Definition of exclusion, contaminant reduction, and other work zones.
- Monitoring procedures for Site operations.
- Safety procedures.
- Personal protective clothing and equipment requirements for various field operations.
- Disposal and decontamination procedures.

The HASP also includes a contingency plan that addresses potential site-specific emergencies, and a Community Air Monitoring Plan as described above.

Health and safety activities will be monitored throughout the remedial field activities. A member of the field team will be designated to serve as the Site Safety and Health Officer (SSHO). The SSHO will report directly to the Project Manager and the Corporate Health and Safety Coordinator. The HASP will be subject to revision as necessary, based on new information that is discovered during the field investigation and/or remedial activities.

5.2.1 Community Air Monitoring

Real-time community air monitoring will be performed during remedial activities at the Site. A Community Air Monitoring Plan is included with Benchmark-TurnKey's HASP. Particulate and VOC monitoring will be performed along the downwind perimeter of the work area during subgrade excavation, grading, and soil/fill handling activities in accordance with this plan. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC. Accordingly, it follows procedures and practices outlined under DER-10 Appendix 1A (NYSDOH's Generic Community Air Monitoring Plan) and Appendix 1B (Fugitive Dust and Particulate Monitoring).

5.3 Soil/Fill Management Plan (SFMP)

The purpose of the Soil/Fill Management Plan (SFMP) is to protect both the environment and human health during remedial and redevelopment activities at the Site. The SFMP will be modified/expanded as appropriate based on the results of the IRM and RI. The SFMP is included in Appendix B.

While an assessment of surface and subsurface soil/fill and/or groundwater at the Site has been preliminarily investigated, and will be further investigated during the RI, subsurface information is never 100 percent complete or accurate. As such, it is not unreasonable to anticipate the possibility that some quantity of subsurface soil/fill contamination may be encountered during IRM and redevelopment activities.

Compliance with the SFMP is required to properly manage subsurface soil contamination. The SFMP was developed and incorporated into this Work Plan with the express purpose of addressing unknown subsurface contamination if and when encountered. This SFMP provides protocols for the proper handling of Site soil/fill during development activities, including:

- Excavation, grading, sampling and handling of site soils.
- Acceptability of soils/fill from off-site sources for backfill or subgrade fill.
- Erosion and dust control measures.
- Access controls.
- Health and safety procedures for subsurface construction work and the protection of the surrounding community.

5.4 Citizen Participation Activities

NYSDEC will coordinate and lead community relations throughout the course of the project with support from Benchmark-TurnKey as requested. A Citizen Participation (CP) Plan has been prepared and submitted to the NYSDEC as a separate document for review. A copy of the approved CP Plan will be placed at the designated project document repository.

The NYSDEC, with input from Benchmark-TurnKey and Merani, will issue project-related fact sheets to keep the public informed of BCP activities.

6.0 REPORTING

Documentation, including excavation, disposal, post-excavation analytical laboratory reports, UW disposal/recycling documents, facility approvals, and agency approvals will be included in the Remedial Investigation, IRM, Alternatives Analysis (RI/IRM/AA) Report.

At a minimum, the IRM section of the report will include:

- A map showing the lateral limits of excavation;
- Summaries of unit quantities, including: volume of soil/fill excavated; disposition of excavated soil/fill and collected ground/surface water; volume/type/source of backfill; and volume of ground/surface water pumped and treated;
- Planimetric map showing location of all verification and other sampling locations with sample identification labels/codes;
- Tabular comparison of verification and other sample analytical results to SCOs. An explanation shall be provided for any results exceeding acceptance criteria; and,
- Text describing that the excavation activities were performed in accordance with this Work Plan.

Additional remedial measures beyond those planned as IRMs will be presented in a Remedial Action Work Plan (RAWP) that will be prepared and submitted to the Department after completion of the RI and Alternatives Analysis Report.

7.0 REFERENCES

1. TurnKey Environmental Restoration, LLC. *401Buffalo Avenue – Supplemental Investigation, Niagara Falls, New York*. September 2014.
2. TurnKey Environmental Restoration, LLC. *401Buffalo Avenue – Supplemental Phase II Investigation, Niagara Falls, New York*. April 2014.
3. TurnKey Environmental Restoration, LLC. *Limited Phase II Environmental Investigation Report, 401, 402 and 430 Buffalo Avenue, Niagara Falls, Niagara County, New York*. November 2013.
4. New York State Department of Environmental Conservation. *DER-10 Technical Guidance for Site Investigation and Remediation*. May 2010.

TABLE

TABLE 1

SUMMARY OF PCB WIPE SAMPLE RESULTS

402 and 430 BUFFALO AVENUE SITE

NIAGARA FALLS, NEW YORK

Parameter[1]	Wipe Sample 1	Wipe Sample 2	Housing 103
	11/11/2014		
Total PCBs - ug/Abs			
Aroclor 1016	ND	ND	ND
Aroclor 1221	ND	ND	ND
Aroclor 1232	ND	ND	ND
Aroclor 1242	ND	ND	ND
Aroclor 1248	ND	ND	ND
Aroclor 1254	ND	ND	ND
Aroclor 1260	77.6	276	322
Aroclor 1262	ND	ND	ND
Aroclor 1268	ND	ND	ND
Total Polychlorinated Biphenyls	77.6	276	322

Notes:

1. Sample results were reported by the laboratory in ug Abs; equivalent to ug/100 cm^2.

Definitions:

ND = Parameter not detected above laboratory detection limit.

FIGURES

FIGURE 1

TURNKEY ENVIRONMENTAL RESTORATION, LLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0294-013-001

DATE: OCTOBER 2014

DRAFTED BY: BLR/NTM

SITE LOCATION AND VICINITY MAP

INTERIM REMEDIAL MEASURES WORK PLAN

401, 402, & 430 BUFFALO AVENUE SITE
BCP SITE No. C932164
NIAGARA FALLS, NEW YORK

PREPARED FOR

MERANI HOSPITALITY, INC.

DATE: OCTOBER 2014
DRAFTED BY: BLR/NTM

FIGURE 2

SITE PLAN (AERIAL)

INTERIM REMEDIAL MEASURES WORK PLAN

401, 402, & 430 BUFFALO AVENUE SITE
BCP SITE No. C932164
NIAGARA FALLS, NEW YORK

PREPARED FOR

MERANI HOSPITALITY

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0294-013-001

F:\CAD\TurnKey\Merani Hospitality\401, 402, and 430 Buffalo Ave\IRM WP\IRM FIG 3.dwg

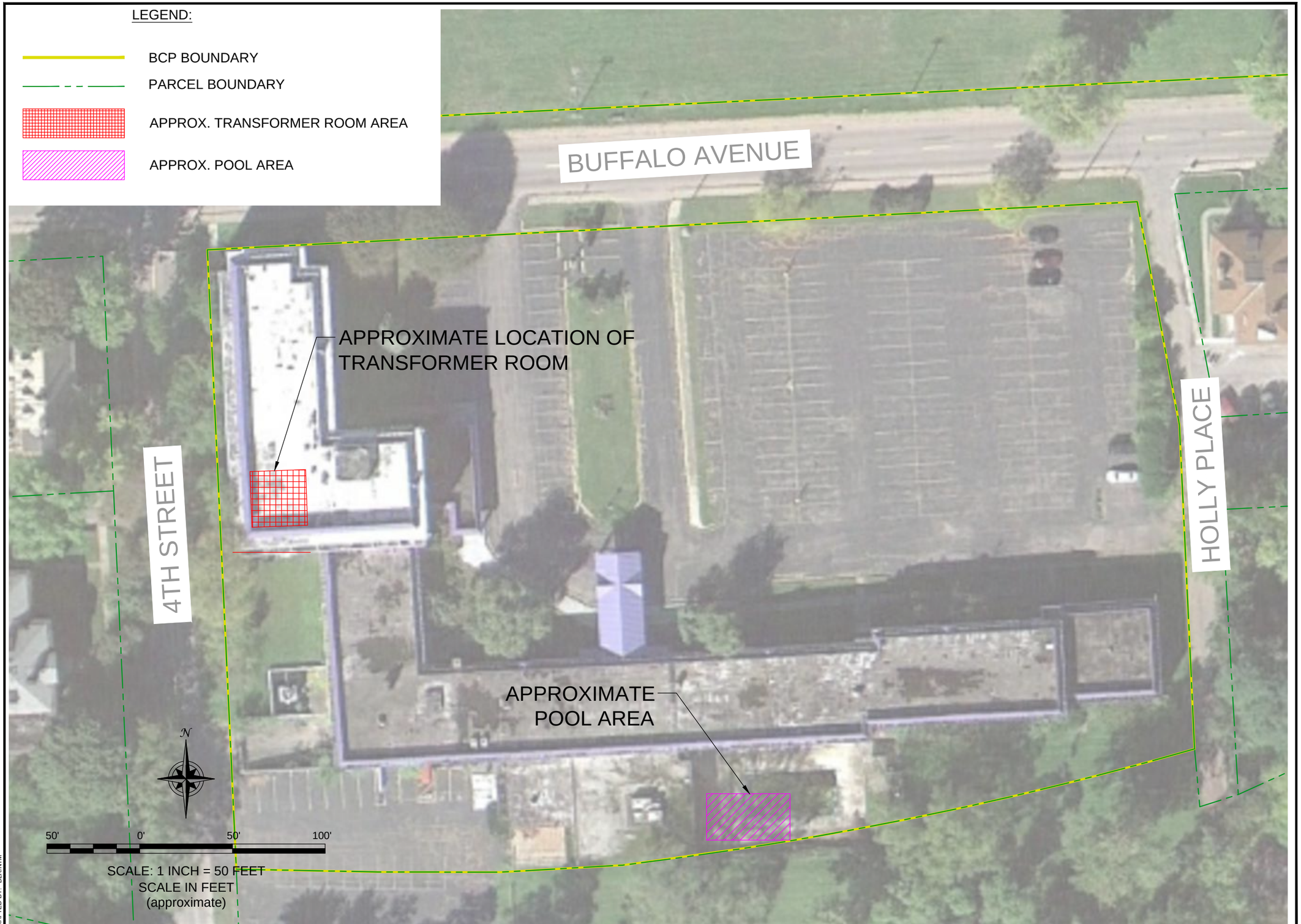
LEGEND:

BCP BOUNDARY

PARCEL BOUNDARY

APPROX. TRANSFORMER ROOM AREA

APPROX. POOL AREA



DATE: NOVEMBER 2014
DRAFTED BY: BLR/NTM

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0294-013-001

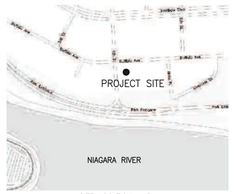
PLANNED INTERIM REMEDIAL MEASURES

INTERIM REMEDIAL MEASURES WORK PLAN

402 & 430 BUFFALO AVENUE SITE
BCP SITE NO. C932164
NIAGARA FALLS, NEW YORK

PREPARED FOR
MERANI HOSPITALITY, INC.

FIGURE 3



SITE LOCATION MAP

BUFFALO AVENUE (66' WIDE)

BLACKTOP PARKING LOT

EX CURB CUT

EX CURB CUT

0.5' CONC. CURB/EDGING

4.6' BRICK PAVER WALK

0.4' GRANITE CURB

4.7' BRICK PAVER WALK

489.82'± DEED = 492.02' MEAS.
S 86°-58'-51" W

END SF

HOLLY PLACE (66' WIDE)

4 STORY BRICK & MASONRY HOTEL BUILDING TO REMAIN

3 STORY BRICK HOTEL BUILDING NO. 401

BLACKTOP PARKING

BLACKTOP DRIVE

EXIST SHRUBS TO BE REMOVED

SITE BENCHMARK: SET MAG NAIL IN NORTH FACE OF UTILITY POLE ELEV.=584.67

FOURTH STREET

S 2°-40'-45" E 334.00' DEED & MEAS.

N 2°-40'-45" W 297.14' DEED & MEAS.

N 10°-43'-29" W 122.38' MEAS.

Transformer Room Area

CONSTRUCTION ENTRANCE

ABANDON EX CURB CUT 2

REMOVE AND REPLACE EXIST CB 5

2.1'x16.0' TRENCH DRAIN (COLLAPSING STRUCTURE)

OHE 9

POLE WITH STREET LIGHT 8

POLE WITH STREET LIGHT NG 3, NYT 3

CABLE BOX

CONC. STOOP WITH 3.5' HIGH ALUMINUM HAND RAIL

GLASS PANEL ENCLOSED ENTRANCE

CANOPY

FLAG POLES 7

PORTE-COCHERE

0.7' TO 1.1' HIGH CONC. ISLAND

10.0' CONC. WALK

5.1' CONC. WALK

3.5' CONC. WALK

6.0' CONC. WALK

5.0' CONC. WALK

CONC. STOOP

CANOPY

3 STORY BRICK HOTEL BUILDING NO. 401

Approximate area of elevated radiologic material

Elevated Radiologic Material Area

CONCRETE PATIO

IN-GROUND POOL

FRAME POOL HOUSE 1

6' HIGH CHAIN LINK FENCE

WOOD DECK

TIMBER GUARD RAIL

EXISTING IRON PIPE 0.28 N.

EXISTING SAN. M.H. RIM: 569.77 10" W. INV.-563.32 8" NW. INV.-563.41 12" N. INV.-564.91 18" NE. INV.-563.26

247.64' DEED = 248.05' MEAS. RAD. = 2000.00'

64" BLACK WALNUT

66.66' DEED & MEAS. N 82°-04'-45" E

66.00' DEED & MEAS. N 89°-56'-00" E

66.00' DEED & MEAS. N 86°-43'-15" E

64.19' DEED = 66.66' MEAS. S 88°-43'-00" E

50.00' DEED & MEAS. N 02°-40'-45" W

EX PAVT TO REMAIN

WIDEN EXISTING CURB CUT: REF. DWG SP101

EX TREE TO REMAIN - PROVIDE CONSTRUCTION FENCING SURROUND AND AVOID ALL DISTURBANCE WITHIN DRIP-LINE

EX TREE TO REMAIN - PROVIDE CONSTRUCTION FENCING SURROUND AND AVOID ALL DISTURBANCE WITHIN DRIP-LINE

NORTH LINE OF LAND CONVEYED TO THE PEOPLE OF THE STATE OF NEW YORK LIBER 1278, PAGE 394

STATE OF NEW YORK
NIAGARA FRONTIER PARK COMMISSION
"PROSPECT PARK"

SURVEY LEGEND:

HYD.	—	HYDRANT	
POLE	—	UTILITY POLE	
<	—	POLE ANCHOR	
◇	—	LIGHT POLE	
RCVR.	—	RECEIVER	
M.H.	—	MANHOLE	
⊣	—	SIGN	
W.V.	—	WATER VALVE	
G.V.	—	GAS VALVE	
ST	—	STORM SEWER LINE	
SA	—	SANITARY SEWER LINE	
W	—	WATER LINE	
G	—	GAS LINE	
CTV	—	OVERHEAD CABLE TV WIRES	
UCTV	—	UNDERGROUND CABLE TV WIRES	
E	—	OVERHEAD ELECTRIC WIRES	
UE	—	UNDERGROUND ELECTRIC WIRES	
T	—	OVERHEAD TELEPHONE WIRES	
×—×—×	—	CHAIN LINK FENCE	
#—#—#	—	WOOD FENCE	
× 600.00	—	SPOT ELEVATION	
600	—	EXISTING CONTOUR	

SITE DEMOLITION & ESC PLAN

1" = 20'

N

SITE DATA

CURRENT ZONING: R4-HERITAGE; WATERFRONT OVERLAY DISTRICT
TOTAL SITE AREA: ±3.8 ACRES (AC)

GENERAL NOTES:

1. BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN ON THIS DRAWING IS FOR INFORMATION ONLY. REFER TO SURVEY(S) PREPARED BY APEX, JOB No 12-110, DATED 9/13/2012.
2. REFER TO ARCHITECTURAL DRAWINGS FOR ALL BUILDING DEMOLITION, RENOVATIONS, ADDITIONS AND UTILITY CONNECTIONS.

SITE DEMOLITION NOTES:

1. REMOVE PORTIONS OF EXISTING BUILDING STRUCTURE & FOUNDATIONS IN THEIR ENTIRETY – REFER TO ARCHITECTURAL DWGS. FOR ADDITIONAL INFO. NOT SHOWN
2. REMOVE CONCRETE/ASPHALT PAVT
3. REMOVE CURBING
4. REMOVE POOL (& PLUMBING) IN ITS ENTIRETY
5. REMOVE STORM RECEIVER (& PLUMBING)
6. REMOVE TREE PLANTING & ROOT BALL
7. REMOVE SIGN/FLAGPOLE & FOUNDATION
8. REMOVE LIGHT POLE & FOUNDATION (VERIFY CONDUIT/CIRCUITING)
9. REMOVE EXISTING UTILITY LINE (VERIFY EXTENTS)
10. REMOVE FENCING & FOUNDATIONS
11. EXISTING TREE TO BE REMOVE
12. RELOCATE EXISTING TRAFFIC SIGN

LAWN SEED SCHEDULE

Mixtures		Rate per Acre (lbs)	Rate per 1,000 sq. ft. (lbs)
A.	Birdsfoot trefoil or ladino clover	8	0.20
	Tall fescue or mooth bromegrass	20	0.45
	Redtop	2	0.05
		30	0.70
OR			
B.	Kentucky bluegrass	25	0.60
	Creeping red fescue	20	0.50
	Perennial ryegrass	10	0.20
		55	1.30

EROSION CONTROL LEGEND

-SF-	SILT FENCE
W	WHEEL WASH/DUST CONTROL
	EXCAVATED DROP INLET PROTECTION
M	MULCHING
PS	PERMANENT SEEDING
TS	TEMPORARY SEEDING
	TOPSOILING

tredo ENGINEERS
755 Seneca Street
Suite 202
Buffalo, New York 14210
716.876.7147 ph
716.876.8661 fax

ROBERTS SHACKLETON BOY
ARCHITECTS AND ENGINEERS
6 CAYUGA ROAD
CHEEKTOWAGA, NEW YORK 14225
PHONE (716) 895-2233
FAX (716) 895-2273
E-MAIL RSBARCHITECTS@WORLDNET.ATT.NET
WWW.RSBARCHITECTS.COM

Project:
DoubleTree Hotel
401 Buffalo Ave.
Niagara Falls, New York

REVISIONS NO.	DESCRIPTION	DATE
1		
2		

Sheet Title:
SITE DEMOLITION AND EROSION CONTROL PLAN

Project No.:	Checked By:
TE# 14-01	AVM
Scale: AS NOTED	Drawn By: AVM
Date: 9.16.14	

Drawing Number:
SD101

DOCUMENT STATUS: ☐ PROGRESS NOT FOR CONSTRUCTION ☐ BID SET ☐ PERMIT SET ☐ FINAL FOR CONSTRUCTION

APPENDIX A

HEALTH AND SAFETY PLAN

SITE HEALTH AND SAFETY PLAN
for
BROWNFIELD CLEANUP PROGRAM
RI/IRM ACTIVITIES

401, 402, and 430 BUFFALO AVENUE SITE
BCP SITE No. C932164

NIAGARA FALLS, NEW YORK

November 2014 0294-013-001

Prepared for:

MERANI HOSPITALITY, INC.

401, 402, AND 430 BUFFALO AVENUE SITE
HEALTH AND SAFETY PLAN FOR RI/IRM ACTIVITIES

ACKNOWLEDGEMENT

Plan Reviewed by (initial):

Corporate Health and Safety Director: Thomas H. Forbes, P.E.

Project Manager: Michael Lesakowski

Designated Site Safety and Health Officer: Bryan C. Hann

Acknowledgement:
I acknowledge that I have reviewed the information contained in this site-specific Health and Safety Plan, and understand the hazards associated with performance of the field activities described herein. I agree to comply with the requirements of this plan.

NAME (PRINT)	SIGNATURE	DATE

TURNKEY

401, 402, AND 430 BUFFALO AVENUE SITE
HEALTH AND SAFETY PLAN FOR RI/IRM ACTIVITIES

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401, 402, AND 430 BUFFALO AVENUE SITE
HEALTH AND SAFETY PLAN FOR RI/IRM ACTIVITIES

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1.0 INTRODUCTION

1.1 General

In accordance with OSHA requirements contained in 29 CFR 1910.120, this Health and Safety Plan (HASP) describes the specific health and safety practices and procedures to be employed by TurnKey Environmental Restoration, LLC and Benchmark Environmental Engineering & Science, PLLC employees (referred to jointly hereafter as "TurnKey-Benchmark") during Remedial Investigation (RI) and Interim Remedial Measures (IRM) activities at the 401, 402, and 430 Buffalo Avenue Site (Site) located in the City of Niagara Falls, Niagara County, New York. This HASP presents procedures for TurnKey-Benchmark employees who will be involved with RI/IRM field activities; it does not cover the activities of other contractors, subcontractors or other individuals on the Site. These firms will be required to develop and enforce their own HASPs as discussed in Section 2.0. TurnKey-Benchmark accepts no responsibility for the health and safety of contractor, subcontractor or other personnel.

This HASP presents information on known Site health and safety hazards using available historical information, and identifies the equipment, materials and procedures that will be used to eliminate or control these hazards. Environmental monitoring will be performed during the course of field activities to provide real-time data for on-going assessment of potential hazards.

1.2 Background

The subject property (hereinafter, the "Project Site" or the "Site") subject to the Brownfield Cleanup Agreement (BCA) is comprised of three (3) adjoining parcels totaling 6.2 acres, located in a highly developed mixed use commercial and residential area of the City of Niagara Falls, Niagara County, New York (see Figures 1 and 2).

The Site is bound by 4th Street to the west, 6th Street and Holly Place to the east, a public alleyway from 4th Street the 6th Street to the north, and the Robert Moses State Parkway with the Niagara River beyond to the south. Buffalo Avenue intersects the property from east to west (see Figure 2). Land use surrounding the Site includes commercial and residential properties to the north, Robert Moses Parkway to the south with the Niagara beyond, residential properties to the east, and vacant and residential properties to the west.

The 401 Buffalo Avenue parcel is currently improved with a vacant municipally-condemned former hotel and conference center, parking areas and vegetated/landscaped areas.

The 402 and 430 Buffalo Avenue parcels are currently vacant, though historically were part of the manufacturing facility owned and operated by National Biscuit Co / Shredded Wheat Company. Manufacturing began on Site in at least 1914, and operations included underground storage tanks (USTs) noted as fuel oil. Baking ovens, likely utilizing the noted fuel oil, were located across the manufacturing facility (including both 402 and 430 Buffalo Avenue parcels) for drying raw materials, heating the various buildings and operations, and baking final products. Additional operations included paper box manufacturing and printing, material handling and shipping equipment, maintenance of manufacturing equipment and vehicles, and use and storage of paint, solvents, thinners, grease and lubricants common among former manufacturing operations. It is also likely that demolition debris from the former factory is located on the vacant Site.

1.3 Known and Suspected Environmental Conditions

Previous investigations completed on-Site identified recognized environmental conditions (RECs) including:

- NYSDEC Spill No. 1312160 was assigned to the Site related to the vandalism/destruction of three transformers and spilling of approximately 120-gallons of potential PCB-containing transformer oil. The spill is currently open.
- Elevated radiological material was identified in the vicinity of the pool area, with readings as high as 40,000 counts per minute (cpm).
- Leaking oil-containing equipment and oil-contaminated floors, walls, and equipment were noted in the Boiler Room, Maintenance Room, and both elevator control rooms.
- Improper storage and handling of hazardous chemicals, including corrosive boiler chemicals, solvents, lubricants, degreasers, paints, thinners, hydraulic oils and maintenance equipment fuels, pesticides and herbicides, pool and water treatment chemicals;
- Illegal dumping and vandalism; and,
- Universal and e-waste throughout the building.

The RI will be performed in support of the BCP to determine the nature and extent of impacts from these known and suspect environmental conditions on this parcel. As part of the RI, an IRM will be completed to immediately address known environmental impacts related to past use of the Site as a manufacturing facility. An IRM will quickly mitigate risks to public health and the environment attributable to petroleum contamination at the Site. Impacted soil will be removed and impacted groundwater (if encountered) will be extracted and treated during the IRM.

1.4 Parameters of Interest

Based on the previous investigations, constituents of potential concern (COPCs) in soil and, potentially groundwater, at the Site include:

- **Inorganic Compounds –** The inorganic COPCs potentially present at elevated concentrations are arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury.

- **Volatile Organic Compounds (VOCs)** – VOCs present at elevated concentration may include petroleum-related VOCs, such as 1,2,3-trichlorobenzene, 1,2,4,5-tetramethylbenzene, 1,2,4-trichlorobenzene, 1,4-diethylbenzene, 4-ethyltoluene, and acetone.

- **Semi-Volatile Organic Compounds (SVOCs) –** SVOCs present at elevated concentrations may include polycyclic aromatic hydrocarbons (PAHs), which are byproducts of incomplete combustion and impurities in petroleum products.

- **Polychlorinated Biphenyls (PCBs)** – PCBs present at elevated concentrations are Aroclors 1248, 1254, and 1260.

1.5 Overview of Demolition Activities

Engineering Survey and Chemical Walk-over

Prior to demolition of the 3-story portion of the existing buildings and interior portions of the 4-story structure, an OSHA required Engineering Survey and Chemical Walk-over will be completed by the demolition contractor. The walkover aims to identify universal wastes, undescribed asbestos containing material (ACM) and any abandoned

chemicals that may be present and will require removal/abatement prior to building demolition. Accessible areas will also be visually inspected for areas of staining and/or potential petroleum contamination.

Asbestos Containing Material (ACM)

A pre-demolition asbestos survey has been completed, and friable and non-friable ACM has been identified on-Site. ACM abatement is planned to be completed by licensed-ACM subcontractor in the 4-story portion of the building. Based on the widespread uncontrolled release of ACM, likely caused by the extensive vandalism, the 3-story portion of the building is planned for controlled demolition. ACM abatement related to the removal of Universal Waste (UW), from the 3-story will be completed. All ACM abatement will be handled by licensed ACM subcontractor, and all ACM demolition material will be handled, recycled, and/or disposed off-site by licensed handlers and disposal/recycling facilities. Disposal documents will be provided to the Department.

Removal of Residual Chemicals, Maintenance Fluids, and Sumps

Prior to demolition activities, sumps, trenches and maintenance areas will be inspected and residual contents removed. Areas will also be inspected for residual chemicals and maintenance fluids, including paints, cleaners, solvents, hydraulic oils, and grease will be collected and consolidated into "lab-pack" or other approved disposal containers. Material will be characterized for off-site disposal and/or recycling.

Universal Waste

Universal Wastes (UWs), including bulbs, mercury-containing equipment (thermometers), and batteries will be identified during the pre-demolition survey, and removed during pre-demolition activities. Universal waste will be collected, handled and recycled/disposed in accordance with Title 40 Part 273 regulations. Recycling/disposal documents will be provided to the Department.

Transformer Room (Spill 1312160)

Prior to above grade demolition activities, polychlorinated biphenyl (PCB) wipe samples will be collected of the residual oil and/or oil-stained concrete floor within the transformer room. Based on the laboratory analytical results, any PCB-contaminated material will be segregated and disposed in accordance with PCB regulations. Transformer

room contents, including former transformer housings will be removed and disposed/recycled.

Post Demolition Radiological Screening Activities:

Based on the findings of the pre-demolition Supplemental Investigation (September 2014), areas of potentially elevated radiological material may be present beneath the pool area and 3-story portion of the building.

After demolition of the above grade structure and removal of the slab, a licensed radiological subcontractor will complete a gamma walkover survey of accessible areas beneath the slab and exposed foundation to screen and evaluate potential elevated radiological material (e.g., slag) and delineate potential areas that will require additional assessment and/or remediation.

The radiological subcontractor will also collect radiological waste characterization samples in the pool area and any additional area(s) identified above the approved NYSDEC background levels that are planned to be excavated. All radiological material that is removed from the excavation will be field-screened and handled in accordance with the approved NYSDEC Radiological Material Work Plan, prepared by Greater Radiological Dimensions, Inc. (GRD), a licensed NYSDOH Radioactive Material contractor. Radiological material health and safety and handling protocols are more fully described in the Radiological Material Work Plan, included in Appendix C.

1.6 Overview of RI/IRM Activities

TurnKey-Benchmark personnel will be on-site to observe and perform RI and IRM activities. The field activities to be completed as part of the RI and IRM are described below.

Remedial Investigation Activities

1. **Surface Soil Sampling:** TurnKey-Benchmark will advance monitoring well borings and collect one surface soil sample from each boring from the upper 0-6 inches for the purpose of determining the nature and extent of potential COPC impacts in the surface soil/fill.

2. **Subsurface Soil Sampling:** TurnKey-Benchmark will advance soil borings, and/or test pits; and collect one subsurface soil sample from each location for the purpose of

determining the nature and extent of potential COPC impacts in the subsurface soil/fill.

3. **Monitoring Well Installation/Development and Sampling:** TurnKey-Benchmark will observe the installation of on-Site groundwater monitoring wells, develop the wells, and collect groundwater samples for the purpose of determining the nature and extent of potential COPC impacts.

4. **Subslab Vapor Sampling:** TurnKey-Benchmark will advance sample points into the sub-slab of the on-Site Building and collect subslab vapor, ambient indoor air, and ambient outdoor air samples for the purpose of determining the nature and extent of potential COPC impacts.

Potential IRM Activities

1. **Soil Excavation:** The remediation contractor would perform soil excavation activities.

2. **Verification Sampling:** The remediation contractor, in association with TurnKey-Benchmark, will collect soil samples from the sidewalls and bottom of the excavations using a backhoe to verify that cleanup objectives have been met.

3. **Backfilling:** The remediation contractor would coordinate and perform backfilling activities.

4. **Groundwater and Surface Management:** The remediation contractor would direct groundwater/surface water collection during soil excavation activities and coordinate disposal of the collected water.

2.0 ORGANIZATIONAL STRUCTURE

This section of the HASP describes the lines of authority, responsibility and communication as they pertain to health and safety functions at the Site. The purpose of this chapter is to identify the personnel who impact the development and implementation of the HASP and to describe their roles and responsibilities. This chapter also identifies other contractors and subcontractors involved in work operations and establish the lines of communications among them for health and safety matters. The organizational structure described in this chapter is consistent with the requirements of 29 CFR 1910.120(b)(2). This section will be reviewed by the Project Manager and updated as necessary to reflect the current organizational structure at this Site.

2.1 Roles and Responsibilities

All Turnkey-Benchmark personnel on the Site must comply with the minimum requirements of this HASP. The specific responsibilities and authority of management, safety and health, and other personnel on this Site are detailed in the following paragraphs.

2.1.1 Corporate Health and Safety Director

The TurnKey-Benchmark Corporate Health and Safety Director is ***Mr. Thomas H. Forbes, P.E.*** The Corporate Health and Safety Director responsible for developing and implementing the Health and Safety program and policies for Benchmark Environmental Engineering & Science, PLLC and TurnKey Environmental Restoration, LLC, and consulting with corporate management to ensure adequate resources are available to properly implement these programs and policies. The Corporate Health and Safety Director coordinates TurnKey-Benchmark's Health and Safety training and medical monitoring programs and assists project management and field staff in developing site-specific health and safety plans.

2.1.2 Project Manager

The Project Manager for this Site is ***Mr. Michael Lesakowski.*** The Project Manager has the responsibility and authority to direct all TurnKey-Benchmark work operations at the Site. The Project Manager coordinates safety and health functions with the Site Safety and Health Officer, and bears ultimate responsibility for proper implementation of this HASP.

He may delegate authority to expedite and facilitate any application of the program, including modifications to the overall project approach as necessary to circumvent unsafe work conditions. Specific duties of the Project Manager include:

- Preparing and coordinating the Site work plan.
- Providing TurnKey-Benchmark workers with work assignments and overseeing their performance.
- Coordinating health and safety efforts with the Site Safety and Health Officer (SSHO).
- Reviewing the emergency response coordination plan to assure its effectiveness.
- Serving as the primary liaison with Site contractors and the property owner.

2.1.3 Site Safety and Health Officer

The Site Safety and Health Officer (SSHO) for this Site is ***Mr. Bryan C. Hann***. The qualified alternate SSHO is ***Mr. Nathan Munley.*** The SSHO reports to the Project Manager. The SSHO is on-site or readily accessible to the Site during all work operations and has the authority to halt Site work if unsafe conditions are detected. The specific responsibilities of the SSHO are:

- Managing the safety and health functions for TurnKey-Benchmark personnel on the Site.
- Serving as the point of contact for safety and health matters.
- Ensuring that TurnKey-Benchmark field personnel working on the Site have received proper training (per 29 CFR Part 1910.120(e)), that they have obtained medical clearance to wear respiratory protection (per 29 CFR Part 1910.134), and that they are properly trained in the selection, use and maintenance of personal protective equipment, including qualitative respirator fit testing.
- Performing or overseeing Site monitoring as required by the HASP.
- Assisting in the preparation and review of the HASP.

- Maintaining site-specific safety and health records as described in this HASP.
- Coordinating with the Project Manager, Site Workers, and Contractor's SSHO as necessary for safety and health efforts.

2.1.4 Site Workers

Site workers are responsible for: complying with this HASP or a more stringent HASP, if appropriate (i.e., Contractor and Subcontractor's HASP); using proper PPE; reporting unsafe acts and conditions to the SSHO; and following the safety and health instructions of the Project Manager and SSHO.

2.1.5 Other Site Personnel

Other Site personnel who will have health and safety responsibilities will include the Drilling Contractor, who will be responsible for developing, implementing and enforcing a Health and Safety Plan equally stringent or more stringent than TurnKey-Benchmark's HASP. TurnKey-Benchmark assumes no responsibility for the health and safety of anyone outside its direct employ. Each Contractor's HASP shall cover all non-TurnKey/Benchmark Site personnel. Each Contractor shall assign a SSHO who will coordinate with TurnKey-Benchmark's SSHO as necessary to ensure effective lines of communication and consistency between contingency plans.

In addition to TurnKey-Benchmark and Contractor personnel, other individuals who may have responsibilities in the work zone include subcontractors and governmental agencies performing Site inspection work (i.e., the New York State Department of Environmental Conservation). The Contractor shall be responsible for ensuring that these individuals have received OSHA-required training (29 CFR 1910.120(e)), including initial, refresher and site-specific training, and shall be responsible for the safety and health of these individuals while they are on-site.

3.0 HAZARD EVALUATION

Due to the presence of certain contaminants at the Site, the possibility exists that workers will be exposed to hazardous substances during field activities. The principal points of exposure would be through direct contact with and incidental ingestion of soil, and through the inhalation of contaminated particles or vapors. Other points of exposure may include direct contact with groundwater. In addition, the use of drilling and/or medium to large-sized construction equipment (e.g., excavator) will also present conditions for potential physical injury to workers. Further, since work will be performed outdoors, the potential exists for heat/cold stress to impact workers, especially those wearing protective equipment and clothing. Adherence to the medical evaluations, worker training relative to chemical hazards, safe work practices, proper personal protection, environmental monitoring, establishment work zones and Site control, appropriate decontamination procedures and contingency planning outlined herein will reduce the potential for chemical exposures and physical injuries.

3.1 Chemical Hazards

As discussed in Section 1.3, historic activities have potentially resulted in impacts to Site soil and groundwater. Visual and olfactory observations, as well as elevated PID readings, indicate a potential VOC impact to Site soil. In addition to VOCs, soil and groundwater may be impacted by SVOCs (PAHs) due to historic use. Table 1 lists exposure limits for airborne concentrations of the COPCs identified in Section 1.4 of this HASP. Brief descriptions of the toxicology of the prevalent COPCs and related health and safety guidance and criteria are provided below.

- **1,2,3-Trichlorobenzene (CAS# 87-61-6)** is a white solid with a sharp chlorobenzene odor. Inhalation may cause irritation of respiratory tract. Irritating to the eyes and may redden skin on contact. Ingestion may cayuse liver damage.

- **1,2,4,5-Tetramethylbenzene (CAS# 95-93-2)** is known as an alkylbenzene and is one of the isomers of tetramethylbenzene. It is relatively toxic for an aromatic hydrocarbon. Ingestion and inhalation should be avoided. May cause redness and irritation if inhaled.

- **1,2,4-Trichlorobenzene (CAS# 120-82-1)** is a colorless liquid. It is used as a solvent and dielectric fluid and as a degreaser. Inhalation can lead to irritation of

the lungs and dyspnea, which is shortness of breath.

- **Acetone (CAS# 67-64-1)** A colorless liquid used as a solvent and an antiseptic. It is one of the ketone bodies produced during ketoacidosis. Most commonly used as a laboratory solvent.

- **4-Ethyltoluene (CAS# 622-96-8)** may cause respiratory tract irritation. May cause central nervous system depression. May cause eye and skin irritation. May cause lung damage. Target Organs: Central nervous system, lungs.

- **Polycyclic Aromatic Hydrocarbons (PAHs)** are formed as a result of the pyrolysis and incomplete combustion of organic matter such as fossil fuel. PAH aerosols formed during the combustion process disperse throughout the atmosphere, resulting in the deposition of PAH condensate in soil, water and on vegetation. In addition, several products formed from petroleum processing operations (e.g., roofing materials and asphalt) also contain elevated levels of PAHs. Hence, these compounds are widely dispersed in the environment. PAHs are characterized by a molecular structure containing three or more fused, unsaturated carbon rings. Seven of the PAHs are classified by USEPA as probable human carcinogens (USEPA Class B2). These are: benzo(a)pyrene; benzo(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; chrysene; dibenzo(a,h)anthracene; and indeno(1,2,3-cd)pyrene. The primary route of exposure to PAHs is through incidental ingestion and inhalation of contaminated particulates. PAHs are characterized by an organic odor, and exist as oily liquids in pure form. Acute exposure symptoms may include acne-type blemishes in areas of the skin exposed to sunlight.

- **Arsenic (CAS #7440-38-2)** is a naturally occurring element and is usually found combined with one or more elements, such as oxygen or sulfur. Inhalation is a more important exposure route than ingestion. First phase exposure symptoms include nausea, vomiting, diarrhea and pain in the stomach. Prolonged contact is corrosive to the skin and mucus membranes. Arsenic is considered a Group A human carcinogen by the USEPA. Exposure via inhalation is associated with an increased risk of lung cancer. Exposure via the oral route is associated with an increased risk of skin cancer.

- **Barium (CAS #7440-39-3)** is a silver white metal, produced by the reduction of barium oxide. Local effects and symptoms of exposure to barium compounds, such as the hydroxide or carbonate, may include irritation of the eyes, throat, nose and skin. Systemic effects from ingestion include increased muscle contractility, reduction of heart rate/potential arrest, intestinal peristalsis, vascular constriction,

and bladder contraction.

- **Cadmium** is a natural element and is usually combined with one or more elements, such as oxygen, chloride, or sulfur. Breathing high levels of cadmium severely damages the lungs and can cause death. Ingestion of high levels of cadmium severely irritates the stomach, leading to vomiting and diarrhea. Long term exposure to lower levels of cadmium leads to a buildup of this substance in the kidneys and possible kidney disease. Other potential long term effects are lung damage and fragile bones. Cadmium is suspected to be a human carcinogen.

- **Chromium (CAS #7440-47-3)** is used in the production of stainless steel, chrome plated metals, and batteries. Two forms of chromium, hexavalent (CR+6) and trivalent (CR+3) are toxic. Hexavalent chromium is an irritant and corrosive to the skin and mucus membranes. Chromium is a potential occupational carcinogen. Acute exposures to dust may cause coughing, wheezing, headaches, pain and fever.

- **Lead (CAS #7439-92-1)** can affect almost every organ and system in our bodies. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the immune system. The effects are the same whether it is breathed or swallowed. Lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect memory. Lead may cause anemia.

- **Selenium (CAS# 7782-49-2)** is not a very common naturally occuring mineral. Selenium is most commonly produced from selenide in many sulfide ores, such as those of copper, nickel, or lead. Selenium has historically been used in the electronics industry due to its physical and chemical properties. Selenium is toxic in high doses.

- **Silver (CAS# 7740-22-4)** has a number of uses including jewelry, coins, solar panels, water infiltration, and X-ray and photographic technology. Diluted silver nitrate solutions are used as disinfectants and microbiocides.

- **Mercury (CAS #7439-97-6)** is used in industrial applications for the production of caustic and chlorine, and in electrical control equipment and apparatus. Overexposure to mercury may cause coughing, chest pains, bronchitis, pneumonia, indecision, headaches, fatigue, and salivation. Mercury is a skin and eye irritant.

- **Polychlorinated Biphenyls (PCBS)** are synthetic organic chemical compounds which are composed of chlorine attached to biphenyl (molecule composed of two

benzene rings). There are ~209 configurations of one to ten chlorine atoms attached to a biphenyl that comprise the PCB molecules. PCBs are historically known for their use as fluid used due to the commercial utility which was based largely on their chemical stability, including low flammability, and desirable physical properties, including electrical insulating properties. PCBS have been used in plasticisers, fire retardant fabric treatments, adhesives, and railroad ties. PCBs are known to cause health effects from exposure including; toxic and mutagenic effects by interfering with hormones in the body as well as cause certain types of cancers.

With respect to the anticipated RI/IRM activities discussed in Section 1.5, possible routes of exposure to the above-mentioned contaminants are presented in Table 2. The use of proper respiratory equipment, as outlined in Section 7.0 of this HASP, will minimize the potential for exposure to airborne contamination. Exposure to contaminants through dermal and other routes will also be minimized through the use of protective clothing (Section 7.0), safe work practices (Section 6.0), and proper decontamination procedures (Section 12.0).

3.2 Physical Hazards

RI/IRM field activities at the 401, 402, and 430 Buffalo Avenue Street Site may present the following physical hazards:

- The potential for physical injury during heavy construction equipment use, such as backhoes and excavators.
- The potential for heat/cold stress to employees during the summer/winter months (see Section 10.0).
- The potential for slip and fall injuries due to rough, uneven terrain and/or open excavations.

These hazards represent only some of the possible means of injury that may be present during RI/IRM operations and sampling activities at the Site. Since it is impossible to list all potential sources of injury, it shall be the responsibility of each individual to exercise proper care and caution during all phases of the work.

4.0 TRAINING

4.1 Site Workers

All personnel performing RI/IRM activities at the Site (such as, but not limited to, equipment operators, general laborers, and drillers) and who may be exposed to hazardous substances, health hazards, or safety hazards and their supervisors/managers responsible for the Site shall receive training in accordance with 29 CFR 1910.120(e) before they are permitted to engage in operations in the exclusion zone or contaminant reduction zone. This training includes an initial 40-hour Hazardous Waste Site Worker Protection Course, an 8-hour Annual Refresher Course subsequent to the initial 40-hour training, and 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. Additional site-specific training shall also be provided by the SSHO prior to the start of field activities. A description of topics to be covered by this training is provided below.

4.1.1 Initial and Refresher Training

Initial and refresher training is conducted by a qualified instructor as specified under OSHA 29 CFR 1910.120(e)(5), and is specifically designed to meet the requirements of OSHA 29 CFR 1910.120(e)(3) and 1910.120(e)(8). The training covers, as a minimum, the following topics:

- OSHA HAZWOPER regulations.
- Site safety and hazard recognition, including chemical and physical hazards.
- Medical monitoring requirements.
- Air monitoring, permissible exposure limits, and respiratory protection level classifications.
- Appropriate use of personal protective equipment (PPE), including chemical compatibility and respiratory equipment selection and use.
- Work practices to minimize risk.
- Work zones and Site control.

- Safe use of engineering controls and equipment.
- Decontamination procedures.
- Emergency response and escape.
- Confined space entry procedures.
- Heat and cold stress monitoring.
- Elements of a Health and Safety Plan.
- Spill containment.

Initial training also incorporates workshops for PPE and respiratory equipment use (Levels A, B and C), and respirator fit testing. Records and certification received from the course instructor documenting each employee's successful completion of the training identified above are maintained on file at TurnKey-Benchmark's Buffalo, NY office. Contractors and Subcontractors are required to provide similar documentation of training for all their personnel who will be involved in on-site work activities.

Any employee who has not been certified as having received health and safety training in conformance with 29 CFR 1910.120(e) is prohibited from working in the exclusion and contamination reduction zones, or to engage in any on-site work activities that may involve exposure to hazardous substances or wastes.

4.1.2 Site Training

Site workers are given a copy of the HASP and provided a site-specific briefing prior to the commencement of work to ensure that employees are familiar with the HASP and the information and requirements it contains. The Site briefing shall be provided by the SSHO prior to initiating field activities and shall include:

- Names of personnel and alternates responsible for Site safety and health.
- Safety, health and other hazards present on the Site.
- The site lay-out including work zones and places of refuge.

- The emergency communications system and emergency evacuation procedures.
- Use of PPE.
- Work practices by which the employee can minimize risks from hazards.
- Safe use of engineering controls and equipment on the site.
- Medical surveillance, including recognition of symptoms and signs of over-exposure as described in Chapter 5 of this HASP.
- Decontamination procedures as detailed in Chapter 12 of this HASP.
- The emergency response plan as detailed in Chapter 15 of this HASP.
- Confined space entry procedures, if required, as detailed in Chapter 13 of this HASP.
- The spill containment program as detailed in Chapter 9 of this HASP.
- Site control as detailed in Chapter 11 of this HASP.

Supplemental health and safety briefings will also be conducted by the SSHO on an as-needed basis during the course of the work. Supplemental briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during ongoing Site characterization and analysis. Conditions for which the SSHO may schedule additional briefings include, but are not limited to: a change in Site conditions (e.g., based on monitoring results); changes in the work schedule/plan; newly discovered hazards; and safety incidents occurring during Site work.

4.2 Supervisor Training

On-site safety and health personnel who are directly responsible for or who supervise the safety and health of workers engaged in hazardous waste operations (i.e., SSHO) shall receive, in addition to the appropriate level of worker training described in Section 4.1, above, 8 additional hours of specialized supervisory training, in compliance with 29 CFR 1910.120(e)(4).

4.3 Emergency Response Training

Emergency response training is addressed in Appendix A of this HASP, Emergency Response Plan.

4.4 Site Visitors

Each Contractor's SSHO will provide a site-specific briefing to all Site visitors and other non-TurnKey/Benchmark personnel who enter the Site beyond the Site entry point. The site-specific briefing will provide information about Site hazards, the Site layout including work zones and places of refuge, the emergency communications system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

Site visitors will not be permitted to enter the exclusion zone or contaminant reduction zones unless they have received the level of training required for Site workers as described in Section 4.1.

5.0 MEDICAL MONITORING

Medical monitoring examinations are provided to TurnKey-Benchmark employees as stipulated under 29 CFR Part 1910.120(f). These exams include initial employment, annual and employment termination physicals for all TurnKey-Benchmark employees involved in hazardous waste site field operations. Post-exposure examinations are also provided for employees who may have been injured, received a health impairment, or developed signs or symptoms of over-exposure to hazardous substances or were accidentally exposed to substances at concentrations above the permissible exposure limits without necessary personal protective equipment. Such exams are performed as soon as possible following development of symptoms or the known exposure event.

Medical evaluations are performed by Health Works, an occupational health care provider under contract with TurnKey-Benchmark. Health Works is located in Seneca Square Plaza, 1900 Ridge Road, West Seneca, New York 14224. The facility can be reached at (716) 823-5050 to schedule routine appointments or post-exposure examinations.

Medical evaluations are conducted according to the TurnKey-Benchmark Medical Monitoring Program and include an evaluation of the workers' ability to use respiratory protective equipment. The examinations include:

- Occupational/medical history review.
- Physical exam, including vital sign measurement.
- Spirometry testing.
- Eyesight testing.
- Audio testing (minimum baseline and exit, annual for employees routinely exposed to greater than 85db).
- EKG (for employees >40 yrs age or as medical conditions dictate).
- Chest X-ray (baseline and exit, and every 5 years).
- Blood biochemistry (including blood count, white cell differential count, serum multiplastic screening).
- Medical certification of physical requirements (i.e., sight, musculoskeletal,

cardiovascular) for safe job performance and to wear respiratory protection equipment.

The purpose of the medical evaluation is to determine an employee's fitness for duty on hazardous waste sites; and to establish baseline medical data.

In conformance with OSHA regulations, TurnKey-Benchmark will maintain and preserve medical records for a period of 30 years following termination of employment. Employees are provided a copy of the physician's post-exam report, and have access to their medical records and analyses.

6.0 SAFE WORK PRACTICES

All TurnKey-Benchmark employees shall conform to the following safe work practices during all on-site work activities conducted within the exclusion and contamination reduction zones:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth contact is strictly prohibited.
- The hands and face must be thoroughly washed upon leaving the work area and prior to engaging in any activity indicated above.
- Respiratory protective equipment and clothing must be worn by all personnel entering the Site as required by the HASP or as modified by the Site safety officer. Excessive facial hair (i.e., beards, long mustaches or sideburns) that interferes with the satisfactory respirator-to-face seal is prohibited.
- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for transfer to personnel, cross contamination and need for decontamination.
- Medicine and alcohol can synergize the effects of exposure to toxic chemicals. Due to possible contraindications, use of prescribed drugs should be reviewed with the TurnKey-Benchmark occupational physician. Alcoholic beverage and illegal drug intake are strictly forbidden during the workday.
- All personnel shall be familiar with standard operating safety procedures and additional instructions contained in this Health and Safety Plan.
- On-site personnel shall use the "buddy" system. No one may work alone (i.e., out of earshot or visual contact with other workers) in the exclusion zone.
- Personnel and equipment in the contaminated area shall be minimized, consistent with effective Site operations.
- All employees have the obligation to immediately report and if possible, correct unsafe work conditions.
- Use of contact lenses on-site will not be permitted. Spectacle kits for insertion into full-face respirators will be provided for TurnKey-Benchmark employees, as requested and required.

The recommended specific safety practices for working around the contractor's equipment (e.g., backhoes, bulldozers, excavators, drill rigs etc.) are as follows:

- Although the Contractor and subcontractors are responsible for their equipment and safe operation of the Site, TurnKey-Benchmark personnel are also responsible for their own safety.

- Subsurface work will not be initiated without first clearing underground utility services.

- Heavy equipment should not be operated within 20 feet of overhead wires. This distance may be increased if windy conditions are anticipated or if lines carry high voltage. The Site should also be sufficiently clear to ensure the project staff can move around the heavy machinery safely.

- Care should be taken to avoid overhead wires when moving heavy-equipment from location to location.

- Hard hats, safety boots and safety glasses should be worn at all times in the vicinity of heavy equipment. Hearing protection is also recommended.

- The work Site should be kept neat. This will prevent personnel from tripping and will allow for fast emergency exit from the Site.

- Proper lighting must be provided when working at night.

- Construction activities should be discontinued during an electrical storm or severe weather conditions.

- The presence of combustible gases should be checked before igniting any open flame.

- Personnel shall stand upwind of any construction operation when not immediately involved in sampling/logging/observing activities.

- Personnel will not approach the edge of an unsecured trench/excavation closer than 2 feet.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 Equipment Selection

Personal protective equipment (PPE) will be donned when work activities may result in exposure to physical or chemical hazards beyond acceptable limits, and when such exposure can be mitigated through appropriate PPE. The selection of PPE will be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the Site, the task-specific conditions and duration, and the hazards and potential hazards identified at the Site.

Equipment designed to protect the body against contact with known or suspect chemical hazards are grouped into four categories according to the degree of protection afforded. These categories designated A through D consistent with United States Environmental Protection Agency (USEPA) Level of Protection designation, are:

- **Level A:** Should be selected when the highest level of respiratory, skin and eye protection is needed.

- **Level B:** Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. Level B protection is the minimum level recommended on initial Site entries until the hazards have been further defined by on-site studies. Level B (or Level A) is also necessary for oxygen-deficient atmospheres.

- **Level C:** Should be selected when the types of airborne substances are known, the concentrations have been measured and the criteria for using air-purifying respirators are met. In atmospheres where no airborne contaminants are present, Level C provides dermal protection only.

- **Level D:** Should not be worn on any Site with elevated respiratory or skin hazards. This is generally a work uniform providing minimal protection.

OSHA requires the use of certain PPE under conditions where an immediate danger to life and health (IDLH) may be present. Specifically, OSHA 29 CFR 1910.120(g)(3)(iii) requires use of a positive pressure self-contained breathing apparatus, or positive pressure air-line respirator equipped with an escape air supply when chemical exposure levels present a substantial possibility of immediate serious injury, illness or death, or impair the ability to

escape. Similarly, OSHA 29 CFR 1910.120(g)(3)(iv) requires donning totally-encapsulating chemical protective suits (with a protection level equivalent to Level A protection) in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate serious illness, injury or death, or impair the ability to escape.

In situations where the types of chemicals, concentrations, and possibilities of contact are unknown, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be further characterized. The individual components of clothing and equipment must be assembled into a full protective ensemble to protect the worker from site-specific hazards, while at the same time minimizing hazards and drawbacks of the personal protective gear itself. Ensemble components are detailed below for levels A/B, C, and D protection.

7.2 Protection Ensembles

7.2.1 Level A/B Protection Ensemble

Level A/B ensembles include similar respiratory protection, however Level A provides a higher degree of dermal protection than Level B. Use of Level A over Level B is determined by: comparing the concentrations of identified substances in the air with skin toxicity data, and assessing the effect of the substance (by its measured air concentrations or splash potential) on the small area of the head and neck unprotected by Level B clothing.

The recommended PPE for level A/B is:

- Pressure-demand, full-face piece self-contained breathing apparatus (MSHA/-NIOSH approved) or pressure-demand supplied-air respirator with escape self-contained breathing apparatus (SCBA).
- Chemical-resistant clothing. For Level A, clothing consists of totally-encapsulating chemical resistant suit. Level B incorporates hooded one-or two-piece chemical splash suit.
- Inner and outer chemical resistant gloves.
- Chemical-resistant safety boots/shoes.
- Hardhat.

7.2.2 Level C Protection Ensemble

Level C protection is distinguished from Level B by the equipment used to protect the respiratory system, assuming the same type of chemical-resistant clothing is used. The main selection criterion for Level C is that conditions permit wearing an air-purifying device. The device (when required) must be an air-purifying respirator (MSHA/NIOSH approved) equipped with filter cartridges. Cartridges must be able to remove the substances encountered. Respiratory protection will be used only with proper fitting, training and the approval of a qualified individual. In addition, an air-purifying respirator can be used only if: oxygen content of the atmosphere is at least 19.5% in volume; substances are identified and concentrations measured; substances have adequate warning properties; the individual passes a qualitative fit-test for the mask; and an appropriate cartridge/canister is used, and its service limit concentration is not exceeded.

Recommended PPE for Level C conditions includes:

- Full-face piece, air-purifying respirator equipped with MSHA and NIOSH approved organic vapor/acid gas/dust/mist combination cartridges or as designated by the SSHO.
- Chemical-resistant clothing (hooded, one or two-piece chemical splash suit or disposable chemical-resistant one-piece suit).
- Inner and outer chemical-resistant gloves.
- Chemical-resistant safety boots/shoes.
- Hardhat.

An air-monitoring program is part of all response operations when atmospheric contamination is known or suspected. It is particularly important that the air be monitored thoroughly when personnel are wearing air-purifying respirators. Continual surveillance using direct-reading instruments is needed to detect any changes in air quality necessitating a higher level of respiratory protection.

7.2.3 Level D Protection Ensemble

As indicated above, Level D protection is primarily a work uniform. It can be worn in areas where only boots can be contaminated, where there are no inhalable toxic substances

and where the atmospheric contains at least 19.5% oxygen.

Recommended PPE for Level D includes:

- Coveralls.
- Safety boots/shoes.
- Safety glasses or chemical splash goggles.
- Hardhat.
- Optional gloves; escape mask; face shield.

7.2.4 Recommended Level of Protection for Site Tasks

Based upon current information regarding both the contaminants suspected to be present at the Site and the various tasks that are included in the remedial activities, the minimum required levels of protection for these tasks shall be as identified in Table 3.

8.0 EXPOSURE MONITORING

8.1 General

Based on the results of historic sample analysis and the nature of the proposed work activities at the Site, the possibility exist that organic vapors and/or particulates may be released to the air during intrusive construction activities. Ambient breathing zone concentrations may at times, exceed the permissible exposure limits (PELs) established by OSHA for the individual compounds (see Table 1), in which case respiratory protection will be required. Respiratory and dermal protection may be modified (upgraded or downgraded) by the SSHO based upon real-time field monitoring data.

8.1.1 On-Site Work Zone Monitoring

TurnKey-Benchmark personnel will conduct routine, real-time air monitoring during all intrusive construction phases such as excavation, backfilling, drilling, etc. The work area will be monitored at regular intervals using a photo-ionization detector (PID), combustible gas meter and a particulate meter. Observed values will be recorded and maintained as part of the permanent field record.

Additional air monitoring measurements may be made by TurnKey-Benchmark personnel to verify field conditions during subcontractor oversight activities. Monitoring instruments will be protected from surface contamination during use. Additional monitoring instruments may be added if the situations or conditions change. Monitoring instruments will be calibrated in accordance with manufacturer's instructions before use.

8.1.2 Off-Site Community Air Monitoring

In addition to on-site monitoring within the work zone(s), monitoring at the down-wind portion of the Site perimeter will be conducted. This will provide a real-time method for determination of vapor and/or particulate releases to the surrounding community as a result of ground intrusive investigation work.

Ground intrusive activities are defined in the Generic Community Air Monitoring Plan and attached as Appendix C. Ground intrusive activities include soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells. Non-intrusive activities include the collection of soil and sediment samples or the

collection of groundwater samples from existing wells. Continuous monitoring is required for ground intrusive activities and periodic monitoring is required for non-intrusive activities. Periodic monitoring consists of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring while bailing a well, and taking a reading prior to leaving a sampling location. This may be upgraded to continuous if the sampling location is in close proximity to individuals not involved in the Site activity (i.e., on a curb of a busy street). The action levels below will be used during periodic monitoring.

8.2 Monitoring Action Levels

8.2.1 On-Site Work Zone Action Levels

The PID, or other appropriate instrument(s), will be used by TurnKey-Benchmark personnel to monitor organic vapor concentrations as specified in this HASP. Combustible gas will be monitored with the "combustible gas" option on the combustible gas meter or other appropriate instrument(s). In addition, fugitive dust/particulate concentrations will be monitored during major soil intrusion (viz., well/boring installation) using a real-time particulate monitor as specified in this plan. In the absence of such monitoring, appropriate respiratory protection for particulates shall be donned. Sustained readings obtained in the breathing zone may be interpreted (with regard to other Site conditions) as follows for TurnKey-Benchmark personnel:

- Total atmospheric concentrations of unidentified vapors or gases ranging from 0 to 1 ppm above background on the PID) - Continue operations under Level D (see Appendix A).

- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings from >1 ppm to 5 ppm above background on the PID (vapors not suspected of containing high levels of chemicals toxic to the skin) - Continue operations under Level C (see Appendix A).

- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings of >5 ppm to 50 ppm above background on the PID - Continue operations under Level B (see Attachment 1), re-evaluate and alter (if possible) construction methods to achieve lower vapor concentrations.

- Total atmospheric concentrations of unidentified vapors or gases above 50 ppm on the PID - Discontinue operations and exit the work zone immediately.

The particulate monitor will be used to monitor respirable dust concentrations during all intrusive activities and during handling of Site soil/fill. Action levels based on the instrument readings shall be as follows:

- Less than 50 mg/m^3 - Continue field operations.
- 50-150 mg/m^3 - Don dust/particulate mask or equivalent
- Greater than 150 mg/m^3 - Don dust/particulate mask or equivalent. Initiate engineering controls to reduce respirable dust concentration (viz., wetting of excavated soils or tools at discretion of Site Health and Safety Officer).

Readings from the field equipment will be recorded and documented on the appropriate Project Field Forms. All instruments will be calibrated before use on a daily basis and the procedure will be documented on the appropriate Project Field Forms.

8.2.2 Community Air Monitoring Action Levels

In addition to the action levels prescribed in Section 8.2.1 for TurnKey-Benchmark personnel on-site, the following criteria shall also be adhered to for the protection of downwind receptors consistent with NYSDOH requirements (Appendix C):

- **ORGANIC VAPOR PERIMETER MONITORING:**
  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 5 ppm above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the sustained organic vapor decreases below 5 ppm over background, work activities can resume with continued monitoring.
  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone are greater than 5 ppm over background but less than 25 ppm for the 15-minute average, activities can resume provided that: the organic vapor level 200 feet downwind of the working site or half the distance to the nearest off-site residential or commercial structure, whichever

is less, but in no case less than 20 feet, is below 5 ppm over background; and more frequent intervals of monitoring, as directed by the Site Health and Safety Officer, are conducted.

- If the sustained organic vapor level is above 25 ppm at the perimeter of the exclusion zone for the 15-minute average, the Site Health and Safety Officer must be notified and work activities shut down. The Site Health and Safety Officer will determine when re-entry of the exclusion zone is possible and will implement downwind air monitoring to ensure vapor emissions do not impact the nearest off-site residential or commercial structure at levels exceeding those specified in the ***Organic Vapor Contingency Monitoring Plan*** below. All readings will be recorded and will be available for New York State Department of Environmental Conservation (DEC) and Department of Health (DOH) personnel to review.

o **ORGANIC VAPOR CONTINGENCY MONITORING PLAN:**

- If the sustained organic vapor level is greater than 5 ppm over background 200 feet downwind from the work area or half the distance to the nearest off-site residential or commercial property, whichever is less, all work activities must be halted.

- If, following the cessation of the work activities or as the result of an emergency, sustained organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest off-site residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest off-site residential or commercial structure (20-foot zone).

- If efforts to abate the emission source are unsuccessful and if sustained organic vapor levels approach or exceed 5 ppm above background within the 20-foot zone for more than 30 minutes, or are sustained at levels greater than 10 ppm above background for longer than one minute, then the ***Major Vapor Emission Response Plan*** (see below) will automatically be placed into effect.

o **MAJOR VAPOR EMISSION RESPONSE PLAN:**

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in this Health and Safety Plan and the Emergency Response Plan (Appendix A) will be advised.

2. The local police authorities will immediately be contacted by the Site Health and Safety Officer and advised of the situation.

3. Frequent air monitoring will be conducted at 30-minute intervals within the 20-foot zone. If two sustained successive readings below action levels are measured, air monitoring may be halted or modified by the Site Health and Safety Officer.

The following personnel are to be notified in the listed sequence in the event that a Major Vapor Emission Plan is activated:

Responsible Person	Contact	Phone Number
SSHO	Police	911
SSHO	State Emergency Response Hotline	(800) 457-7362

Additional emergency numbers are listed in the Emergency Response Plan included as Appendix A.

- **EXPLOSIVE VAPORS:**
  - Sustained atmospheric concentrations of greater than 10% LEL in the work area - Initiate combustible gas monitoring at the downwind portion of the Site perimeter.
  - Sustained atmospheric concentrations of greater than 10% LEL at the downwind Site perimeter – Halt work and contact local Fire Department.

- **AIRBORNE PARTICULATE COMMUNITY AIR MONITORING**

Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the upwind and downwind perimeter of the exclusion zone. The monitoring will be performed using real-time monitoring equipment capable of measuring PM-10 and integrating over a period of 15-minutes for comparison to the airborne particulate action levels. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. All readings will be recorded and will be available for NYSDEC and NYSDOH review. Readings will be interpreted as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than the background (upwind perimeter) reading for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression provided that the downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and that visible dust is not migrating from the work area.

- If, after implementation of dust suppression techniques downwind PM-10 levels are greater than 150 ug/m^3 above the upwind level, work activities must be stopped and dust suppression controls re-evaluated. Work can resume provided that supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

Pertinent emergency response information including the telephone number of the Fire Department is included in the Emergency Response Plan (Appendix A).

9.0 SPILL RELEASE/RESPONSE

This chapter of the HASP describes the potential for and procedures related to spills or releases of known or suspected petroleum and/or hazardous substances on the Site. The purpose of this Section of the HASP is to plan appropriate response, control, counter-measures and reporting, consistent with OSHA requirements in 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii). The spill containment program addresses the following elements:

- Potential hazardous material spills and available controls.
- Initial notification and evaluation.
- Spill response.
- Post-spill evaluation.

9.1 Potential Spills and Available Controls

An evaluation was conducted to determine the potential for hazardous material and oil/petroleum spills at this Site. For the purpose of this evaluation, hazardous materials posing a significant spill potential are considered to be:

- CERCLA Hazardous Substances as identified in 40 CFR Part 302, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).

- Extremely Hazardous Substances as identified in 40 CFR Part 355, Appendix A, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).

- Hazardous Chemicals as defined under Section 311(e) of the Emergency Planning and Community Right-To-Know Act of 1986, where such chemicals are present or will be stored in excess of 10,000 lbs.

- Toxic Chemicals as defined in 40 CFR Part 372, where such chemicals are present or will be stored in excess of 10,000 lbs.

- Chemicals regulated under 6NYCRR Part 597, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).

Oil/petroleum products are considered to pose a significant spill potential whenever the following situations occur:

- The potential for a "harmful quantity" of oil (including petroleum and non-petroleum-based fuels and lubricants) to reach navigable waters of the U.S. exists (40 CFR Part 112.4). Harmful quantities are considered by USEPA to be volumes that could form a visible sheen on the water or violate applicable water quality standards.

- The potential for any amount of petroleum to reach any waters of NY State, including groundwater, exists. Petroleum, as defined by NY State in 6NYCRR Part 612, is a petroleum-based heat source, energy source, or engine lubricant/maintenance fluid.

- The potential for any release, to soil or water, of petroleum from a bulk storage facility regulated under 6NYCRR Part 612. A regulated petroleum storage facility is defined by NY State as a site having stationary tank(s) and intra-facility piping, fixtures and related equipment with an aggregate storage volume of 1,100 gallons or greater.

The evaluation indicates that, based on Site history and decommissioning records, a hazardous material spill and/or a petroleum product spill is not likely to occur during RI/IRM efforts.

9.2 Initial Spill Notification and Evaluation

Any worker who discovers a hazardous substance or oil/petroleum spill will immediately notify the Project Manager and SSHO. The worker will, to the best of his/her ability, report the material involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, if any, and any associated injuries. The Emergency Response Plan presented in Attachment H2 of this HASP will immediately be implemented if an emergency release has occurred.

Following initial report of a spill, the Project Manager will make an evaluation as to whether the release exceeds RQ levels. If an RQ level is exceeded, the Project Manager will notify the Site owner and NYSDEC at 1-800-457-7362 within 2 hours of spill discovery. The Project Manager will also determine what additional agencies (e.g., USEPA) are to be contacted regarding the release, and will follow-up with written reports as required by the applicable regulations.

9.3 Spill Response

For all spill situations, the following general response guidelines will apply:

- Only those personnel involved in overseeing or performing containment operations will be allowed within the spill area. If necessary, the area will be roped, ribboned, or otherwise blocked off to prevent unauthorized access.
- Appropriate PPE, as specified by the SSHO, will be donned before entering the spill area.
- Ignition points will be extinguished/removed if fire or explosion hazards exist.
- Surrounding reactive materials will be removed.
- Drains or drainage in the spill area will be blocked to prevent inflow of spilled materials or applied materials.

For minor spills, the Contractor will maintain a Spill Control and Containment Kit in the Field Office or other readily accessible storage location. The kit will consist of, at a minimum, a 50 lb. bag of "speedy dry" granular absorbent material, absorbent pads, shovels, empty 5-gallon pails and an empty open-top 55-gallon drum. Spilled materials will be absorbed, and shoveled into a 55-gallon drum for proper disposal (NYSDEC approval will be secured for on-site treatment of the impacted soils/absorbent materials, if applicable). Impacted soils will be hand-excavated to the point that no visible signs of contamination remains, and will be drummed with the absorbent.

In the event of a major release or a release that threatens surface water, a spill response contractor will be called to the Site. The response contractor may use heavy equipment (e.g., excavator, backhoe, etc.) to berm the soils surrounding the spill Site or create diversion trenching to mitigate overland migration or release to navigable waters. Where feasible, pumps will be used to transfer free liquid to storage containers. Spill control/cleanup contractors in the Western New York area that may be contacted for assistance include:

- The Environmental Service Group of NY, Inc.: (716) 695-6720
- Environmental Products and Services, Inc.: (716) 447-4700
- Op-Tech: (716) 873-7680

9.4 Post-Spill Evaluation

If a reportable quantity of hazardous material or oil/petroleum is spilled as determined by the Project Manager, a written report will be prepared as indicated in Section 9.2. The report will identify the root cause of the spill, type and amount of material released, date/time of release, response actions, agencies notified and/or involved in cleanup, and procedures to be implemented to avoid repeat incidents. In addition, all re-useable spill cleanup and containment materials will be decontaminated, and spill kit supplies/disposable items will be replenished.

10.0 HEAT/COLD STRESS MONITORING

Since some of the work activities at the Site will be scheduled for both the summer and winter months, measures will be taken to minimize heat/cold stress to TurnKey-Benchmark employees. The Site Safety and Health Officer and/or his or her designee will be responsible for monitoring TurnKey-Benchmark field personnel for symptoms of heat/cold stress.

10.1 Heat Stress Monitoring

Personal protective equipment may place an employee at risk of developing heat stress, a common and potentially serious illnesses often encountered at construction, landfill, waste disposal, industrial or other unsheltered sites. The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning and age. Personal protective equipment may severely reduce the body's normal ability to maintain temperature equilibrium (via evaporation and convection), and require increased energy expenditure due to its bulk and weight.

Proper training and preventive measures will mitigate the potential for serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress, the following steps should be taken:

- Adjust work schedules.
- Modify work/rest schedules according to monitoring requirements.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat (i.e., eight fluid ounces must be ingested for approximately every 1 lb of weight lost). The normal thirst

mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost perspiration. When heavy sweating occurs, workers should be encouraged to drink more.

- Train workers to recognize the symptoms of heat related illness.

Heat-Related Illness - Symptoms:

- Heat rash may result from continuous exposure to heat or humid air.

- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include: muscle spasms; pain in the hands, feet and abdomen.

- Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include: pale, cool, moist skin; heavy sweating; dizziness; nausea; fainting.

- Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are: red, hot, usually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

The monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism.

- Heart rate may be measured by the radial pulse for 30 seconds as early as possible in the resting period. The rate at the beginning of the rest period should not exceed 100 beats per minute. If the rate is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest periods stay the same, If the pulse rate is 100 beats per minute at the beginning of the nest rest period, the following work cycle should be further shortened by 33%.

- Body temperature may be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the beginning of the rest period

should not exceed 99.6 degrees Fahrenheit. If it does, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period remains the same. However, if the oral temperature exceeds 99.6 degrees Fahrenheit at the beginning of the next period, the work cycle may be further shortened by 33%. Oral temperature should be measured at the end of the rest period to make sure that it has dropped below 99.6 degrees Fahrenheit. No TurnKey-Benchmark employee will be permitted to continue wearing semi-permeable or impermeable garments when his/her oral temperature exceeds 100.6 degrees Fahrenheit.

10.2 Cold Stress Monitoring

Exposure to cold conditions may result in frostbite or hypothermia, each of which progresses in stages as shown below.

- **Frostbite** occurs when body tissue (usually on the extremities) begins to freeze. The three states of frostbite are:

  1) **Frost nip** - This is the first stage of the freezing process. It is characterized by a whitened area of skin, along with a slight burning or painful sensation. Treatment consists of removing the victim from the cold conditions, removal of boots and gloves, soaking the injured part in warm water (102 to 108 degrees Fahrenheit) and drinking a warm beverage. Do not rub skin to generate friction/ heat.

  2) **Superficial Frostbite** - This is the second stage of the freezing process. It is characterized by a whitish gray area of tissue, which will be firm to the touch but will yield little pain. The treatment is identical for Frost nip.

  3) **Deep Frostbite** - In this final stage of the freezing process the affected tissue will be cold, numb and hard and will yield little to no pain. Treatment is identical to that for Frost nip.

- **Hypothermia** is a serious cold stress condition occurring when the body loses heat at a rate faster than it is produced. If untreated, hypothermia may be fatal. The stages of hypothermia may not be clearly defined or visible at first, but generally include:

  1) Shivering
  2) Apathy (i.e., a change to an indifferent or uncaring mood)

3) Unconsciousness
4) Bodily freezing

Employees exhibiting signs of hypothermia should be treated by medical professionals. Steps that can be taken while awaiting help include:

1) Remove the victim from the cold environment and remove wet or frozen clothing. (Do this carefully as frostbite may have started.)

2) Perform active re-warming with hot liquids for drinking (Note: do not give the victim any liquid containing alcohol or caffeine) and a warm water bath (102 to 108 degrees Fahrenheit).

3) Perform passive re-warming with a blanket or jacket wrapped around the victim.

In any potential cold stress situation, it is the responsibility of the Site Health and Safety Officer to encourage the following:

- Education of workers to recognize the symptoms of frostbite and hypothermia.
- Workers should dress warmly, with more layers of thin clothing as opposed to one thick layer.
- Personnel should remain active and keep moving.
- Personnel should be allowed to take shelter in a heated areas, as necessary.
- Personnel should drink warm liquids (no caffeine or alcohol if hypothermia has set in).
- For monitoring the body's recuperation from excess cold, oral temperature recordings should occur:
  - At the Site Safety Technicians discretion when suspicion is based on changes in a worker's performance or mental status.
  - At a workers request.
  - As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind chill less than 20 degrees Fahrenheit or wind chill

less than 30 degrees Fahrenheit with precipitation).

- As a screening measure, whenever anyone worker on-site develops hypothermia.

Any person developing moderate hypothermia (a core body temperature of 92 degrees Fahrenheit) will not be allowed to return to work for 48 hours without the recommendation of a qualified medical doctor.

11.0 WORK ZONES AND SITE CONTROL

Work zones around the areas designated for construction activities will be established on a daily basis and communicated to all employees and other Site users by the SSHO. It shall be each Contractor's Site Safety and Health Officer's responsibility to ensure that all Site workers are aware of the work zone boundaries and to enforce proper procedures in each area. The zones will include:

- Exclusion Zone ("Hot Zone") - The area where contaminated materials may be exposed, excavated or handled and all areas where contaminated equipment or personnel may travel. Flagging tape will delineate the zone. All personnel entering the Exclusion Zone must wear the prescribed level of personal protective equipment identified in Section 7.

- Contamination Reduction Zone - The zone where decontamination of personnel and equipment takes place. Any potentially contaminated clothing, equipment and samples must remain in the Contamination Reduction Zone until decontaminated.

- Support Zone - The part of the site that is considered non-contaminated or "clean." Support equipment will be located in this zone, and personnel may wear normal work clothes within this zone.

In the absence of other task-specific work zone boundaries established by the SSHO, the following boundaries will apply to all investigation and construction activities involving disruption or handling of Site soils or groundwater:

- Exclusion Zone: 50 foot radius from the outer limit of the sampling/construction activity.

- Contaminant Reduction Zone: 100 foot radius from the outer limit of the sampling/construction activity.

- Support Zone: Areas outside the Contaminant Reduction Zone.

Access of non-essential personnel to the Exclusion and Contamination Reduction Zones will be strictly controlled by the SSHO. Only personnel who are essential to the

completion of the task will be allowed access to these areas and only if they are wearing the prescribed level of protection. Entrance of all personnel must be approved by the SSHO.

The SSHO will maintain a Health and Safety Logbook containing the names of TurnKey-Benchmark workers and their level of protection. The zone boundaries may be changed by the SSHO as environmental conditions warrant, and to respond to the necessary changes in work locations on-site.

12.0 DECONTAMINATION

12.1 Decontamination for TurnKey-Benchmark Employees

The degree of decontamination required is a function of a particular task and the environment within which it occurs. The following decontamination procedure will remain flexible, thereby allowing the decontamination crew to respond appropriately to the changing environmental conditions that may arise at the Site. All TurnKey-Benchmark personnel on-site shall follow the procedure below, or the Contractor's procedure (if applicable), whichever is more stringent.

Station 1 - Equipment Drop: Deposit visibly contaminated (if any) re-useable equipment used in the contamination reduction and exclusion zones (tools, containers, monitoring instruments, radios, clipboards, etc.) on plastic sheeting.

Station 2 - Boots and Gloves Wash and Rinse: Scrub outer boots and outer gloves. Deposit tape and gloves in waste disposal container.

Station 3 - Tape, Outer Boot and Glove Removal: Remove tape, outer boots and gloves. Deposit tape and gloves in waste disposal container.

Station 4 - Canister or Mask Change: If worker leaves exclusive zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot cover donned, and worker returns to duty.

Station 5 - Outer Garment/Face Piece Removal: Protective suit removed and deposited in separate container provided by Contractor. Face piece or goggles are removed if used. Avoid touching face with fingers. Face piece and/or goggles deposited on plastic sheet. Hard hat removed and placed on plastic sheet.

Station 6 - Inner Glove Removal: Inner gloves are the last personal protective equipment to be removed. Avoid touching the outside of the gloves with bare fingers. Dispose of these gloves in waste disposal container.

Following PPE removal, personnel shall wash hands, face and forearms with absorbent wipes. If field activities proceed for duration of 6 consecutive months or longer, shower facilities will be provided for worker use in accordance with OSHA 29 CFR 1910.120(n).

12.2 Decontamination for Medical Emergencies

In the event of a minor, non-life threatening injury, personnel should follow the decontamination procedures as defined, and then administer first-aid.

In the event of a major injury or other serious medical concern (e.g., heat stroke), immediate first-aid is to be administered and the victim transported to the hospital in lieu of further decontamination efforts unless exposure to a Site contaminant would be considered "Immediately Dangerous to Life or Health."

12.3 Decontamination of Field Equipment

The Contractor in accordance with his approved Health and Safety Plan in the Contamination Reduction Zone will conduct decontamination of heavy equipment. As a minimum, this will include manually removing heavy soil contamination, followed by steam cleaning on an impermeable pad.

TurnKey-Benchmark personnel will conduct decontamination of all tools used for sample collection purposes. It is expected that all tools will be constructed of nonporous, nonabsorbent materials (i.e., metal), which will aid in the decontamination effort. Any tool or part of a tool made of porous, absorbent material (i.e., wood) will be placed into suitable containers and prepared for disposal.

Decontamination of bailers, split-spoons, spatula knives, and other tools used for environmental sampling and examination shall be as follows:

- Disassemble the equipment
- Water wash to remove all visible foreign matter.
- Wash with detergent.
- Rinse all parts with distilled-deionized water.
- Allow to air dry.
- Wrap all parts in aluminum foil or polyethylene.

13.0 CONFINED SPACE ENTRY

OSHA 29 CFR 1910.146 identifies a confined space as a space that is large enough and so configured that an employee can physically enter and do assigned work, has limited or restricted means for entry and exit, and is not intended for continuous employee occupancy. Confined spaces include, but are not limited to, trenches, storage tanks, process vessels, pits, sewers, tunnels, underground utility vaults, pipelines, sumps, wells, and excavations.

Confined space entry by TurnKey-Benchmark employees is not anticipated to be necessary to complete the RI/IRM activities identified in Section 2.0. In the event that the scope of work changes or confined space entry appears necessary, the Project Manager will be consulted to determine if feasible engineering alternatives to confined space entry can be implemented. If confined space entry by TurnKey-Benchmark employees cannot be avoided through reasonable engineering measures, task-specific confined space entry procedures will be developed and a confined-space entry permit will be issued through TurnKey-Benchmark's corporate Health and Safety Director. TurnKey-Benchmark employees shall not enter a confined space without these procedures and permits in place.

14.0 FIRE PREVENTION AND PROTECTION

14.1 General Approach

Recommended practices and standards of the National Fire Protection Association (NFPA) and other applicable regulations will be followed in the development and application of Project Fire Protection Programs. When required by regulatory authorities, the project management will prepare and submit a Fire Protection Plan for the approval of the contracting officers, authorized representative or other designated official. Essential considerations for the Fire Protection Plan will include:

- Proper Site preparation and safe storage of combustible and flammable materials.
- Availability of coordination with private and public fire authorities.
- Adequate job-site fire protection and inspections for fire prevention.
- Adequate indoctrination and training of employees.

14.2 Equipment and Requirements

Fire extinguishers will be provided by each Contractor and are required on all heavy equipment and in each field trailer. Fire extinguishers will be inspected, serviced, and maintained in accordance with the manufacturer's instructions. As a minimum, all extinguishers shall be checked monthly and weighed semi-annually, and recharged if necessary. Recharge or replacement shall be mandatory immediately after each use.

14.3 Flammable and Combustible Substances

All storage, handling or use of flammable and combustible substances will be under the supervision of qualified persons. All tanks, containers and pumping equipment, whether portable or stationary, used for the storage and handling of flammable and combustible liquids, will meet the recommendations of the National Fire Protection Association.

14.4 Hot Work

If the scope of work necessitates welding or blowtorch operation, the hot work permit presented in Appendix B will be completed by the SSHO and reviewed/issued by the Project Manager.

15.0 EMERGENCY INFORMATION

In accordance with OSHA 29 CFR Part 1910, an Emergency Response Plan is attached to this HASP as Appendix A. The hospital route map is presented within Appendix A as Figure 1.

16.0 REFERENCES

1. New York State Department of Environmental Conservation. *DER-10; Technical Guidance for Site Investigation and Remediation.* May 2010.

TABLES

TABLE 1

TOXICITY DATA FOR CONSTITUENTS OF POTENTIAL CONCERN

401, 402, and 430 Buffalo Avenue Site

Niagara Falls, New York

Parameter	Synonyms	CAS No.	Code	Concentration Limits [1]		
				PEL	TLV	IDLH
Volatile Organic Compounds (VOCs): ppm						
1,2,4-Trimethylbenzene	Pseudocumene	95-63-6	*none*	25	25	--
1,3,5-Trimethylbenzene	Mesitylene	108-67-8	*none*	25	25	--
Ethylbenzene	Ethylbenzol, Phenylethane	100-41-4	*none*	100	100	800
Isopropylbenzene	Cumene	98-82-8	*none*	50	50	900
n-Propylbenzene	Isocumene	103-65-1	*none*	50	50	--
Xylene, Total	o-, m-, p-isomers	1330-20-7	*none*	100	100	900
Semi-volatile Organic Compounds (SVOCs) [2]: ppm						
Anthracene	*none*	120-12-7	*none*	--	--	--
Benzo(a)anthracene	*none*	56-55-3	*none*	--	--	--
Benzo(a)pyrene	*none*	50-32-8	*none*	--	--	--
Benzo(b)fluoranthene	*none*	205-99-2	*none*	--	--	--
Benzo(k)fluoranthene	*none*	207-08-9	*none*	--	--	--
Chrysene	*none*	218 01 9	*none*	--	--	--
Dibenzo(a,h)anthracene	*none*	53-70-3	*none*	--	--	--
Fluoranthene	*none*	206-44-0	*none*	--	--	--
Fluorene	*none*	86-73-7	*none*	--	--	--
Indeno(1,2,3-cd)pyrene	*none*	193-39-5	*none*	--	--	--
Naphthalene	Naphthalin, Tar camphor, White tar	91-20-3	*none*	10	10	250
Phenanthrene	*none*	85-01-8	*none*	--	--	--
Pyrene	*none*	129-00-0	*none*	--	--	--
Inorganic Compounds: mg/m [2]						
Arsenic	*none*	7440-38-2	*Ca*	0.01	0.01	5
Barium	*none*	7440-39-3	*none*	0.5	0.5	50
Cadmium	*none*	7440-43-9	*Ca*	0.005	0.01	9
Chromium	*none*	7440-47-3	*none*	1	0.5	250
Copper	*none*	7440-50-8	*none*	0.1	0.2	200
Lead	*none*	7439-92-1	*none*	0.05	0.15	100
Mercury	*none*	7439-97-6	C-0.1	0.1	0.05	10
Selenium	*none*	7782-49-2	*none*	0.2	0.2	1
Silver	*none*	7440-28-0	*none*	0.01	0.1	10
Zinc	*none*	7440-66-6	*none*	--	--	--

Notes:

1. Concentration limits as reported by NIOSH Pocket Guide to Chemical Hazards, February 2004 (NIOSH Publication No. 97-140, fourth printing with chages and updates.
2. " -- " = concentration limit not available; exposure should be minimized to the extent feasible through appropriate engineering controls & PPE.

Explanation:

Ca = NIOSH considers constituent to be a potential occupational carcinogen.
C-## = Ceiling Level equals the maximum exposure concentration allowable during the work day.
IDLH = Immediately Dangerous to Life or Health.
ND indicates that an IDLH has not as yet been determined.
TLV = Threshold Limit Value, established by American Conference of Industrial Hygienists (ACGIH), equals the maximum exposure concentration allowable for 8 hours/day @ 40 ho
TLVs are the amounts of chemicals in the air that almost all healthy adult workers are predicted to be able to tolerate without adverse effects. There are three types.
TLV-TWA (TLV-Time-Weighted Average) which is averaged over the normal eight-hour day/forty-hour work week. (Most TLVs.)
TLV-C or Ceiling limits are the concentration that should not be exceeded during any part of the working exposure.
Unless the initials "STEL" or "C" appear in the Code column, the TLV value should be considered to be the eight-hour TLV-TWA.
PEL = Permissible Exposure Limit, established by OSHA, equals the maximium exposure conconcentration allowable for 8 hours per day @ 40 hours per week

TABLE 2

POTENTIAL ROUTES OF EXPOSURE TO THE CONSTITUENTS OF POTENTIAL CONCERN

401, 402, and 430 Buffalo Avenue Site
Niagra Falls, New York

Activity [1]	Direct Contact with Soil/Fill	Inhalation of Vapors or Dust	Direct Contact with Groundwater
Remedial Investigation Tasks			
1. Subsurface Soil Sampling	**x**	**x**	
2. Monitoring Well Installation/Development and Sampling	**x**	**x**	**x**
3. Subslab Vapor Sampling	**x**	**x**	
Interim Remedial Measures Tasks			
1. Soil Excavation	x	x	
2. Backfilling	x	x	
3. Verification Sampling	x	x	
4. Groundwater and Surface Water Management	x		x

Notes:
1. Activity as described in Section 1.5 of the Health and Safety Plan.

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE 3

REQUIRED LEVELS OF PROTECTION
FOR RI/IRM TASKS

401, 402, and 430 Buffalo Avenue Site
Niagara Falls, New York

Activity	Respiratory Protection [1]	Clothing	Gloves [2]	Boots [2, 3]	Other Required PPE/Modifications [2, 4]
Remedial Investigation Tasks					
1. Subsurface Soil Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
2. Monitoring Well Installation/Development and Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	SGSS
3. Subslab Vapor Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
Interim Remedial Measures Tasks					
1. Soil Excavation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
2. Backfilling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
3. Verification Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
4. Groundwater and Surface Water Management	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS

Notes:

1. Respiratory equipment shall conform to guidelines presented in Section 7.0 of this HASP. The Level C requirement is an air-purifying respirator equiped with organic compound/acid gas/dust cartridge.
2. HH = hardhat; L= Latex; L/N = latex inner glove, nitrile outer glove; N = Nitrile; S = Saranex; SG = safety glasses; SGSS = safety glasses with sideshields; STSS = steel toe safety shoes.
3. Latex outer boot (or approved overboot) required whenever contact with contaminated materials may occur. SSHO may downgrade to STSS (steel-toed safety shoes) if contact will be limited to cover/replacement soils.
4. Dust masks shall be donned as directed by the SSHO (site safety and health officer) or site safety technician whenever potentially contaminated airborne particulates (i.e., dust) are present in significant amounts in the breathing zone. Goggles may be substituted with safety glasses w/side-shields whenever contact with contaminated liquids is not anticipated.

FIGURES

FIGURE 1

TURNKEY ENVIRONMENTAL RESTORATION, LLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0294-013-001

DATE: OCTOBER 2014

DRAFTED BY: BLR/NTM

SITE LOCATION AND VICINITY MAP

INTERIM REMEDIAL MEASURES WORK PLAN

401, 402, & 430 BUFFALO AVENUE SITE
BCP SITE No. C932164
NIAGARA FALLS, NEW YORK

PREPARED FOR

MERANI HOSPITALITY, INC.

DATE: OCTOBER 2014
DRAFTED BY: BLR/NTM

FIGURE 2

SITE PLAN (AERIAL)

INTERIM REMEDIAL MEASURES WORK PLAN

401, 402, & 430 BUFFALO AVENUE SITE
BCP SITE No. C932164
NIAGARA FALLS, NEW YORK

PREPARED FOR

MERANI HOSPITALITY

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0294-013-001

ATTACHMENT A

EMERGENCY RESPONSE PLAN

TURNKEY

EMERGENCY RESPONSE PLAN
for
BROWNFIELD CLEANUP PROGRAM
RI/IRM ACTIVITIES

401, 402, and 430 BUFFALO AVENUE SITE
NIAGARA FALLS, NEW YORK

November 2014 0294-013-001

Prepared for:

MERANI HOSPITALITY, INC.

HEALTH AND SAFETY PLAN FOR RI/IRM ACTIVITIES
APPENDIX A: EMERGENCY RESPONSE PLAN
401, 402, AND 430 BUFFALO AVENUE SITE

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LIST OF FIGURES

1.0 GENERAL

This report presents the site-specific Emergency Response Plan (ERP) referenced in the Site Health and Safety Plan (HASP) prepared for Remedial Investigation (RI) and Interim Remedial Measures (IRM) activities at the 401, 402, and 430 Buffalo Avenue Site in Niagara Falls, New York. This appendix of the HASP describes potential emergencies that may occur at the Site; procedures for responding to those emergencies; roles and responsibilities during emergency response; and training all workers must receive in order to follow emergency procedures. This ERP also describes the provisions this Site has made to coordinate its emergency response planning with other contractors on-site and with off-site emergency response organizations.

This ERP is consistent with the requirements of 29 CFR 1910.120(l) and provides the following site-specific information:

- Pre-emergency planning.
- Personnel roles, lines of authority, and communication.
- Emergency recognition and prevention.
- Safe distances and places of refuge.
- Evacuation routes and procedures.
- Decontamination procedures.
- Emergency medical treatment and first aid.
- Emergency alerting and response procedures.
- Critique of response and follow-up.
- Emergency personal protective equipment (PPE) and equipment.

2.0 PRE-EMERGENCY PLANNING

This Site has been evaluated for potential emergency occurrences, based on site hazards, the required work tasks, the site topography, and prevailing weather conditions. The results of that evaluation indicate the potential for the following site emergencies to occur at the locations indicated.

Type of Emergency:

1. Medical, due to physical injury

Source of Emergency:

1. Slip/trip/fall

Location of Source:

1. Non-specific

3.0 ON-SITE EMERGENCY RESPONSE EQUIPMENT

Emergency procedures may require specialized equipment to facilitate worker rescue, contamination control and reduction, or post-emergency clean up. Emergency response equipment available on the Site is listed below. The equipment inventory and storage locations are based on the potential emergencies described above. This equipment inventory is designed to meet on-site emergency response needs and any specialized equipment needs that off-site responders might require because of the hazards at this Site but not ordinarily stocked.

Any additional personal protective equipment (PPE) required and stocked for emergency response is also listed in below. During an emergency, the Emergency Response Coordinator (ERC) is responsible for specifying the level of PPE required for emergency response. At a minimum, PPE used by emergency responders will comply with Section 7.0, Personal Protective Equipment, of this HASP. Emergency response equipment is inspected at regular intervals and maintained in good working order. The equipment inventory is replenished as necessary to maintain response capabilities.

Emergency Equipment	Quantity	Location
First Aid Kit	1	Site Vehicle
Chemical Fire Extinguisher	2 (minimum)	All heavy equipment and Site Vehicle

Emergency PPE	Quantity	Location
Full-face respirator	1 for each worker	Site Vehicle
Chemical-resistant suits	4 (minimum)	Site Vehicle

4.0 EMERGENCY PLANNING MAPS

An area-specific map of the Site will be developed on a daily basis during performance of field activities. The map will be marked to identify critical on-site emergency planning information, including: emergency evacuation routes, a place of refuge, an assembly point, and the locations of key site emergency equipment. Site zone boundaries will be shown to alert responders to known areas of contamination. There are no major topographical features, however the direction of prevailing winds/weather conditions that could affect emergency response planning are also marked on the map. The map will be posted at site-designated place of refuge and inside the TurnKey personnel field vehicle.

5.0 EMERGENCY CONTACTS

The following identifies the emergency contacts for this ERP.

Emergency Telephone Numbers:

Project Manager: ***Michael Lesakowski***
Work: (716) 856-0599
Mobile: (716) 818-3954

Corporate Health and Safety Director: ***Thomas H. Forbes***
Work: (716) 856-0599
Mobile: (716) 864-1730

Site Safety and Health Officer (SSHO): ***Bryan C. Hann***
Work: (716) 856-0635
Mobile: (716) 870-1165

Alternate SSHO: ***Nathan Munley***
Work: (716) 856-0635
Mobile: (716) 289-1072

NIAGRA FALLS MEMORIAL MEDICAL CENTER (ER):	(716) 278-4000
FIRE:	911
AMBULANCE:	911
BUFFALO POLICE:	911
STATE EMERGENCY RESPONSE HOTLINE:	(800) 457-7362
NATIONAL RESPONSE HOTLINE:	(800) 424-8802
NYSDOH:	(716) 847-4385
NYSDEC:	(716) 851-7220
NYSDEC 24-HOUR SPILL HOTLINE:	(800) 457-7252

The Site location is:

401, 402, and 430 Buffalo Avenue
Niagara Falls, New York 14303
Site Phone Number: (Insert Cell Phone or Field Trailer): _____

6.0 EMERGENCY ALERTING & EVACUATION

Internal emergency communication systems are used to alert workers to danger, convey safety information, and maintain site control. Any effective system can be employed. Two-way radio headsets or field telephones are often used when work teams are far from the command post. Hand signals and air-horn blasts are also commonly used. Every system must have a backup. It shall be the responsibility of each contractor's Site Health and Safety Officer to ensure all personnel entering the site understand an adequate method of internal communication. Unless all personnel are otherwise informed, the following signals shall be used.

1) Emergency signals by portable air horn, siren, or whistle: two short blasts, personal injury; continuous blast, emergency requiring site excavation.

2) Visual signals: hand gripping throat, out of air/cannot breathe; hands on top of head, need assistance; thumbs up, affirmative/ everything is OK; thumbs down, no/negative; grip partner's wrist or waist, leave area immediately.

If evacuation notice is given, site workers leave the worksite with their respective buddies, if possible, by way of the nearest exit. Emergency decontamination procedures detailed in Section 12.0 of the HASP are followed to the extent practical without compromising the safety and health of site personnel. The evacuation routes and assembly area will be determined by conditions at the time of the evacuation based on wind direction, the location of the hazard source, and other factors as determined by rehearsals and inputs from emergency response organizations. Wind direction indicators are located so that workers can determine a safe up wind or cross wind evacuation route and assembly area if not informed by the emergency response coordinator at the time the evacuation alarm sounds. Since work conditions and work zones within the site may be changing on daily basis, it shall be the responsibility of the construction Site Health and Safety Officer to review evacuation routes and procedures as necessary and to inform all TurnKey-Benchmark workers of any changes.

Personnel exiting the site will gather at a designated assembly point. To determine that everyone has successfully exited the site, personnel will be accounted for at the assembly

site. If any worker cannot be accounted for, notification is given to the SSHO (***Bryan Hann*** or ***Nathan Munley***) so that appropriate action can be initiated. Contractors and subcontractors on this site have coordinated their emergency response plans to ensure that these plans are compatible and that source(s) of potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

7.0 EXTREME WEATHER CONDITIONS

In the event of adverse weather conditions, the Site Safety and Health Officer in conjunction with the Contractor's SSHO will determine if engineering operations can continue without sacrificing the health and safety of site personnel. Items to be considered prior to determining if work should continue include but are not limited to:

- Potential for heat/cold stress.
- Weather-related construction hazards (e.g., flooding or wet conditions producing undermining of structures or sheeting, high wind threats, etc).
- Limited visibility.
- Potential for electrical storms.
- Limited site access/egress (e.g., due to heavy snow)

8.0 EMERGENCY MEDICAL TREATMENT & FIRST AID

Personnel Exposure:

The following general guidelines will be employed in instances where health impacts threaten to occur acute exposure is realized:

- Skin Contact: Use copious amounts of soap and water. Wash/rinse affected area for at least 15 minutes. Decontaminate and provide medical attention. Eyewash stations will be provided on site. If necessary, transport to Buffalo General Hospital.

- Inhalation: Move to fresh air and, if necessary, transport to Hospital.

- Ingestion: Decontaminate and transport to Hospital.

Personal Injury:

Minor first-aid will be applied on-site as deemed necessary. In the event of a life threatening injury, the individual should be transported to Hospital via ambulance. The Site Health and Safety Officer will supply available chemical specific information to appropriate medical personnel as requested.

First aid kits will conform to Red Cross and other applicable good health standards, and shall consist of a weatherproof container with individually sealed packages for each type of item. First aid kits will be fully equipped before being sent out on each job and will be checked weekly by the SSHO to ensure that the expended items are replaced.

Directions to Niagara Falls Memorial Medical Center (see Figure 1):

The following directions describe the best route from the Site to Niagara Falls Memorial Medical Center:

- Head east on Buffalo Avenue toward Holly Place
- Turn right onto Robert Moses Parkway
- Keep right at the fork, follow signs for New York 384/New York 265/Tonawandas and merge onto LaSalle Expressway
- Turn left onto Williams Road
- Hospital on the left (6934 Williams Road)
  (7.5 miles)

9.0 EMERGENCY RESPONSE CRITIQUE & RECORD KEEPING

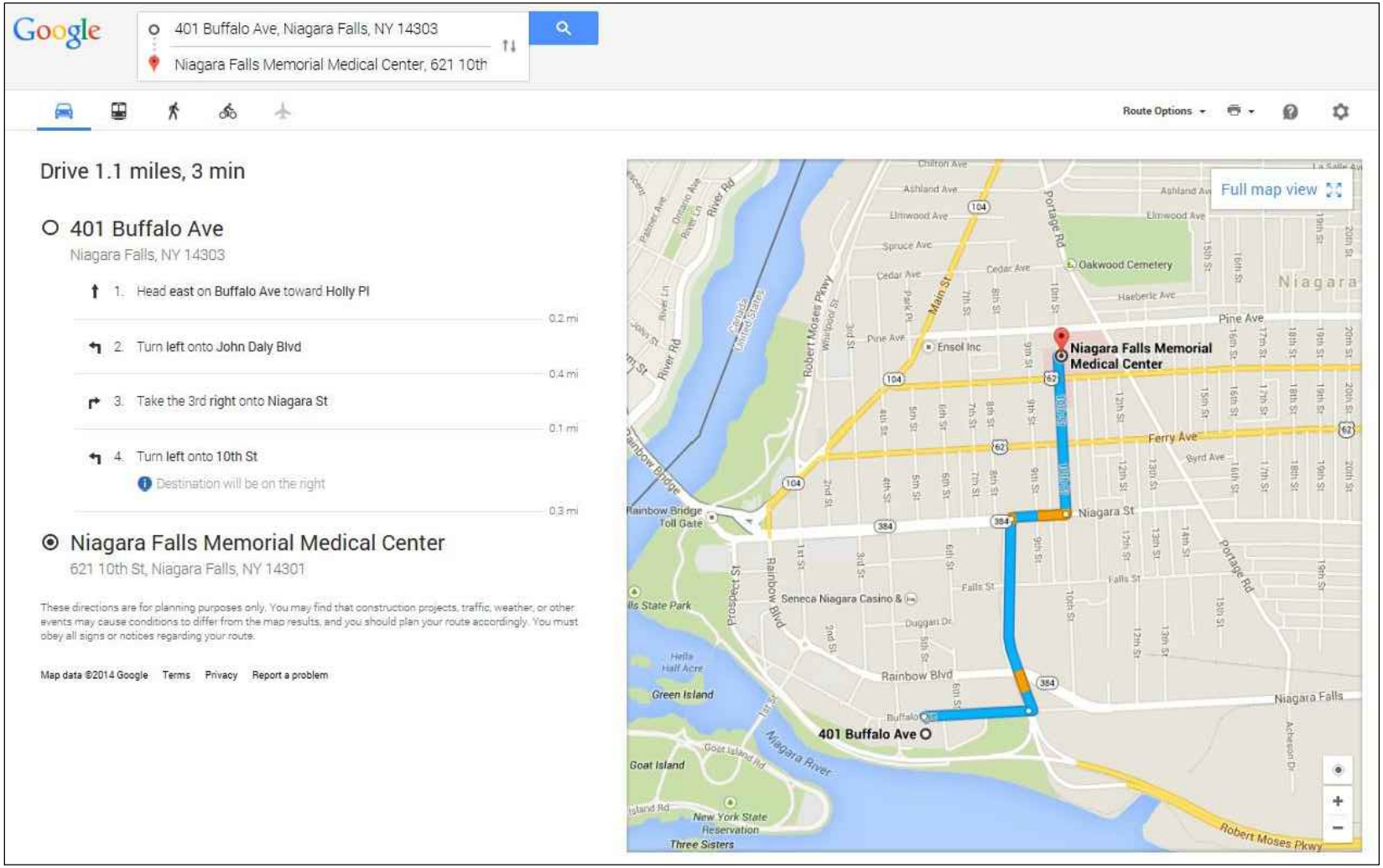
Following an emergency, the SSHO and Project Manager shall review the effectiveness of this Emergency Response Plan (ERP) in addressing notification, control and evacuation requirements. Updates and modifications to this ERP shall be made accordingly. It shall be the responsibility of each contractor to establish and assure adequate records of the following:

- Occupational injuries and illnesses.
- Accident investigations.
- Reports to insurance carrier or State compensation agencies.
- Reports required by the client.
- Records and reports required by local, state, federal and/or international agencies.
- Property or equipment damage.
- Third party injury or damage claims.
- Environmental testing logs.
- Explosive and hazardous substances inventories and records.
- Records of inspections and citations.
- Safety training.

10.0 EMERGENCY RESPONSE TRAINING

All persons who enter the worksite, including visitors, shall receive a site-specific briefing about anticipated emergency situations and the emergency procedures by the SSHO. Where this site relies on off-site organizations for emergency response, the training of personnel in those off-site organizations has been evaluated and is deemed adequate for response to this site.

FIGURES



TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0294-013-001

DATE: NOVEMBER 2014

DRAFTED BY: NTM

HOSPITAL ROUTE MAP

401, 402, & 430 BUFFALO AVENUE SITE

NIAGARA FALLS, NEW YORK

PREPARED FOR

MERANI HOSPITALITY, INC.

FIGURE 1

ATTACHMENT B

HOT WORK PERMIT FORM

HOT WORK PERMIT

PART 1 - INFORMATION

Issue Date:	
Date Work to be Performed: Start:	Finish (permit terminated):
Performed By:	
Work Area:	
Object to be Worked On:	

PART 2 - APPROVAL

(for 1, 2 or 3: mark Yes, No or NA)*

Will working be on or in:	Finish (permit terminated):	
1. Metal partition, wall, ceiling covered by combustible material?	yes	no
2. Pipes, in contact with combustible material?	yes	no
3. Explosive area?	yes	no

* = If any of these conditions exist (marked "yes"), a permit will not be issued without being reviewed and approved by Thomas H. Forbes (Corporate Health and Safety Director). Required Signature below.

PART 3 - REQUIRED CONDITIONS**

(Check all conditions that must be met)

	PROTECTIVE ACTION		PROTECTIVE EQUIPMENT
	Specific Risk Assessment Required		Goggles/visor/welding screen
	Fire or spark barrier		Apron/fireproof clothing
	Cover hot surfaces		Welding gloves/gauntlets/other:
	Move movable fire hazards, specifically		Wellintons/Knee pads
	Erect screen on barrier		Ear protection: Ear muffs/Ear plugs
	Restrict Access		B.A.: SCBA/Long Breather
	Wet the ground		Respirator: Type:
	Ensure adequate ventilation		Cartridge:
	Provide adequate supports		Local Exhaust Ventilation
	Cover exposed drain/floor or wall cracks		Extinguisher/Fire blanket
	Fire watch (must remain on duty during duration of permit)		Personal flammable gas monitor
	Issue additional permit(s):		

Other precautions:

** Permit will not be issued until these conditions are met.

SIGNATURES

Orginating Employee:	Date:
Project Manager:	Date:
Part 2 Approval:	Date:

ATTACHMENT C

NYSDOH GENERIC COMMUNITY AIR MONITORING PLAN

TURNKEY

Appendix C1
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix C2
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX B

SOIL/FILL MANAGEMENT PLAN

BENCHMARK TURNKEY

SOIL/FILL MANAGEMENT PLAN

for the

402 & 430 BUFFALO AVENUE SITE

NIAGARA FALLS, NEW YORK

December 2014 0294-013-001

Prepared for:

MERANI HOSPITALITY, INC.

SOIL/FILL MANAGEMENT PLAN
402 and 430 Buffalo Avenue Site

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SOIL/FILL MANAGEMENT PLAN
402 and 430 Buffalo Avenue Site

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LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

1.1 Background and History

The Site consists of three adjoining parcels totaling approximately 6.2-acres, located at 401, 402 and 430 Buffalo Avenue in the City of Niagara Falls, Erie County, New York. The 401 Buffalo Avenue parcel is currently improved with a vacant municipally-condemned former hotel and conference center, parking areas and vegetated/landscaped areas. The 402 and 430 Buffalo Avenue parcels are currently vacant, though historically were part of the large manufacturing facility owned and operated by National Biscuit/Shredded Wheat Company.

1.2 Previous Environmental Investigations

Previous investigations completed on-Site identified recognized environmental conditions (RECs) including:

- NYSDEC Spill No. 1312160 was assigned to the Site related to the vandalism/destruction of three transformers and spilling of approximately 120-gallons of potential PCB-containing transformer oil. The spill is currently open.
- Elevated radiological material was identified in the vicinity of the pool area, with readings as high as 40,000 counts per minute (cpm).
- Leaking oil-containing equipment and oil-contaminated floors, walls, and equipment were noted in the Boiler Room, Maintenance Room, and both elevator control rooms.
- Improper storage and handling of hazardous chemicals, including corrosive boiler chemicals, solvents, lubricants, degreasers, paints, thinners, hydraulic oils and maintenance equipment fuels, pesticides and herbicides, pool and water treatment chemicals;
- Illegal dumping and vandalism; and,
- Universal and e-waste throughout the building.

1.3 Purpose and Scope

The purpose of this Soil/Fill Management Plan (SFMP) is to protect both the environment and human health during redevelopment of the Site and subsequent to completion of Brownfield Cleanup activities. While assessments of surface and subsurface soil/fill and groundwater at the Site will be performed during the RI, subsurface information is never 100 percent complete or accurate, especially on a site with a long and diverse history. In particular, soil/fill impacts may be encountered during development activities such as infrastructure construction (i.e., roads, waterline, sewers, electric, cable, etc.) or foundation excavation and site grading. The SFMP will be modified/expanded as appropriate based on the results of the RI and IRM.

Compliance with this SFMP is required to properly manage any impacted subsurface soil/fill encountered during redevelopment activities at the Site. This SFMP was developed with the express purpose of addressing unknown subsurface impacts if and when encountered.

This SFMP provides protocols for development and post-development activities. Items discussed herein include:

- Excavation, grading, sampling and handling of Site soils.
- Acceptability of soil/fill from off-site sources for backfill or sub-grade fill.
- Erosion and dust control measures.
- Fencing and other access controls.
- Health and safety procedures for subsurface construction work and the protection of the surrounding community.
- Acceptability and placement of final cover.

1.4 Soil/Fill Management Program Responsibility

The property owner(s) or responsible entity will be responsible for all monitoring, implementation, and reporting requirements of this Plan. The property owner(s) will not perform, contract, nor permit their employees, agents, or assigns to perform any excavations or disturbance of Site soils, except as delineated in this Plan. The property owner(s) or responsible entity will be responsible for proper notification and reporting to regulatory agencies (i.e., NYSDEC Region 9, Division of Environmental Remediation and NYS

Department of Health) prior to and following construction activities. The NYSDEC may provide periodic construction oversight and monitoring during construction activities to verify that the requirements of this SFMP are adhered to.

1.5 Notification and Reporting Requirements

The NYSDEC will be notified prior to subgrade activities being started. The property owner(s) or other responsible entity shall complete daily logs, and details of intrusive activities will be provided to the Department.

2.0 SOIL/FILL MANAGEMENT

Based on the findings of the previous investigations, a Radiological Work Plan has been prepared for the 401,402 and 430 Buffalo Avenue Site. This SFMP has been prepared for the handling and management of non-radiological elevated material.

2.1 Soil Screening Methods

Visual, olfactory and instrument-based soil screening will be performed by a qualified environmental professional (QEP) during all remedial intrusive activities. Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal, material that requires testing, material that can be returned to the subsurface, and material that can be used as cover soil.

Based on the findings of the radiological screening, as described above, radiological field scanning will be completed during intrusive activities in areas of the Site that are identified as potentially elevated for radiologic material (soil/fill).

2.2 On-Site Stockpile Methods

Every attempt will be made to have material requiring off-site disposal to be direct loaded and transported directly off-site. For materials that cannot be direct loaded, or material that requires testing, will be placed on and covered with polyethylene sheeting to prevent infiltration of precipitation and wind erosion. If off-Site disposal of the material is planned, the stockpiled impacted material will be characterized per the requirements of a permitted disposal facility. Stockpiled impacted material will not remain on-Site for more than 90 days. Upon obtaining an approved waste profile, the impacted material will be transported and disposed of off-Site.

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by NYSDEC.

Stockpiling of radiological material will be in accordance with the Radiologic Work Plan (attached). Separate stockpile areas, from those described above, will be used for elevated radiologic material. Elevated radiological material stockpiled for off-site disposal may be present on-Site longer than other waste streams to allow for the required disposal arrangements.

2.3 Excavation and Handling of On-Site Soil/Fill

A QEP will inspect soil/fill excavations or disturbances on behalf of the property owner. The soil/fill will be inspected for staining or discoloration, and will be field screened for the presence of volatile organic compounds (VOCs) with a photoionization detector (PID). The PID detector will be calibrated as per the manufacturer's requirements. Sampling and analyses to verify excavation limits and analysis for disposal purposes will be in accordance with the protocols delineated in Section 2.3.

Excavation of impacted soil/fill will continue horizontally until visually impacted materials are removed to the satisfaction of the environmental professional and the NYSDEC representative, but will not extend beyond the Site boundaries. All excavation work will be directed by an experienced engineer or scientist to remove all visually-impacted material.

Impacted material will either be direct loaded, placed in roll-off containers or be stockpiled on plastic sheeting in an area away from the primary work activities and then sampled to determine whether it is subject to special disposal/reuse requirements. The length of time soil can be stockpiled should be limited to 90 days due to potential hazardous waste storage requirement concerns.

Sampling and analyses to verify excavation limits and analysis for disposal purposes will be in accordance with the protocols identified in Section 2.3.

2.4 Backfill Material

2.4.1 Use Criteria

Material used to backfill excavations or to increase site grades or elevations may be comprised of on-Site soil/fill and demolition material including brick and concrete, or off-Site soil/fill. Backfill materials used on-Site must meet the following criteria:

- Excavated on-Site soil/fill with no evidence of visible or olfactory evidence of contamination that has been tested to meet the criteria Restricted Residential (RR) Soil Cleanup Objectives (SCOs), as list in 6NYCRR Part 375, and in accordance with DER-10, and has been screened and determined to be below the radiological threshold;

- On-Site demolition material proposed for reuse on-site will be sampled and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval.

- Off-site soil will originate from known sources having no evidence of disposal or releases of hazardous substances, hazardous, toxic or radioactive wastes, or petroleum, which has been tested in accordance with DER10, 5.4(e)10, or at a reduced frequency if agreeable to the Department;

- All off-site sources of soil/fill to be used as backfill must be tested in accordance with the Sampling and Analytical Protocol (Section 2.3), and found to contain concentrations less than RRSCOs; and,

- No materials meeting the definitions of a solid waste as defined in 6NYCRR, Part 360-1.2(a), and/or grossly contaminated as defined in 6 NYCRR Part 375-1.2(u), shall be used as backfill.

2.4.2 On-Site Source Sampling Requirements

If on-Site soil is to be used as a source of backfill, then it must be tested to meet the criteria identified for RRSCOs, as list in 6NYCRR Part 375, and in accordance with DER-10.

Discrete grab samples will be collected for VOC analysis source is required. For all other analyses, a minimum of three grab samples will be collected per composite sample.

Approximately equal aliquots of the grab samples will be composited in the field using a stainless steel trowel and bowl. The trowel and bowl shall be decontaminated with a non-phosphate detergent (i.e., Alconox®) and potable water wash solution followed by a distilled water rinse between sampling locations. The soil/fill samples will be analyzed in accordance with USEPA SW-846 Methodology by a NYSDOH ELAP-certified laboratory. A Category B deliverables package will be requested to facilitate data evaluation by a third-party validation expert.

2.4.3 Off-Site Borrow Source Sampling Requirements

If an off-site soil/fill borrow source is of unknown origin or originates from a commercial, industrial or urban site, then it must be tested to meet the criteria identified in DER-10, Appendix 5 for RRSCOs. If an off-site soil/fill borrow source is of known origin, NYSDEC would be involved in the decision as to whether the source is in fact known and acceptable for use and whether sampling of the source is required.

Grab samples will be collected for VOC analysis. For all other analyses, a minimum of four grab samples will be collected per composite sample. Approximately equal aliquots of the grab samples will be composited in the field using a stainless steel trowel and bowl. The trowel and bowl shall be decontaminated with a non-phosphate detergent (i.e., Alconox®) and potable water wash solution followed by a distilled water rinse between sampling locations. The soil/fill samples will be analyzed in accordance with USEPA SW-846 Methodology by a NYSDOH ELAP-certified laboratory. A Category B deliverables package will be requested to facilitate data evaluation by a third-party validation expert.

2.5 Sampling and Analysis Protocol

Excavated soil/fill that is deemed unacceptable for on-Site reuse and is designated for off-site disposal shall be sampled in accordance with the requirements of the off-site disposal facility and the appropriate regulatory authorities. In addition, the resulting excavation following removal of impacted soil/fill will require verification sampling and analysis to determine the limits of impact. Both characterization and verification sampling and analysis are discussed in the following sections.

2.5.1 Impacted Soil/Fill Characterization

The following procedure represents a suggested method for determining requirements for impacted soil/fill designated for off-site disposal, recycling, and/or biotreatment. The sampling procedures, frequency and parameter list must be coordinated with the off-site disposal facility prior to undertaking characterization work. Excavated soil/fill should be separately stockpiled from any on-Site excavated material which may be re-used.

The samples will be analyzed by a NYSDOH ELAP-certified laboratory for Toxicity Characteristic Leaching Procedure (TCLP) method to determine the appropriate off-site disposal method. Parameters to be analyzed for by TCLP protocol (i.e. VOCs, SVOCs, PCB, etc.) will be determined by the potential off-site disposal facility. If TCLP hazardous waste characteristic values are exceeded, the soil/fill will be disposed of in a permitted hazardous waste disposal facility, or treated to render non-hazardous prior to disposal. If TCLP analytical results are below hazardous waste characteristic values, the soil/fill will be disposed of off-site in a permitted sanitary landfill, and/or recycled at a permitted biotreatment facility.

2.5.2 Verification Sampling

Verification sampling will be performed on the excavation sidewalls and bottom of the excavation after lateral and vertical excavation limits have been achieved and visibly impacted soil/fill has been removed. In general, one sidewall sample will be collected for each 30 linear feet of excavation sidewall and one sample will be collected from the bottom of the excavation for each 900 square feet of excavation bottom. The samples will be collected by retrieving a discrete sample from across the excavation face. The backhoe bucket will be used to assist in sample collection and avoid the need for confined space entry. For excavations having lengths greater than 30 feet, an additional discrete sample will be collected for each additional 30 feet of excavation length. Verification sampling analytical protocols will be determined based on the areas of concern, in accordance with DER-10 and consultation with the NYSDEC.

A Category B deliverables package will be requested to facilitate data evaluation by a third-party validation expert.

2.6 Groundwater/Fluids Management

All groundwater/fluids to be removed from the site, including excavation dewatering, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, and monitoring well purge and development fluids will not be recharged back to the land surface or subsurface of the site without a written request to the Department seeking permission to discharge.

3.0 COMMUNITY AIR MONITORING PLAN

The New York State Department of Health's Generic Community Air Monitoring Plan requires monitoring for volatile organic compounds and particulates. As detailed in Appendix A of this SFMP, the following criteria shall also be adhered to for the protection of the nearby community.

ORGANIC VAPOR PERIMETER MONITORING:

Community air monitoring for organic vapors will be performed at the downwind perimeter of the exclusion zone on a continuous basis during intrusive activities performed outdoors that may be reasonably expected to potentially release organic vapors, or when sustained readings are detected in the work zone (i.e., proximate to the source of the intrusive activity). Otherwise, the monitoring will be performed on an hourly basis. A photoionization detector (PID) or other equipment will be suitable to the types of contaminants known or suspected to be present will be used, and will be capable of calculating 15-minute running average concentrations. All air monitoring equipment will be calibrated at least daily and an upwind concentration will be taken at least daily to establish background conditions. The 15-minute average concentrations will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

- All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

EXPLOSIVE VAPORS:

Explosive vapor community air monitoring will be performed at the downwind perimeter of the Site on a continuous basis whenever sustained atmospheric concentrations of greater than 10% of the LEL are recorded in the exclusion zone. If sustained atmospheric concentrations of greater than 10% LEL are recorded at the downwind Site perimeter, the local Fire Department will be contacted (see Section 2.5.1 of the SMP for phone number).

AIRBORNE PARTICULATE COMMUNITY AIR MONITORING

Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the downwind perimeter of the exclusion zone. The monitoring will be performed using real-time monitoring equipment capable of measuring less than PM-10 and integrating over a period of 15-minutes for comparison to the airborne particulate action levels. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. All readings will be recorded and will be available for NYSDEC and NYSDOH review. Readings will be interpreted as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than the background reading for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression provided that the downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the background level and that visible dust is not migrating from the work area.

- If, after implementation of dust suppression techniques downwind PM-10 levels are greater than 150 ug/m^3 above the background level, work activities must be stopped and dust suppression controls re-evaluated. Work can resume provided that

supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the background level and in preventing visible dust migration.

The location of air sampling stations will be based on generally prevailing wind conditions. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide upwind and downwind monitoring stations.

Exceedance of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

DUST CONTROL PLAN

Dust monitoring will be performed at the Site during subgrade excavation, grading, and handling activities in accordance with the *NYSDEC's DER-10 (May 2010) Appendix A1 (NYSDOH's Generic Community Air Monitoring Plan) and Appendix A1 (Fugitive Dust and Particulate Monitoring).* Dust suppression techniques will be employed as necessary to mitigate fugitive dust from non-vegetated or disturbed soil/fill during intrusive activities.

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. The truck will be equipped with water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Hauling materials in properly tarped containers or vehicles.
- Covering or proof-rolling excavated areas and materials after excavation activity ceases.
- Reducing the excavation size and/or number of excavations.

4.0 REFERENCES

1. TurnKey Environmental Restoration, LLC. *Phase I Environmental Site Assessment, 1050-1088 Niagara Street, Buffalo, New York*. June 2012.

2. TurnKey Environmental Restoration, LLC. *Limited Phase II Environmental Investigation Report, 1050-1088 Niagara Street, Buffalo, New York*. July 2012.

3. TurnKey Environmental Restoration, LLC. *Supplemental Phase II Site Investigation Report, 1050-1088 Niagara Street, Buffalo, New York*. August 2013.

4. New York State Department of Environmental Conservation. *DER-10; Technical Guidance for Site Investigation and Remediation*. May 2010.

FIGURES

FIGURE 1

TURNKEY ENVIRONMENTAL RESTORATION, LLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

PROJECT NO.: 0294-013-001

DATE: OCTOBER 2014

DRAFTED BY: BLR/NTM

SITE LOCATION AND VICINITY MAP

INTERIM REMEDIAL MEASURES WORK PLAN

401, 402, & 430 BUFFALO AVENUE SITE
BCP SITE No. C932164
NIAGARA FALLS, NEW YORK

PREPARED FOR

MERANI HOSPITALITY, INC.

DATE: OCTOBER 2014
DRAFTED BY: BLR/NTM

FIGURE 2

SITE PLAN (AERIAL)

INTERIM REMEDIAL MEASURES WORK PLAN

401, 402, & 430 BUFFALO AVENUE SITE
BCP SITE No. C932164
NIAGARA FALLS, NEW YORK

PREPARED FOR

MERANI HOSPITALITY

TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0294-013-001

APPENDIX A

NYSDOH/NYSDEC
GENERIC COMMUNITY AIR MONITORING PLAN
&
FUGITIVE DUST

Appendix A1
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix A2
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX C

RADIOLOGICAL MATERIAL WORK PLAN AND ASSOCIATED DOCUMENTS

BENCHMARK TURNKEY

Greater Radiological Dimensions, Inc.
1527 Ridge Road – Lewiston, NY 1409
Phone: (716)754-2654 Fax: (716)754-2622

Description: Radiological Material Work Plan

Prepared for: Merani Hospitality, Inc.

Project Location: 401, 402 and 430 Buffalo Avenue Site
Niagara Falls, New York, BCP Site No. C932164

1.0 Purpose:

The purpose of this Work Plan and associated support documents, including the Technical Approach and Radiological Health and Safety Plan (attached), is to present the means and methods that will be required to address on-Site elevated radiological soil / fill, and provide radiological technical support, screening and oversight of the investigation and removal of elevated radiological material on the 401, 402, and 430 Buffalo Avenue, Niagara Falls, New York Site (Site).

This radiological work plan and associated radiological support documents have been prepared in association with the NYSDEC Brownfield Cleanup Program (BCP) work plan prepared by TurnKey Environmental Restoration, LLC and Benchmark Environmental Engineering and Science, PLLC. GRD is solely responsible for the contents of this work plan.

Greater Radiological Dimensions Inc. (GRD), a Licensed Radiological Material Handling Company (New York State Department of Health Radioactive Materials License # C5514), will provide radiological oversight for the investigation, pre-screening, remedial excavation, minimization, segregation and off-site transportation of radiologically-impacted soil / fill wastes for off-site disposal at an approved disposal facility.

2.0 Background:

Based on the location of the Site within an area of Niagara Falls New York that is recently known to contain historic slag material which exhibits elevated levels of naturally-occurring radioactive material (NORM) and technologically-enhanced,

naturally-occurring radioactive material (TENORM), radiological screening of the Site was recommended by the NYSDEC to be completed as part of the BCP activities. The environmental and pre-demolition investigation (TurnKey, August 2014) indicated areas of the 401 Buffalo Avenue parcel contain elevated radiological material above background levels, with readings as high as 40,000 counts per minute (cpm) being recorded in the pool area.

The 402 and 430 Buffalo Avenue parcels were previously part of the National Bisquit / Shredded Wheat Factory, and based on the former commercial / industrial use of this portion of the Site, a gamma walkover screening of the entire parcel is planned during the Remedial Investigation (RI) of the Site.

Any elevated radiological material that is planned to be removed during remedial and / or redevelopment activities will be handled in accordance with this work plan and associated technical documents.

3.0 Screening of Potential Radiologic Material:

During intrusive activities, it will be necessary to pre-screen the areas and determine if elevated radiological material is present above the established background. Prior to excavation a radiological technician (Rad Tech) will perform a gamma walkover of the surface area, utilizing a Ludlum Model #2221 Detector paired with a #44-10 sodium iodide probe. Utilizing the results of the gamma walkover; along with visually screening; the rad tech will determine when and how often to scan buckets during excavation.
If elevated activity is found to be approaching the NYSDEC established threshold of separation, the technician will then scan each bucket until levels are at or below background. The threshold is typically determined to be at or near 1.5 to 2 times background; this threshold has previously been used on the properties per the NYSDEC. Therefore, the threshold for the Site would be 12,000-14,000 cpm.

Any material above the threshold will be segregated to the radiological-contaminated lay-down area. A contaminated material lay-down area will be established and appropriately posted. This area will have a plastic under-lay and will be covered with poly sheeting at all times. For more specific means, methods and requirements refer to the Radiation Health and Safety Plan.

Radiological general area air monitoring will be completed during the excavation and handling of elevated radiological material. General air monitoring will be completed in addition to the BCP Community Air Monitoring Plan.

the following procedure for Radiological general area air monitoring will be utilized:

Three (3) F&J low-volume air monitors will be placed waist high within 20 feet of the excavation at upwind, down wind and cross wind of excavation / load out area. The monitors will run during all excavation / load out activities and the filter cartridges will be collected daily.

The 47mm filters will be counted immediately for any excessive levels, then held for 5 days for radon decay, then recounted with a Ludlum model #2929 alpha / beta filter counter or equivalent. The results of air monitoring data will be reported using the guidance in NRC Regulatory Guide 8.25 (attached). All Air Sample data will be compared with the derivative air concentrations (DAC) that are the most conservative for the contaminants expected to be present. Radioactive contaminants in Appendix B of New York's State Sanitary code # "10 NYCRR part 16-ionizing radiation" will be used to assess the exposure potentials, as appropriate.

All instruments will be calibrated in accordance with regulatory guidance and subjected to daily quality checks to ensure proper operating condition and functionality. The data will be recorded on field survey forms and reviewed by senior radiological staff.

4.0 Oversight/Rad Support of Load Out, Shipping and Disposal of Contaminated Material:

With the approval from the NYSDEC and the acceptance of sample results from the approved off-site disposal facility and the facility's state regulatory agency, the radiological -contaminated material will be loaded into the appropriate shipping containers for off-site transportation by licensed radiological transporter and disposal at registered disposal facility. GRD will provide a certified waste shipper if needed who will ensure that all of the necessary permits and state regulatory requirements are fulfilled. The trucks will be lined with poly and covered (tarped). A dose rate survey of the trailer and cab will be performed, with a Bicron µR meter, in order to determine the dose rate in (µr / hr). The tires will be pre-scanned prior to leaving the Site, and if levels are more than two times the background, the tires will be decontaminated utilizing water prior to being released from the excavation site. Decon materials will be containerized for off-site disposal. Details are provided in the support documents.

Once the load out of contaminated material has been completed, all associated equipment will be scanned and released. A pre- and post-gamma walkover survey of the radiological-contaminated staging area will be performed.

5.0 Reporting:

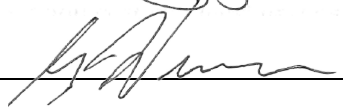
Daily field logs will be utilized to record daily activities, screening results and sampling, and equipment usage and calibration results. Additional documentation,

including: radiological waste characterization sample results, disposal facility applications and approvals, off-site transporter licenses, radiological worker training certifications, and disposal manifests and tonnage reports will be provided in the close out documents.

Greater Radiological Dimensions, Inc.
1527 Ridge Road – Lewiston, NY 14092
Phone: (716)754-2654 Fax: (716)754-2622

Greater Radiological Dimensions Inc. 1527 Ridge Road , Lewiston, NY 14092	
LOCATION: 401, 402 and 430 BUFFALO AVENUE Site **Niagara Falls New York BCP Site No. C932164**	

TECHNICAL APPROACH

Prepared By	**Stuart Pryce** **Project Manager / Sr. Technician**	
Approved By:	**George Weissenburger** **Program Manager / Sr. Technician**	

Greater Radiological Dimensions, Inc.
1527 Ridge Road – Lewiston, NY 14092
Phone: (716)754-2654 Fax: (716)754-2622

The anticipated scope of consultant work is as follows:

- Provide radiation health and safety consulting.
- Obtain Radioactive Materials license coverage for Merani Hospitality, Inc. (Merani), and Turnkey Environmental Restoration, LLC (TurnKey) and Benchmark Environmental Engineering and Science, PLLC (Benchmark), their subcontractors, for this project.
- Write a Contaminated Materials Handling Plan (CHMP) for the project. A draft copy of the CMHP must be submitted to Merani, or designated subcontractor, for review and comment. The following is a suggested CHMP outline:

Introduction

- Protection of Workers and General Public
  - General Concepts
  - General Radiation Protection Methodologies
  - Personal Protective Equipment
  - Contamination Control
  - Fugitive Dust Control
  - Instrumentation
  - Contamination Release Limits
- Excavation and Management of Soils and Slag
  - General
  - Radiation Field Screening Procedures
  - Segregation and Transport of Radiologically Contaminated Materials
  - Contaminated Material Staging Area
- Decontamination of Equipment
- Emergency Event Guidelines
- Site Worker Radiation Safety Training Requirements
- Radiological Documentation
  - Screened Material
  - Excavation Actions
  - Training
  - Equipment Decon
  - Project Personnel Contact Information
- References
- Training Outline
- Glossary of Terms

Radioactively Contaminated Materials Handling Plan for the Project

Introduction

Greater Radiological Dimensions, Inc. (GRD) has contracted to provide radiation health and safety consulting, radiation monitoring, and job-site field surveys.

GRD shall be responsible only for radiation-related support services, including radiation related consulting, monitoring, surveying and minor decontamination within radiation control areas for this project. The non-radiological aspects of the project shall be the responsibility of Merani and their designated subcontractors, including ,excavation and utility installation (and attendant health and safety), non-radioactive air monitoring, dust control, disposal and re-use of non-radiologic excavated materials and waste.

GRD will prepare relevant Radiation Work Permits (RWPs), Radiation Standard Operating Procedures (RSOPs), and Radiation Health and Safety Plans (RHASPs). It is the responsibility of Merani and/or its subcontractors to prepare all other relevant plans.

Protection of Workers and General Public

General Concepts

In summary, GRD will take measures to minimize exposure to ionizing radiation for the general public, Merani, and associated contract works, and GRD workers and associated contract employees. General methodologies and rules are described in more detail below.

The overarching philosophy/methodology for protection is As Low As Reasonably Achievable (ALARA), whereby workers keep any received dose ALARA through formal procedures and sound work practices, including monitoring and personal protective equipment – PPE, as described below.

General Radiation Protection Methodologies

General Rule for Safe Use of Radioactive Material

The radiation dose received by any person from external or internal exposure to ionizing radiation in a radiation installation (a controlled area in which radioactive material or machines generating ionizing radiation or both are used) must be held to the lowest possible value consistent with effective use of the installation. Exposure of personnel, and the general public, to ionizing radiation, must never exceed the legal maximum permissible values. Control of ionizing radiation exposure is based on the assumption that any exposure involves some risk. However, occupational exposure within accepted limits represents a very small risk compared to the other risks voluntarily encountered in other work environments. The policy of GRD is to maintain occupational exposures of individuals within allowable Radiation Exposure Guides. The individual and collective dose to workers is maintained As Low As Reasonably Achievable (ALARA). ALARA is a part of the normal work process where people are working with ionizing radiation. Management at all levels, and in all areas, as well as each individual worker, must take an active role in minimizing this radiation exposure. Disposal of all radioactive waste must be in accordance with procedures contained in GRD's Radiation License. The radiation dose received by any person from external and/or internal exposure to ionizing radiation in a non-controlled area must be held as close to natural background levels as possible. Exposure to the general public from any operation must never exceed the annual legal maximum permissible exposure level of 100 mRem per year above the natural background level. Legal maximum permissible dose levels are those specified in the current edition of the New York State Department of Health Sanitary Code, Chapter I, Part 16, Ionizing Radiation: and in Title 10, Part 20, of the Code of Federal Regulations (10 CFR 20), Radiation Protection. These two reference materials contain definitions of terms used in this document. Federal and State regulations shall be considered as a

part of GRD's procedures outlined within this document.

GRD shall employ the following methods/procedures for ensuring radiation protection of workers and the general public:

- General and specific RWPs (radiation work permits) are written for a 6-month period and will be reviewed and revised as conditions change. Specific RWPs are written for jobs that are outside the scope of work covered in a general RWP.
- Procedures in RWPs will be followed.
- Employ personnel monitoring – Thermoluminescent Detector (TLD) bioassays; TLD's to be worn between neck & waist.
- Control of area access by posting radiation areas.
- Materials sampling.
- Use of a log book to track work activities.
- Performance of RWP surveys, which accompany the RWP.
- If needed, buffer areas shall be placed at egress points from contaminated areas.
- Keep access egress logs.
- Slag is a heavy material, but airborne material arising from slag has been shown not to be an issue from historical data from other BCP Site(s) in Niagara Falls, New York.
- Instrumentation to be calibrated yearly by a commercial service.
- Instruments are set up to +/- 2 sigma measurement tolerances.
- Daily source checks of all instruments are to be performed and recorded on daily performance sheets.
- Source jigs will be performance checked to obtain appropriate use geometry.
- Loose contamination surveys shall be performed using swipes for 100 cm2 area. LAWs (large area wipes) can also be used to detect loose contamination as another method of radiation surveying. In this case, a cloth, such as maslin, is used in place of 100 cm2 swipes.100 cm2 swipes will be counted on instrumentation that can detect beta, gamma, and alpha emitters.
- Direct contamination surveys will be performed by scanning with instrumentation that detects beta, gamma, and alpha.
- Equipment surveys that pertain to any material or equipment in a controlled area shall be performed on a weekly basis.
- Equipment surveys will be performed for equipment that will remain on the job site, if it is being released from controlled areas.
- Gamma walk-over survey of all accessible areas fo the BCP Site will be comeplted prior to intrusive activities
- Excavation surveys shall be performed, in areas of the Site that have been identified as elevated during previous assessment or during the walk-over survey, during excavation activities.
- Collection of radiologic waste characterization samples for disposal approval, as required.
- Personnel surveys/monitoring of personnel shall be performed on a schedule set by the RWP.
- All surveys will be available for workers to review conditions and will also be included in RWP packages.
- Conditional release surveys will be performed when materials and equipment are leaving a controlled area.
- An unconditional release survey is performed when equipment is being released from the job site. Equipment surveys are also required when maintenance is performed on equipment.

- All surveys shall be documented.

Personal Protective Equipment (PPE)

Use and Selection of Protective Clothing

PPE will be selected based on the contamination levels in the work area and the anticipated work activity, ALARA and safety considerations, and consideration of non-radiological hazardous materials that may be present. Surfaces are considered radiologically contaminated if above Table 4 levels.

PPE provided will be in good condition and free of chemical or radioactive contamination and may include the following items at the discretion of the RSO:

- Full Set Coveralls (TyvekTM or cotton)
- Cotton glove liners
- Rubber or chemical resistant gloves
- Shoe covers
- Protective overshoes
- Hood (TyvekTM or cotton)

Protective clothing and equipment selected for project tasks will be described in the GRD RHASP, together with procedures for donning and removing PPE without spreading contamination or contaminating the worker. The necessary PPE for a task will be specified by the RWP.

Use and Selection of Respiratory Protection Devices

GRD's documented respiratory protection program details specific procedures for respiratory usage, fit, cleaning, and so forth. Engineering control measures will be provided to limit the concentrations of radioactivity in air to levels below those that constitute an airborne radioactivity area to the extent feasible. When this level is not feasible, other methods such as administrative controls and respiratory protection will be employed to limit the potential for intake of radioactive material.

Only respiratory protection equipment that is tested and certified by the National Institute for Occupational Safety and Health (NIOSH) will be used. Protection factors listed in Appendix A of 10 CFR 20 will be used in the assessment of potential radioactive material intake. Selection of appropriate respiratory protection devices will be designated within either the HASP or the RWP. At a minimum, respiratory protection devices will be selected so that a protection factor greater than the multiple by which peak concentrations or airborne radioactivity exceed the values specified in Appendix B of 10 CFR 20 is not exceeded. Only respiratory protection equipment that has been specifically certified for emergency use by NIOSHI Mine Safety and Health Administration (MSHA) will be used as emergency devices. Whenever respiratory protection will be used at a site, the following additional minimum requirements will be met:

Air sampling for radiation will be performed to identify the potential hazard, permit proper equipment selection, and estimate exposures. Surveys and bioassays, as appropriate, will be performed to evaluate actual intakes. Respirators will be tested for operability immediately prior to each use. Written procedures will be available regarding selection, fitting, issuance, maintenance, medical testing and testing of respirators (including testing for operability prior to each use), supervision and training of personnel, monitoring (including air sampling and bioassays), and recordkeeping.

Radioactive Contamination Control

The best way to control the spread of radioactive contamination is to prevent it from occurring. However, in virtually any environment, this is impossible. Therefore, the next best solution is to delineate and enforce boundaries beyond which contamination will not be permitted. Access should be limited to as few points as possible to minimize the possibility of undetected contamination being carried out of the area. These boundaries should enclose the smallest area possible and should be monitored to ensure that no contamination can escape. Monitoring should include, but not be limited to, surveys of all personnel and equipment entering and leaving the contaminated areas, the entry and exit areas, and any boundaries that are not solid (i.e. any rope boundaries, turnstiles, gates, doorways, etc.).

At the entrance points, it is also helpful to have a buffer zone with a step-off pad that will allow personnel entering and exiting the contaminated area a place to don or to remove anti-contamination (Anti-C) clothing and to frisk themselves for contamination before their entrance or exit. This buffer zone should be surveyed frequently to ensure that it is maintained contamination-free. If this area is the only egress from the contaminated area, and it is clean, then the likelihood that contamination will spread beyond that point is remote.

The boundaries of entry points to any contaminated area should be clearly marked and posted with the requirements for entry. This may include Anti-C clothing, respirators, or only protective gloves (PPE). There should also be a supply of the proper clothing available at the entrance to the area and waste cans in which to dispose of the clothing upon exiting. Finally, there should be a person present in the vicinity of the entrance/exit point to ensure that proper frisking and logging is performed and to deal with any problems that may arise.

Much of radiological contamination control is similar to chemical contamination control. The best way to prevent personal contamination is to avoid coming in contact with any source of contamination. If this is not possible, then one should carefully dress in Anti-C clothing that is appropriate for the nature and amount of contamination that is present. Upon exiting an area, one should remove any of the potentially-contaminated clothing and perform a personal survey to ensure that there was no leakage of contamination past the protective clothing. Anything that comes in contact with a piece of contaminated material such as the ground, a fence, a truck tire, an excavator bucket, etc., should be treated as contaminated and either left in the contaminated area, placed in a bag to prevent the spread of contamination from that object to other areas, or decontaminated and removed from the area.

Some additional Guidance for contamination control has been provided by the US NRC (Nuclear Regulatory Commission); e.g., IE Circular No. 81-07: Control of Radioactively Contaminated Material". Excerpts relevant to this Project are shown below. Items and material should not be removed from the restricted area until they have been surveyed or evaluated for potential radioactive contamination by a qualified* individual. Personal effects (e.g., notebooks, tools, flashlights, etc.) which are hand carried need not be subjected to the qualified individual survey or evaluation, but these items should be subjected to the same survey requirements as the individual possessing the items. Contaminated or radioactive items and materials must be controlled, contained, handled, used, and transferred in accordance with applicable regulations.

The contamination monitoring using portable survey instruments or laboratory measurements should be performed with instrumentation and techniques (survey scanning speed, counting times, background radiation levels) necessary to detect 5000 dpm/100 cm2 total and 1000 dpm/100 cm2 removable beta/gamma contamination. Instruments should be calibrated with radiation sources having consistent energy spectrum and instrument response with the radio nuclides being measured. If alpha contamination is suspected appropriate surveys and/or laboratory measurements capable of detecting 100 dpm/100 cm2 fixed and 20 dpm/100 cm2 removable alpha activities should be performed.

A qualified individual is defined as a person meeting the radiation protection technician qualifications of Regulatory Guide 1.8, Rev. 1, which endorses ANSI N18.1, 1971.

In evaluating the radioactivity on inaccessible surfaces (e.g., pipes, drain lines, and duct work), measurements at other appropriate access points may be used for evaluating contamination provided the contamination levels at the accessible locations can be demonstrated to be representative of the potential contamination at the inaccessible surfaces. Otherwise, the material should not be released for unrestricted use.

Federal, State, and Municipal regulations for the control of radioactive contamination shall be considered and followed as a part of GRD's procedures. GRD shall employ the following methods / procedures for contamination control:

- All areas identified as containing radioactive contaminants shall be surrounded by posting ropes.
- Buffer areas will be identified per RWPs.
- Access and egress logs shall be kept. Workers shall initial the logs upon entrance and exit and will be frisked appropriately at egress points.
- Workers shall sign the RWP to acknowledge that each worker has read and understands the radiological conditions, PPE that they will wear, and will follow any special instructions stated in the RWP.
- PPE shall be worn per the approved RWP.
- Conditional release surveys on equipment that will remain on site shall be conducted on a weekly basis and the results documented.
- Unconditional release surveys of equipment to be leaving the site shall be performed and documented in accordance with the Section 2.2 guideline in DOE 10CFR 835.
- Materials will be bagged and appropriately tagged.
- Laydown areas will be established and appropriately posted.
- Laydown areas will have a plastic underlayment on the ground for material to lay on; such contaminated material will be covered at all times.
- Contaminated material will be placed in lined trucks and transported to laydown areas; no posting on trucks will be required at the job site.
- A bag at the egress will be in place where all PPE shall be deposited.

  Excavators or equipment used in controlled areas that have contamination above release criteria will either have to stay in controlled area or be decontaminated by established procedures. The decontamination method that is most effective and efficient on excavator buckets and tires is water-based washing, which is performed in a controlled area. After washing and drying, the equipment is then surveyed and the results documented. If the ground is contaminated during such operations, contaminated material / soil will be contained and captured.
- Any contaminants arising from a decontamination operation with be captured and contained.
- Unloading of contaminated material at laydown areas will require the presence of a radiation technician to ensure truck and other equipment tires are free of contamination and that all postings are returned to their original locations, so that areas remain controlled.
- Radiation technicians will control the course of excavations and can serve as a posting in some cases.
- Continuous radiation-monitoring coverage and intermittent coverage will be provided by technicians, depending on job situations and conformance with the RWP.
- Buffer areas always will accompany contamination areas.
- Conditional release surveys will be performed when equipment, tools, or machinery are leaving controlled areas / contamination and will be remaining on site.
- Unconditional release surveys will be performed for material or equipment leaving the Project site.

- Contaminated material will be placed in lined trucks and covered if transported on public roads.

Fugitive Dust Control

General

It should be the responsibility of the excavation and construction contractor to provide fugitive dust emissions control at the job site. Some suggested control measures, such as the erection of screens/barriers/enclosures, covers on piles, covers on trucks, water sprays, latex- binder sprays, and chemical conditioning. Such control measures can be found in US EPA Document EPA/540/2-85/003, Nov 1985, "Dust Control at Hazardous Waste Sites".
GRD will be responsible for the monitoring of dust for radiation. GRD will control dust stirring and emissions by its monitoring personnel by appropriate measures.

Merani Responsibility

Regulations call for the demolition contractor to prepare a Fugitive Dust Suppression Plan coupled with a Community Air Monitoring Program. Elements of this submittal will be consistent the NYSDOH Generic Community Air Monitoring Plan. The elements of this submittal should include:

- Description of dust suppression techniques to be employed during site activities including excavation, demolition and earthwork.
- Description of particulate monitoring techniques and frequency, instrumentation and analytical methods.
- Location of monitoring points.
- Record keeping of meteorological data.
- Action levels, corrective actions, and stop work levels.
- Quality Assurance / Quality Control Plan.
- Demolition, Excavation, and Construction Work Plans
- Identification of the qualified professional who prepared the plan.

During construction of the Project, water or other dust-suppression substances approved by local, state and federal regulators will be used to control dust along public roads as well as Project access roads as needed throughout the duration of construction activities. Globe and its contractors will require reduced vehicle speed on unpaved roads. The enforcement of reduced vehicular speed within the Project boundary will reduce the amount of fugitive dust that would be generated by passing construction traffic.

Instrumentation

GRD's suite of instruments includes personnel dosimeters, radiation survey meters, alpha/gamma detectors, and sample counting meters. Specific instruments include:

Ludlum 2221 w/44-10 Gamma detector Ludlum M-12w/44-9 Beta-gamma frisker Ludlum M-12 Alpha frisker
Ludlum M-19 Gamma dose rate meter
Ludlum 2360 w/43-89 Alpha-beta frisk
Ludlum M-12w/43-5 Alpha frisker
Ludlum 2241w/w44-38 Beta /Gamma dose rate meter
Ludlum 2929w/43-10-1 Alpha-beta-gamma smear & filter counter
Ludlum 2221w/44-1 Gamma detector with Trimble GPS.

Table 1 lists further details about these instruments.

Table 1: GRD Radiation Detection Instruments

Type	Number Available	Radiation Detected	Sensitivity Range	Use
Gamma detector	5	Gamma	0-500 kcpm	Gamma-walkover surveys.
Gamma detector with GPS	1	Gamma	0-500 kcpm	Gamma-walkover surveys, using GPS.
Beta-gamma frisker	2	Beta, gamma	0-500 kcpm	Personal frisking; field surveys.
Gamma dose rate meter	1	Gamma	0-5 mR/hr	Surveys
Alpha Beta frisker	2	Alpha, beta	0-500 kcpm	Personal frisking, field surveys.
Alpha frisker	2	Alpha	0-500 kcpm	Personal frisking, field surveys.
Beta /Gamma dose rate meter	1	Beta, gamma	0-200 mR/hr	Surveys.
Alpha-beta-gamma counter	1	Alpha, beta, gamma	0-9,999,999 cpm	Smear & filter counting.

Instrument calibrations will be performed by a commercial calibration service and calibrations will be performed by persons licensed to perform such services by the US Nuclear Regulatory Commission or an Agreement State. A copy of this license will be kept on file with calibration certificates. GRD will do no in-house calibrations. However, GRD will source-check instruments

before use (with radiation-permit exempt sources). GRD, Inc. will require that the calibration service follow the guidance and documentation provided in Appendix B of New York State Radiation Guide 1.7 (July 2006) and provide the appropriate Survey Meter Calibration Reports. GRD will employ radiation-permit-exempt 'check sources' to check / verify the operation of survey meters / instruments whenever such devices are used. Check sources are Tc-99, Cs-137, and Po-210.

Calibration Report

Calibration reports from the commercial service will adhere to the documentation provided in Appendix B of New York State Radiation Guide 1.7 (July 2006).

Contamination Release Limits

Radiological contamination survey, documentation, and labeling requirements will be established for all property / material released from an RCA (Radiation Control Area). All equipment, materials, and property used in an RCA established for contamination control will be considered as potentially contaminated and will not be released to an uncontrolled or unrestricted area until they have been surveyed and meet criteria established by the RSO.

Excavation and Management of Soils

General

GRD will be responsible for providing radiation health and safety support to in-field operations to ensure that workers and the general public are adequately protected from radiation hazards. Such work includes close support for construction and utility workers, radioactive air monitoring, and surveys of excavated / removed material, stored materials, equipment, and materials and equipment to be taken offsite. GRD will prepare its own radiation work permits, health and safety plans, and standard operating procedures. Merani or its chosen contractors shall be responsible for preparing such permits and plans for their respective work topics.

Radiological (rad) removal work surveys, monitoring, and decontamination shall be performed under the direct supervision of GRD personnel in conformance with GRD's Site-Specific Radiological Safety Plan. Such a plan shall be approved by the NYSDEC and the NYSDOH (e-mail correspondence is sufficient).

Radiation Field Screening Procedures Radiation Surveys

Radiological monitoring and surveys of radiation exposure levels, contamination, and airborne radioactivity will be conducted to:

- Characterize workplace conditions and detect changes in those conditions;
- Verify the effectiveness of physical design features, engineering and process controls, and administrative control procedures,
- Demonstrate regulatory compliance;
- Detect the gradual buildup of radioactive material;
- Identify and control potential sources of personnel exposure; and
- Identify areas requiring postings.
- Monitoring will be performed only by trained and qualified personnel and will be conducted as specified by the project RSO.
- Minimally, radiological surveys will be conducted. Once per shift at entrance or exit points, between contamination areas and clean areas; Daily in RCAs; Weekly in radiation and / or contamination areas; and Weekly in clean areas.

The radiological field measurements will be performed throughout the project. The surveys will focus on the primary radiological contaminants of concern. A gamma scan of the soils surrounding Project excavation activities (out to 15 meters beyond the work area) will be performed to document the status prior to and following groundbreaking/excavation. Radiation detection and measurement instrumentation will be selected based on the type and quantity of radiation to be measured. The instruments used for direct measurements will be capable of detecting the radiation of concern to minimum detectable concentrations (MDCs). The instrumentation to be used by the GRD project team is provided in Table 1. Scan MDCs for various radionuclides are listed in NUREG-1507, Table 6.4 for a scan speed of approximately 1 meter per second. The radionuclides that will be measured are primarily natural uranium and Ra-NUREG -1507, Table 6.4 in the subject reference lists scan MDCs for a 2"×2" NaI(Tl) scintillation detector of 80 and 2.8 picocuries per gram (pCi/g) for natural uranium and Ra-226, respectively. Daily instrument quality control (QC) checks will be documented and performed before and after each day's work.

Static alpha, static alpha + beta, removable alpha, removable beta, and direct gamma exposure rate measurements will be carried out periodically. Instrumentation will be the same instrument types that will be used during pre-excavation surveys. More than one survey instrument will be used for static alpha, and static alpha + beta measurements. Approximately two to four separate areas encompassing excavation paths will be selected and within each area two to four measurements of each (static alpha, static alpha + beta, removable alpha, removable beta, and gamma exposure) will be obtained at unique locations within the area. It is expected that static measurement count times will be about one minute each unless otherwise directed by the RSO to achieve lower detection limits. Soil samples should be collected at three locations and analyzed to determine the concentrations of naturally occurring radionuclide (U-234, U-235, U-238, Ra- 226, Th- 230, Th-232, and Th-228).

Gamma scans will be performed on areas out to 15 meters beyond the work area to establish the existing radiological conditions. This data will establish the comparison for post-surveys to insure excavation activities do not radiologically contaminate other areas and to prevent contamination from outside areas from contaminating the excavation debris. Gamma scans of the areas will be performed using a 2"x 2" NaI (Tl) detector (Ludlum Model 44-10 detector or equivalent) with a 2350-1 data logger or equivalent. Surveys will be performed moving the detector in a serpentine pattern at a speed of no greater than 1 meter per second, covering at least 50% of the area. The surveys will identify posted areas and areas of elevated radioactivity in the soils.

Radiation-Related Air Sampling

General area and personal air sampling (if required) will be conducted in accordance with the guidance in NRC Regulatory Guide 8.25. Air sampling will be employed when necessary to determine whether confinement or suppression of radioactive material is effective, to determine required workplace administrative controls, to estimate worker intakes, and to determine what personal protective equipment (PPE) is appropriate.

General area and/or perimeter air sampling for airborne radioactivity will be conducted with low-volume air samplers F and J Model LV-1 or equivalent (0-100 1pm). The low-volume samplers will use 47mm filters and will be counted on a Ludlum model 2929 sample counter or equivalent, for alpha and beta immediately to determine any excessive levels. The filters will be changed daily. Following a 5 day hold time for radon decay, where the potential for airborne radioactivity is above background levels, the sample will be counted again to determine the actual activity without radon progeny contribution.

High-volume air samplers are those with sufficient flow rate to achieve a minimum detectable activity (MDA) of 10% of the applicable DAC in an 8-hour shift. Air sample filters will be analyzed on site for gross alpha and gross beta in accordance with written procedures. In work

zones with a potential for short-term airborne excursions, representative breathing zone samples will be collected in the immediate vicinity of work being performed to determine whether the area is an airborne radioactivity area requiring additional work controls or to assess the worker's intake of airborne radioactive materials. When required to estimate worker intakes, representative personal air sampling from a member of each field team working in radiologically contaminated areas will be conducted for airborne radioactivity in the breathing zone. The data will be compared with the DACs that are the most conservative for the contaminant(s) expected to be present to gauge employee exposure potential. DACs for radioactive contaminants in Appendix B to 10 NYCRR 16 will be used to assess exposure potentials, as appropriate.

Segregation and Transport of Radiologically Contaminated Materials

Excavated soil will be examined/monitored in the field by GRD personnel for radioactive contamination. Radioactively contaminated soil shall be placed in a temporary laydown area for storage and further monitoring. Merani or other contractor personnel will examine excavated or stored soil/materials for other potential contamination (e.g., chemicals). An on-site competent person will evaluate soil intended for off-site reuse for consistency with regulations. "Clean" excavated soil will be temporarily staged for characterization, if necessary.
It is currently anticipated that affected soil may be live-loaded (after appropriate screening) into vehicles for transport and disposal (or reuse) off site, presuming approval is previously received from the facility accepting the waste.

A separate Transportation and Disposal Plan will be prepared by GRD for the subject Project. The Transportation and Disposal Plan purpose is to aid the assigned project staff in performing transportation related work, assuring that compliance with motor carrier, federal, state and local regulations are understood and adhered to applicable transportation activities performed by employees and lower tier subcontractors. The project team shall implement the Transportation and Disposal Plan in accordance with existing procedures to ensure that the transportation of hazardous materials on-site and off-site is performed in accordance with applicable federal, state and local rules and regulations.

Unless otherwise indicated, the following codes, standards, laws, and regulations establish the minimum requirements for transportation-related work:

- 10 CPR 830- Nuclear Safety Management
- 10 CFR 835- Occupational Radiation Protection
- ICAO/IATA- Dangerous Goods Regulations
- ISO 9001- Quality Management Standard
- FMCSR- Federal Motor Carrier Safety Regulations
- NYCRR- New York Codes, Rules, Regulations
- TDEC Rule 1200-1-7
- Title 29 CFR 1910- Occupational Safety and Health Standards
- Title 40 CFR 61, 262-263 and 700-789
- Title 49 CFR, 100-185, 325 and 355-399

Radiologically Contaminated Material Staging Area

Prior to the start of any excavation or Site clearing work, a subsurface clearance review of the Site will be conducted. Support facilities including an equipment/vehicle decontamination pad and equipment staging areas will be prepared at the Site. Additionally, staging areas for the temporary storage of excavated "clean" soil, or any affected soil that will not be live-loaded for off-site transport and disposal, will be constructed adjacent to excavation areas. Soil staging areas will be constructed with a double layer of 6-mil polyethylene sheeting bermed at the sides with hay bales or equivalent material of similar mass and shape. Staged excavated soil will be covered at the end of each work day and during moderate or heavy precipitation events. These facilities will meet the requirements established in the RHASP for the Exclusion Zone, "Clean" excavated soil will be temporarily staged for characterization, if necessary.

It is currently anticipated that affected soil may be live-loaded (after appropriate screening) into vehicles for transport and disposal (or reuse) off site, presuming approval is previously received from the facility accepting the waste.

Decontamination of Equipment

Equipment decontamination area(s) will be established at predetermined locations as required. These areas will be available for the cleaning of light and heavy equipment (tracked construction equipment, vehicles, etc.) used during radiological excavation and remediation activities. In- place cleaning may include rinsing and/or dry, gross cleaning. If wet decontamination methods are used, water will be captured and containerized for characterization and disposal. All equipment will be evaluated for removable radioactive contamination before leaving the facility.

Equipment will not be demobilized from the Site until it has satisfied an outbound radiological survey and is free released. Once completed, the equipment and support materials can be returned to the rental company or shop location as appropriate.

Surface contamination levels presented in Table 2 will be used to determine if a piece of equipment is contaminated with radioactive materials. When decontamination is necessary, decontamination will be performed using techniques that are appropriate based on site-specific conditions. Generally, dry decontamination methods such as high-efficiency particulate air (1-1EPA) vacuuming or wipe-downs are preferred when facilities for the collection of radiological contaminated wastewater are not in place. If adequate facilities exist for the collection of such fluids, it may be appropriate to use a wet decontamination technique. Additional decontamination methods in extreme conditions include sand or abrasive blasting. Specific decontamination procedures and requirements shall be made under the direction of the RSO.

Emergency and Abnormal Event Guidelines

Details on the site-specific radiological emergency procedures are provided in the RHASP. All site personnel will be instructed in their emergency responsibilities and the emergency procedures. An emergency hospital is identified in the RHASP and maps to this facility are readily available. Merani/site contractors will require their own HASP, with included emergency procedures. Both HASPS shall be shared with all personnel.

Radiological Documentation

GRD shall only be responsible for records pertaining to radiation surveys, monitoring, individual exposures, and limited decontamination of excavated material. Records associated

with radiation surveys and measurements performed to support activities associated with D&D of a site and equipment are:

- Name of the person making the evaluation and recording the results;
- Date of the survey;
- Instrument serial number used for surveys and measurements;
- Results obtained: and
- Applicable review.

Records for Individuals

GRD will record contamination levels observed and procedures followed for incidents involving contamination of individuals. The record should include name of individuals involved, description of work activities, calculated dose, probable causes (including root causes), steps taken to reduce future incidents of contamination, times and dates, and the surveyor's signature. Records to be maintained include the following (as available):

- Doses received by individuals, for whom monitoring was required during previous employment.
- Doses received by individuals for whom monitoring was required:
- Dose assessments for individuals for whom bioassay was performed:
- Doses to the embryo/fetus of a declared pregnant employee:
- Written declarations of pregnancy;
- Written withdrawal of declaration of pregnancy.

RSP records will be maintained to document compliance with regulatory requirements and the exercise of due diligence in the control of radiological hazards for the protection of employees, members of the public, and the environment. These records will be transferred to the project file at the conclusion of the project.

Screened Material Records

During field screening of material, all results will be documented in a GRD daily log. Results will then be inputed into a computer generated GRD radiological survey form.

Excavation Actions Records

GRD shall only be responsible for records of radiation surveys, monitoring, and limited decontamination of excavated material. Excavation activities will be documented on a GRD daily log, Results will then be inputted into a computer generated GRD radiological survey form, which includes a map of areas of excavation and activity for all materials.
Radiological surveys will be documented on a survey map with areas of elevated (greater than two times the area background) exposure rates (or count rates) clearly marked. Areas of elevated activity will be reviewed by the RSO.

Training Records

All GRD employees and anyone working in contaminated areas, must have an 8-hour. radiation worker class. At the end of training, a test will be administered, the results of which will be kept on file. A certificate issued upon completion of training. (test /training approved by NYDOH)

Equipment Decontamination Records

All equipment to be used in contaminated areas will be documented on an incoming GRD survey form. All outgoing equipment will be surveyed and documented in the same manner. Equipment requiring decontamination will have a pre- decontamination survey performed. A post decontamination survey will also be documented.

Training Outline

Training in radiation protection will be under the aegis of Greater Radiological Dimensions, LLC of Lewiston, NY. GRD, Inc. confirms that it will follow the model procedure for training and instruction that is shown in Appendix A of the New York State Department of Health Radiation Guide 1.7 (July 2006). An outline of key GRD training is summarized below. Periodic radiological safety training is necessary to ensure that all individuals understand the general and specific radiological hazards, their responsibility to GRD, Inc. and the public for safe handling of radioactive materials, and to maintain their individual radiation exposure ALARA. The appropriate degree of training for each individual will be established based on the nature of the job assignment (i.e. the location where the work will be performed, the hazards associated with that particular area, and the methods used to perform the work). Workers will be categorized as General Workers (those who do not frequent the Controlled Radiation Zone (CRZ) and typically do not work with radiation or radioactive materials), or Radiation Workers (those who do). General Workers will not have unescorted access to the CRZ. Visitors may be exempted from training requirements provided that he/she is escorted, has received a safety briefing, and has written authorization from the RSO or designee.Each worker who is categorized as a Radiation Worker will receive a minimum of 8 hours classroom training prior to initial assignment if they have no prior experience in equivalent radiological work. The purpose of the training is to teach proper methods for working with radiation and handling radioactive materials, to discuss the effects of radiation to explain the risks of occupational exposure, and to identify the specific hazards associated with the operations to be conducted.

The following topics will be covered:

Radioactive materials and radiation;
Biological effects of radiation;
Risks of occupational exposure;
Exposure limits;
ALARA, minimizing exposure (time distance, and shielding);
Personnel dosimetry;
Protective clothing and equipment (PPE);
Radiation detection — operation, calibration, and use;
Contamination control;
Decontamination;
Responsibilities of radiation workers;
Federal and State Regulations and License provisions for the protection of personnel from radiation and radioactive material;
Emergency response;
Radiation exposure reports available to workers;
Respiratory protection program;
Radiation work permits (RWPs).

Workers with documented prior radiological work experience need receive only as much training as is necessary to ensure a level of competence comparable with trained workers.
Reciprocity will be established with radiation worker qualification through other nuclear facility training programs. Qualifications of the trainer shall be a minimum of five (5) years operational radiation protection experience plus 40 hours of formal training in radiation protection. The training session is followed by a written test which must be passed (80% pass rate) before unescorted access is allowed to the RCA. Records of required training are maintained in each worker's file. The RSO may authorize individuals to challenge any training requirement and demonstrate the requisite level of knowledge in radiation safety by successfully completing a written exam and demonstration of practical factors. Hands-on training should be used for newly trained individuals without prior radiation work experience to ensure understanding and proficiency in radiation safety practices.

Quality Control (QC)

QC measures shall be conducted and documented, ensure specifications and requirements are being met, and review and approve any additional procedures or plans required, and training records. Health & Safety Training Certificates and proof of medical certifications as described in reference (a) will be provided for all GRD employees and Benchmark Turnkey and its subcontractors to upon request.

Glossary of Terms

Absorbed Dose (D) – Energy imparted to matter by ionizing radiation per unit mass of irradiated material at the place of interest in that material. The units of absorbed dose are the rad and the gray (Gy).

Airborne Radioactivity Area – Area where the measured concentration of airborne radioactivity above natural background exceeds a peak concentration of 1 derived air concentration (DAC) or 12 DAC-hours during the hours a worker is present during one week.
Any discarded material that is not recycled and does not meet the definition of a hazardous waste, as defined in 40 CFR 261. A subset of non-hazardous waste includes Special Waste.

As Low As Reasonably Achievable (ALARA) – An approach to radiological control or a process to manage and control exposures to the work force and to the general public at levels as low as is reasonable, taking into account social, technical, economic, practical, and public policy considerations.

Bioassay – Measurement of radioactive material deposited within or excreted from the body. This process may include whole body and organ counting as well as collection of urine and fecal samples. Contaminated Area – An area in which radioactive contamination is present that exceeds removable levels presented in Table 3.

Committed Dose Equivalent (HT,50) – The dose equivalent to organs or tissues of reference that will be received from an intake of radioactive material by a person during the 50-year period following the intake.

Committed Effective Dose Equivalent (HE,50) – The sum of the products of the weighting factors

applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues ($H_{E,50}=\Sigma w_T x H_{T,50}$).

Controlled Area – An area to which access is controlled in order to protect personnel from exposure to radiation and radioactive materials. An area in which the existing or potential radiation and radioactivity levels are above normal background but are less than that designating a radiological area or a restricted area.

Derived Air Concentration (DAC) – The concentration of a radionuclide in air that, if breathed over the period of a work year (2000 hours), would result in the annual limit on intake being reached.

Disintegration per Minute (dpm) – The rate of emission by radioactive material as determined by correcting the counts per minute observed by a detector for background, efficiency, and counting geometry associated with the instrument.

Dose – A generic term for the amount of energy deposited in body tissue due to radiation exposure. Technical definitions for dose terms necessary for various exposure calculations and recordkeeping purposes include the following:

Dose Equivalent (HT) – The product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The units of dose equivalent are the rem and Sievert (Sv).

Effective Dose Equivalent (HE) – The sum of the products of the dose equivalent to the organ or tissue (HT) and the weighting factors (WT) applicable to each of the body organs or tissues that are irradiated (HE = SWT x HT) and the committed dose equivalent to an individual organ or tissue (for internal exposures).

Fixed Contamination – Radioactive material that cannot readily be removed from surfaces by nondestructive means such as causal contact, wiping, brushing, or washing.

Frisking – Process of monitoring personnel for contamination.

GRD – Greater Radiological Dimensions, Inc.

Hazardous Material – A substance or material that the DOT has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and is designated as hazardous under Section 5103 of Federal Hazardous Materials Transportation Law (49 U.S.C. 5103). The term includes temperature sensitive materials, materials designated as Hazardous in the Hazardous Materials Table (see 49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions in part 173 of subchapter C of this chapter.
Hazardous Waste – A waste that exhibits one or more of the characteristics of hazardous waste in 40 CFR 26I , Subpart D.

Hazardous Work Permit (HWP) – Permit that identifies Hazardous conditions and health and safety hazards, establishes worker protection and monitoring requirements, and also contains specific approvals for radiological work activities. The HWP serves as an administrative process for planning and controlling radiological work where a Hazardous and informing the worker of the radiological, health, and safety issues.

Health Physics – The practice of radiological protection or radiation safety.

HASP – Health and Safety Plan. A plan included in investigation or cleanup work plans which outlines protective measures for site workers and the community during investigation or cleanup activities

High Radiation Area – An area, accessible to personnel, in which radiation levels could result in a person receiving a dose equivalent to or in excess of 100 mrem in 1 hour at 30 cm from the radiation source or from any surface that the radiation penetrates.

IRM – Interim Remedial Measures, An IRM is a discrete set of planned actions for both emergency and non-emergency situations that can be conducted without the extensive investigation and evaluation of a Remedial Investigation / Feasibility Study (RI / FS).

Internal Dose – The portion of the dose equivalent received from radioactive material taken into the body.

Low-Level Radioactive Waste – A radioactive waste that is not high-level radioactive waste, spent nuclear fuel, transuranic waste, byproduct material [as defined in Section 1 le.(2) of the Atomic Energy Act of 1954, as amended], or naturally occurring radioactive material (including technically enhanced naturally occurring radioactive material (TENORM)). [Adapted from Nuclear Waste Policy Act of 1982, as amended]

Material – Refers to anything being moved, removed or transported. This includes, but is not limited to, chemical and / or radiological contaminated materials, discarded material, equipment, material to be recycled, supplies, samples, and / or waste.

Occupational Dose – The dose received by a person during employment in which the person's assigned duties involve exposure to radiation and to radioactive material. Occupational dose does not include dose received from background radiation, as a patient from medical practices, from voluntary participation in medical research plans, or as a member of the public.

Optically Stimulated Luminescence Dosimeter (OSL) – Radiation detection and measuring device used to record the radiological exposure of personnel or area to certain types of radiation.

Personnel Dosimetry – Devices designed to be worn by a single person for the assessment of dose equivalent such as film badges, optically stimulated luminescence dosimeters, thermoluminescent dosimeters, and pocket ionization chambers.

Personnel Monitoring – Systematic and periodic estimate of radiation dose received by personnel during work hours.

Qualified Shipper – Personnel or subcontractor qualified to identify and classify material, determine packaging requirements, complete shipping papers and perform pre-shipment reviews. The minimum qualifications for the qualified shipper is at least three (3) years of experience in hazardous materials shipping activities with advanced training in transportation covering air, highway, and rail shipment of hazardous materials, and including radioactive materials, hazardous waste and mixed waste.

QC – Quality Control. Quality control is a process by which entities review the quality of all factors involved in a project or production operation.

Radiation – Ionizing radiation that includes alpha particulate, beta particulate, X-rays, gamma

rays, neutrons, and other particulates capable of producing ions.

Radiation Area – An area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent or in excess of 5 mrem in 1 hour at 30 cm from the source of radiation or from any surface that the radiation penetrates.

Radioactive Material Area – A controlled area or structure where radioactive material is used, handled, or stored.

Radioactive Waste – Any garbage, refuse, sludge, and other discarded material, including solid, liquid, semisolid, or contained gaseous material, that must be managed for its radioactive content.

Radiological Controlled Areas (RCA)- Includes Radioactive Materials Areas, Radiation Areas, Contamination Areas, or Airborne Radioactivity Areas.

Radiological Work Permit (RWP) – Permit that identifies radiological conditions, establishes worker protection and monitoring requirements, and contains specific approvals for radiological work activities. The RWP serves as an administrative process for planning and controlling radiological work and informing the worker of the radiological, health and safety issues.

Radiological Worker – Worker whose job assignment requires work on, with, or in the proximity of radiation-producing machines or radioactive materials. A radiological worker has the potential of being exposed to more than 100 mrem per year, which is the sum of the dose equivalent from external irradiation and the committed effective dose equivalent from internal irradiation.

Record – A completed document or other media that provides objective evidence of an item, service, or process.

Recyclable Material – A material that can be used, reused, or reclaimed. A material is used or reused if it is either: I) employed as an ingredient (including use as an intermediate) in an industrial process to make a product: or 2) employed as a substitute for a commercial product. A material is reclaimed if it is processed to recover a useable product or if it is regenerated *Removable*

Contamination – Radioactive material that can be removed from surfaces by nondestructive means, such as casual contact, wiping, brushing, or washing.

SOP - Standard Operating Procedure. A prescribed procedure to be followed routinely; usually containing work-specific instructions and / or rules.

Special Waste – A waste that is difficult or dangerous to manage and may include bulky or industrial waste.

Survey – An evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other source of radiation. When appropriate, such an evaluation includes a physical survey of the location of radioactive material and measurements or calculations of levels of radiation, or concentrations or quantities of radioactive material present.

Total Effective Dose Equivalent (TEDE) – The sum of the deep dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).

Total Organ Dose Equivalent (TODE) – The sum of the deep dose equivalent (for external

Transportation-Related Work – Includes, but is not limited to, identifying, classifying, containerizing, marking, labeling, placarding, preparing shipping papers, offering for shipment, or transporting materials as a result of work performed pursuant to this project.

Unrestricted Area – An area designated by the Nuclear Regulatory Commission (NRC) or Agreement State as being an area to which access is neither limited nor controlled by an NRC or Agreement State licensee.

Waste Acceptance Criteria – The technical and administrative requirements that a waste must meet to be accepted at a storage, treatment or disposal facility.

References

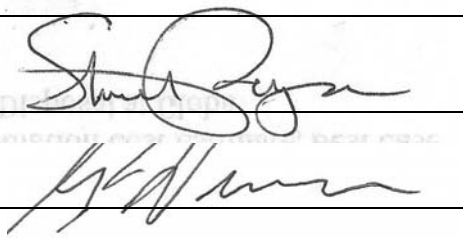
NYS Radiation Material Handling License # C5514, issued to Greater Radiological Dimensions, Inc., March 21, 2012.
10 CPR 830- Nuclear Safety Management
10 CFR 835- Occupational Radiation Protection
ICAO/IATA- Dangerous Goods Regulations
ISO 9001- Quality Management Standard
FMCSR- Federal Motor Carrier Safety Regulations
NYCRR- New York Codes, Rules, Regulations
TDEC Rule 1200-1-7
Title 29 CFR 1910- Occupational Safety and Health Standards
Title 40 CFR 61, 262-263 and 700-789
Title 49 CFR, 100-185, 325 and 355-399

Project Personnel Contact Information

Stuart Pryce (716) 957-0209
George Weissenburger (937) 260-3533

Greater Radiological Dimensions, Inc. 1527 Ridge Road Lewiston, NY 14092	Document: GRD-TI-001
LOCATION: 401 , 402 , 430 BUFFALO AVENUE Site **Niagara Falls, New York BCP Site No. C932164**	

RADIOLOGICAL SAFETY PLAN

Prepared By	**Stuart Pryce** **Project Manager / Sr. Technician**	
Approved By:	**George Weissenburger** **Program Manager / Sr. Technician**	

1. Scope

1.1. Purpose

This document establishes the basis for the radiological controls to be implemented during the performance of work at any client's facility. Operations are subject to the conditions of the applicable Radioactive Materials License and the requirements of applicable regulations. The requirements and guidelines in this document were developed to ensure workers are afforded a safe work environment, to provide a compliant Radiation Protection Program, and to maintain occupational and environmental exposure to ionizing radiation "As Low As Reasonably Achievable" (ALARA).

1.2. Applicability

This document applies to all GRD, Inc. employees, contractors, subcontractors, and visitors at any licensed facility or job site.

1.3. Policy

GRD, Inc. places its highest priority on ensuring the safety and health of its employees and neighbors and protecting the environment. This priority extends to all areas affected by site operations. GRD, Inc. is committed at all levels to implementing a Radiation Protection Program based on the highest standards.

1.4. Responsibilities

1.4.1 The Radiation Safety Officer (RSO) is responsible for ensuring compliance with this Plan, associated procedures, and GRD, Inc. Radioactive Materials License. He has the authority to direct all aspects of the Radiation Protection Program and to ensure compliance with required regulations. The RSO is organizationally independent from operations and has the authority and responsibility to stop any activity which is not conducted in a safe manner or in compliance with the license, applicable regulations, and procedures.

1.4.2 Radiological Safety Technicians (RST) are responsible for determining, by sampling and measurement, compliance with this document. An RST has the authority to stop work if he/she suspects the initiation or continuation of the activity will result in either imminent danger to a worker or a violation of program requirements.

1.4.3 All site personnel are responsible for compliance with the requirements of the Radiation Protection Program and implementation procedures. All personnel have the responsibility and authority to stop work through their supervisor if considered unsafe.

1.5. Quality Assurance

1.5.1 Periodic audits (at least annually) of the Radiation Protection Program will be made during the course of operations to ensure compliance with this document. Audit schedules for individual activities will be identified considering the ALARA, regulatory, and safety reviews in accordance with implementing procedures.

1.5.2 Key elements of Quality Assurance include:

- Conducting Pre-construction quality control meetings
- Performance of daily quality control checks;
- Daily inspection of site, materials, equipment and construction progress;
- Conduct process and materials audits and quality control tests;
- Tracking and documentation of performance versus standards;
- Development of corrective actions;
- Provision of continuing support;
- Maintain "as-built" drawings current with field changes

1.6. Implementation

The provisions of this document will be implemented through radiological safety procedures. These procedures are working documents and will be updated and modified as changes in facilities, equipment, regulations and conditions change.

2. Worker Training In Radiation Protection

2.1. Radiological Safety Training Requirements

2.1.1 Periodic radiological safety training is necessary to ensure that all individuals understand the general and specific radiological hazards, their responsibility to GRD, Inc. and the public for safe handling of radioactive materials, and to maintain their individual radiation exposure ALARA.

2.1.2 The appropriate degree of training for each individual will be established based on the nature of the job assignment (i.e. the location where the work will be performed, the hazards associated with that particular area, and the methods used to perform the work). Workers will be categorized as General Workers (those who do not frequent the Controlled Radiation Zone (CRZ) and typically do not work with radiation or radioactive materials), or Radiation Workers (those who do). General Workers will not have unescorted access to the CRZ. Visitors may be exempted from training requirements provided that he/she is escorted, has received a safety briefing, and has written authorization from the RSO or designee.

2.2. Basic Radiological Safety Training

2.2.1 Each worker who is categorized as a Radiation Worker will receive a minimum of 8 hours classroom training prior to initial assignment if they have no prior experience in equivalent radiological work. The purpose of the training is to teach proper methods for working with radiation and handling radioactive materials, to discuss the effects of radiation to explain the risks of occupational exposure, and to identify the specific hazards associated with the operations to be conducted.

2.2.2 The following topics will be covered:

- Radioactive materials and radiation;
- Biological effects of radiation;
- Risks of occupational exposure;
- Exposure limits;
- ALARA, minimizing exposure (time distance, and shielding);
- Personnel dosimetry;
- Protective clothing and equipment (PPE);
- Radiation detection - operation, calibration, and use;
- Contamination control;
- Decontamination;
- Responsibilities of radiation workers;
- Federal and State Regulations and License provisions for the protection of
- Personnel from radiation and radioactive material;
- Emergency response;
- Radiation exposure reports available to workers;
- Respiratory protection program;
- Radiation work permits (RWPs).

2.2.3 Workers with documented prior radiological work experience need receive only as much training as is necessary to ensure a level of competence comparable with trained workers. Reciprocity will be established with radiation worker qualification through other nuclear facility training programs. Qualifications of the trainer shall be a minimum of five (5) years operational radiation protection experience plus 40 hours of formal training in radiation protection. The training session is followed by a written test which must be passed (80% pass rate) before unescorted access is allowed to the RCA. Records of required training are

maintained in each worker's file. The RSO may authorize individuals to challenge any training requirement and demonstrate the requisite level of knowledge in radiation safety by successfully completing a written exam and demonstration of practical factors. Hands-on training should be used for newly trained individuals without prior radiation work experience to ensure understanding and proficiency in radiation safety practices.

3. Radiation Surveys

3.1. General

3.1.1 Radiation surveys are performed as necessary to ensure personnel do not exceed radiation exposure limits and to meet requirements for posting Radiation, High Radiation, and Very High Radiation Areas. These surveys are performed to determine whether abnormal radiation levels exist and to determine the extent and magnitude of radiation levels. The surveys in this section shall be the minimum performed.

3.1.2 Radiation surveys shall be performed whenever operations are performed that might be expected to change existing radiation levels. Examples of such operations include movement or removal of shielding, radioactive waste processing, and relocation of radioactive materials.

3.1.3 Temporary boundaries (e.g., rope boundaries) of radiation areas shall be surveyed weekly to ensure radiation areas do not extend beyond posted boundaries.

3.1.4 Gamma surveys shall be performed at least weekly in posted radiation, high radiation (if accessible), and radioactive material storage areas. Very high radiation areas shall be surveyed upon entry or when a change of conditions warrant.

3.1.5 When highly radioactive equipment (i.e., contact radiation level greater than 100 mrem/hr) is moved, gamma surveys should be performed in spaces surrounding work areas (including the spaces above and below them if applicable) where personnel are likely to be exposed to radiation.

3.1.6 Potentially contaminated ducts, piping, and hoses outside the RCA shall be surveyed at least monthly when in use or at least annually when not in use (e.g., deactivated systems) for gamma radiation.

3.1.7 Beta-gamma surveys of ventilation system filters shall be performed whenever maintenance work or filter change-out is performed.

3.1.8 Other surveys should be performed as necessary to control personnel exposure to gamma, beta, and alpha radiation. Such surveys should include: (1) a gamma survey during initial entry into a confined space containing potentially radioactive piping; (2) gamma surveys in spaces where significant radiation levels might exist from adjacent operating equipment; (3) alpha, beta/gamma measurements when personnel might come in contact with surfaces contaminated with alpha and beta-emitting radioactive material.

3.1.9 Surveys shall be conducted when performing operations which could result in personnel being exposed to small intense beams of radiation. These operations include maintenance which requires the removal of shielding, or opening shipping/storage containers of radioactive equipment. When surveying are as or equipment where intense small beams of radiation could be present, an instrument should be used with an audible response (e.g., earphones). The probe is moved at a speed which is determined by considering the size of the probe, the instrument response time, the possible intensity of the beam, and the general dose rates in the area. For equipment with complex shield designs, RSTs and workers should be briefed on the equipment design so that the areas most likely to have small beams can be given special attention.

3.1.10 Gamma radiation surveys shall be performed weekly on a revolving basis in the areas of the work site where radioactive materials are not stored or handled. The survey should consist of a scan of accessible areas, offices, lunchrooms, etc. Unrestricted areas adjacent to the restricted area boundary shall be surveyed on a weekly basis. The survey shall consist of measurements taken at 50 foot intervals around the entire perimeter.

3.2. Contamination Surveys for Material Release

3.2.1 Material that is removed from the RCA will be surveyed for surface contamination. Only material which meets the requirements of GRD, Inc.'s free release criteria will be allowed to exit the RCA without

restriction. Material not meeting the free release criteria must be transferred directly to another RCA and/or packaged and labeled for storage or shipment prior to release from the RCA.

3.3. Normal Survey Plan

3.3.1 A free release survey shall be conducted by first surveying the item for removable contamination. The smears shall be counted using an appropriate portable survey instrument. To obtain better sensitivity for radionuclides with very restrictive release limits, a low background laboratory instrument may be used.

3.3.2 A fixed contamination survey is subsequently performed on the item using an appropriate portable survey instrument. The scan rate should not exceed 1 inch per second. The entire surface of the item to be released shall be surveyed. For greater sensitivity where required, a scaler equipped detector can be used along with a statistically valid survey plan approved by the RSO.

3.4. Special Survey Plan

3.4.1 For large amounts of homogeneous material with known history, and the material is either (a) not been exposed to contamination, (b) only suspected of being contaminated, or (c) decontaminated with a method that removes the entire surface area that was contaminated; a special survey plan may be used that surveys less than 100 percent of the surface area. This plan must be specific to the material surveyed and specify a detailed sample and survey plan. This survey plan must be approved by the RSO.

4. ALARA Program

4.1. Minimizing Radiation Exposure

4.1.1 GRD, Inc. shall maintain personnel radiation exposure ALARA. A continuing effort is required to meet this goal by developing and implementing improvements to work procedures and work performance.

4.1.2 All work shall be performed in the RCA under the direction of an approved procedure, approved work instruction, or RWP

4.1.3 Individual work procedures shall specify applicable actions (e.g. mockup training, use of temporary shielding, or removal of equipment from high radiation areas) to be used to minimize radiation exposure while working.

4.1.4 Supervisory personnel and radiological safety personnel shall ensure that personnel are not lingering unnecessarily in radiation areas.

4.1.5 Before entering the RCA, a worker shall receive specific job training and/or briefings necessary to enable him/her to perform his/her work with minimum radiation exposure. Examples include mockup training for specific jobs or periodic briefings by supervisory personnel for routine work.

4.1.6 Radiation levels shall be identified by the use of signs which clearly show the areas with the high and low radiation levels.

4.1.7 GRD, Inc. maintains records of the cumulative radiation exposure involved in performing work and establishes ALARA goals as necessary to improve methods to minimize personnel radiation exposure in future work.

4.2. Plans, Procedures and work instructions

4.2.1 Major work shall be performed under the guidance of a task specific plan, procedure, work instruction, or RWP. Determination of the need for specific approved plans, procedures, work instructions, or permits shall be made by the OM, the RSO, and the Quality Assurance Manager.

4.2.2 Plans, procedures or work instructions may describe the task, radiological conditions, or radiological controls, and shall be approved by the RSO or designee. A RWP will supplement the above with specific contamination or exposure control measures, monitoring requirements, and work instructions.

4.2.3 A pre-job ALARA briefing shall be held prior to beginning work performed under a plan, procedure, work instruction, or RWP to ensure all personnel understand the task, radiological conditions, and radiological controls.

4.3. Radiological Work Permit (RWP)

4.3.1 The RWP is an administrative mechanism to inform personnel of area radiological conditions, entry/exit requirements and specific work requirements that may apply to the task being performed. The RWP shall be used to maintain occupational radiation exposure ALARA, to minimize the spread of contamination, and to provide for augmented monitoring and surveillance where required. A description of the task to be performed and the radiological conditions associated with the work shall be recorded on the RWP. Also specified are the protective measures, dosimetry, and training required by personnel entering the designated area.

4.3.2 A standing RWP is used to govern activities in areas where hazards have been well characterized and radiological conditions are relatively stable. This includes routine activities such as tours and inspections, radiological surveys, and "light work" activities covered by procedures. Standing RWPs must be approved by the RSO or designee and the OM, and are reissued 011 an annual basis. Specific task RWPs are generally issued for the duration of the activity to be performed.

4.3.3 An RWP shall be obtained for all work activities that involve occupational radiation exposure or the potential spread of contamination. This includes activities not specifically covered by an approved plan, procedure or work instructions that are performed in any of the following conditions:

- Entry into a posted Radiation, High Radiation, or Very High Radiation Area;
- Entry into a posted Contamination or Airborne Radioactivity Area;
- Any work within the RCA or on contaminated or potentially contaminated equipment or surfaces;
- Maintenance work that would require the breaking of any process line, tank, vessel, or enclosure containing radioactive material that may become loose or airborne during the task

4.3.4 Signs indicating the need for the RWP shall be conspicuously posted at the entrances to areas were the RWP is required.

4.3.5 It is the responsibility of supervisors proposing to conduct work activities within required areas to initiate the issue of the RWP.

4.3.6 The RST shall complete the RWP after discussion of proposed work activities with the supervisor and performance of appropriate surveys.

4.3.7 Prior to beginning work, the RST shall conduct a pre-job ALARA. Briefing with all personnel working under the RWP. Items discussed shall include work scope, radiological conditions, dosimetry and protective clothing requirements, limiting conditions including stay times and hold points, and emergency actions. All personnel to perform work shall sign the RWP signature form to indicate an understanding of the requirements. Personnel added to the RWP after initiation of work shall be briefed by the RST prior to starting work and shall sign the RWP signature form.

4.3.8 During work under the conditions of a RWP, if radiological conditions change, or the scope of work is changed or expected to change, another RWP will be required and a pre-job ALARA briefing held.

4.3.9 The RST shall determine the type and degree of radiological monitoring required for a specific task. This determination should be based on the potential for radiation exposure or contamination spread and the experience of the personnel conducting the work.

4.3.10 An RWP shall be terminated by the initiator one year from the date of its initiation, or at the completion of the task, whichever comes first. If the work must be continued, a new RWP shall be initiated with the appropriate approvals, briefings, and documentation.

4.3.11 The RSO or designee shall ensure an indexed RWP log is maintained. The RWP log shall include: RWP #, date of issuance, date of termination and reason for RWP (work scope).

4.3.12 The RSO or designee shall ensure that all RWPs are terminated within the time allotted by paragraph 8.3.8 above, and shall ensure copies of all terminated R\VPs are maintained in the facility file throughout the duration of the activities.

5. **Access Control and Restricted Areas**

5.1. General Access

5.1.1 Restricted Areas are maintained for purposes of protecting members of the public against undue risk from exposure to radiation or radioactive materials. Radiation levels at the facility are controlled such that an individual at the Restricted Area boundary could not receive a dose in excess of2 mrem in any hour from external sources, or a cumulative exposure of 100 mrem in a year. Within the Restricted Area are the RCA and support areas. All visitors and vendors must enter the site through the administrative area where a visitor access log is maintained. Visitors are escorted in the RCA.

5.1.2 The RCA may include Radiation, High Radiation, Very High Radiation, Contamination, Airborne Radioactivity, and approved Radioactive Material Storage Areas as appropriate. Access control to the RCA shall be provided via the RW'P process and a formal access control point. The RCA boundary shall consist of engineered barriers and administrative controls which prevent access by unauthorized personnel, and ensure that authorized personnel have received appropriate training arid qualification. The access control requirements are applicable to all employees, contractors and visitors who may have need to enter this area.

5.2. Radiological Areas and Postings

5.2.1 Radiological areas are maintained at various locations inside the RCA, as required. Radiological areas include and will be posted as follows.

• Radiation Area is an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 5mrem in an hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates. To mark such areas, signs shall be conspicuously posted; signs shall contain the conventional magenta three bladed symbol on yellow background and the words "CAUTION RADIATION AREA"; signs are permitted to state the general area radiation level. In addition, "DOSIMETRY REQUIRED" and "RWP REQUIRED" may be posted. No loitering is allowed in these areas.

• High Radiation Area is an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 100 mrem in an hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates. Such areas shall be posted and locked or guarded. The requirement to lock or guard a posted high radiation area does not apply to tanks or voids posted as high radiation areas if entry requires the removal of complex closures. Positive control shall be established for each individual entry into a high radiation area and shall be established in such a way that no individual is prevented from leaving the high radiation area. Prior to locking an unoccupied high radiation area, the area shall be inspected to ensure that no personnel remain inside. No loitering or entry by unauthorized personnel shall be allowed in these spaces. High radiation areas shall be conspicuously posted at entrances into the area. Signs shall contain the conventional magenta three-bladed symbol on yellow background and the words "CAUTION: HIGH RADIATION AREA". In addition, "CONTACT RADIATION SAFETY PRIOR TO ENTRY" shall be posted.

• Very High Radiation Area is an area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 rads in 1 hour at 1 meter from a radiation source or from any surface that the radiation penetrates. Signs shall contain the conventional magenta three-bladed symbol on yellow background and the words: "GRAVE DANGER, VERY HIGH RADIATION AREA". In addition to the control requirements described above for a High Radiation Area, access and security controls for very high radiation areas shall be implemented to ensure an individual cannot gain unauthorized access.

NOTE: PRIOR WRITTEN APPROVAL FROM THE RSO AND QA MANAGER IS REQUIRED FOR ENTRY INTO VERY HIGH RADIATION AREAS.

• Airborne Radioactivity Area is an area where airborne radioactive material exists in concentrations in excess of the derived air concentrations (DACs) specified in Table 1, column 3 of Appendix. B to 10 CFR 20 *(OAC 3701:1-38- 12, Appendix* C, *Table* 1), or to such a degree that an individual in the area without respiratory protection could exceed during a week, an intake of 0.6% of the ALI or 12 DAC-hours. Signs shall be posted at entrances to areas where airborne radioactivity levels exceed or have the potential to

exceed these levels. These signs shall contain the conventional three-bladed magenta symbol on yellow background and the words "CAUTION: AIRBORNE RADIOACTIVITY AREA." The requirements to wear respiratory equipment may also be included on the sign along with the anti-contamination clothing requirements.

• Contamination Area is an area having loose (removable) contamination on exposed surfaces greater than 1000 dpm/100 cm2 beta-gamma activity or 20 dpm/100 cm2 alpha radioactivity. Signs shall be posted at entrances to areas where surface contamination levels exceed or have the potential to exceed these levels. These signs shall contain the conventional three-bladed magenta symbol on yellow background and the words "CAUTION: CONTAMINATION AREA." The requirements to wear anti-contamination clothing or perform personal contamination surveys may also be included on the sign.

• Radiologically Controlled Area (RCA) is an area to which access can be controlled for radiation exposure or contamination control purposes. An RCA typically serves as a buffer around a contamination or radiation area and provides access control for personnel, equipment and material monitoring. Signs shall be posted at entrances to these areas which contain the conventional three-bladed magenta symbol on yellow background and the words "CAUTION: RADIOLOGICALLY CONTROLLED AREA."

• Radioactive Material Storage Area is an area where radioactive material is used or stored in amounts exceeding 10 times the quantity of such material specified in appendix C to 10 CFR 20 *(OAC 3701:1-38-18, Appendix A).* Entrances to areas where radioactive materials are handled or stored that meet this criteria shall be posted with signs having the conventional magenta three-bladed symbol on yellow background and the words "CAUTION: RADIOACTIVE MATERIAL." This posting is in addition to posting required for other radiological areas.

5.2.2 An Access Control Point is a location on the perimeter of a restricted area, or the RCA through which all entries and exits are made. Precautions are taken at the appropriate access control point to prevent the inadvertent exposure to radiation or the spread of contamination to adjacent uncontaminated areas. The dimensions and material requirements of an access control point depend on the type of work to be performed, the number of personnel involved, and the location of the work.

5.3. Temporary Shielding

5.3.1 Since incorrect installation, unauthorized movement, or removal of temporary shielding can result in large changes in work area radiation levels and subsequent radiation exposure, control of temporary shielding is essential.

5.3.2 Temporary shielding installation and removal should be controlled by written instructions. These instructions shall specify locations and amounts of temporary shielding.

5.3.3 After installation, temporary shielding shall be inspected and surveys conducted to ensure it is properly located.

6. **Controlling Airborne Radioactivity**

6.1. General

6.1.1 The primary reason for control of airborne radioactivity is to minimize internal radiation exposure resulting from inhalation of airborne radioactive materials. An intake of radioactive material is measured in units of DAC-hours (DAC multiplied by hours of exposure), which is directly proportional to CEDE.

6.1.2 Radioactivity in the form of particulates, gases, or both can become airborne through sources such as (1) radioactive system leaks, (2) grinding or welding a contaminated component, (3) decontamination operations, (4) disturbing surface contamination deposited on a work surface, (5) improper use of a containment enclosure, (6) inadequate vacuum cleaner and ventilation system control, (7) inadequate application of procedures for venting and draining radioactive systems or components, (8) damage or detects in instrumentation calibration or check sources, and (9) radon from radium sources or from trace amounts of natural radium impurities in construction materials.

6.1.3 Engineering controls shall be used, to the extent practical, to reduce the potential for the release of airborne radioactivity. These -include agents that fix loose contamination, HEPA-filtered ventilation, local exhaust ventilation, containments, decontamination, and wrapping, as required.

6.1.4 Airborne radioactivity monitoring provides a record of ambient airborne radioactivity in the work place, a tool to assess worker intakes, verify required posting, and evaluate the adequacy of engineered and administrative controls for maintaining exposure ALARA.

6.1.5 The RSO will prescribe the continuous or periodic sampling required to detect and evaluate the levels of airborne radioactivity in work areas and exhaust air systems in accordance with this section and Reference 2.1.7. Air sampling is required for activities where an individual is likely to receive in one year, an intake in excess of 10% of the applicable ALL Representative air samples are collected and intakes tracked and controlled such that personnel exposure complies with 10 CFR § 20.1502 *(OAC 3701:1-38-12)* requirements. Continuous air monitoring systems with local and remote alarm capability are provided where the potential for airborne radioactivity is higher during maintenance or off-normal conditions. Portable air samplers and/or personal breathing zone air samplers are used as necessary to monitor specific work activities.

6.1.6 It should be noted that this monitoring is primarily concerned with the control of particulate airborne activity. Certain unique situations with noble gases may be encountered, and will require special monitoring techniques.

6.1.7 Routine bioassays may be performed to supplement air monitoring data for workers where normal operating conditions would result in an intake of radioactive material in excess of 10% of the applicable ALI in 10 CFR 20 *(OAC 3701:1-38).* Routine bioassays include baseline measurements prior to exposure, termination measurements at termination of employment or change in work status, and periodic measurements (as determined 011 a site specific basis to meet 10 CFR § 20.1204 *(OAC 3701:1-38-12)* requirements). Special monitoring bioassays will be performed on a case-by-case basis in the event of unusual or unexpected monitoring results at the discretion of the RSO. Examples of situations that may require special monitoring include: the presence of unusually high levels of facial or nasal contamination, entry into airborne radioactivity areas without appropriate exposure controls, loss of system or container integrity, a CAM alarm, or incidents that result in contamination of wounds or other skin absorption.

6.1.8 Unplanned individual exposures with estimated intakes greater than 0.02 Annual Limit on Intake (ALI) will be investigated. Individual intakes greater than 0.1 ALI will be investigated using follow-up bioassay measurements and available work place monitoring data.

6.2. Limits for Airborne Radioactivity

6.2.1 The administrative limit for occupational exposure to airborne radioactivity is 8 DAC hours in anyone day. The DAC values are found in table 1 of appendix B to 10 CFR 20 *(OAC 3701:1-38-12, Appendix* C *Table* 1). Site specific administrative control levels for occupational exposure to airborne radioactivity are given in Section 6.1.3.

6.2.2 Engineering controls should be designed and operated in such a manner that personnel are not routinely exposed to airborne radioactivity levels that may require use of respiratory protection equipment

6.2.3 Investigation Levels. Any measurement which indicates the airborne radioactivity concentration to be in excess of 2% of the applicable DAC shall be investigated to determine the cause of the airborne radioactivity levels. Appropriate controls shall be implemented to maintain the airborne radioactivity levels ALARA.

6.3. Requirements for Controlling Personnel Exposure to Airborne Radioactivity

6.3.1 Personnel exposure to airborne radioactivity is controlled using fixatives, ventilation, containments or respiratory protection equipment for work in areas with high levels of surface contamination (e.g., >100,000 dpm/100 cm2 beta-gamma, >2000 dpm/100 cm2 alpha) because of the likelihood that this surface contamination could be resuspended. In some circumstances, respiratory equipment might be necessary in areas where surface contamination exists at lower levels due to the nature of the work.

6.3.2 Engineered controls shall be used to the maximum extent practicable to prevent personnel from being exposed to airborne radioactivity above the administrative control levels in Section 6.1.3. These controls are

recommended during radiological work which has been known to cause or is expected to cause airborne radioactivity, and will be provided for in the RWP.

6.3.3 The need for personnel to wear respiratory protection equipment where airborne radioactivity is likely to exceed 25% of the DAC in table 1 of appendix B of 10 CFR 20 *(OAC 3701:1-38-12, Appendix* C *Table* 1) shall be evaluated and documented prior to area entry. Worker efficiency with respiratory protection equipment will be considered in areas with elevated external radiation in order to maintain the TEDE ALARA.

6.3.4 Personnel shall not be exposed to airborne radioactivity such that their daily intake exceeds 8 DAC-hours without prior approval of the RSO.

6.3.5 Signs shall be posted at entrances to airborne radioactivity areas. The requirements for respiratory protection equipment shall also be included on the sign with the anti-contamination clothing requirements where appropriate.

6.3.6 When personnel not wearing respiratory equipment may be exposed to airborne radioactivity above the limits of Section 10.2, ventilation and/or containment should be provided which will capture airborne particulate radioactivity U1 a controlled ventilation system with a high efficiency particulate au' (HEP A) filter. Other controls such as the use of loose fitting prefabricated drapes, ventilated shrouds, ventilated glove-bags, the use of fixatives, or misting may reduce ambient airborne radioactivity to a level that would preclude the use of respiratory protection.

- HEP A filters shall be installed in the ventilation exhaust from radioactive work areas in which work in progress could cause the discharge of airborne radioactivity to the environment.
- HEPA filters shall be installed in the exhaust from contamination containments to prevent personnel from being exposed to high airborne radioactivity.
- HEP A filters shall be installed in vacuum cleaners used for decontamination of loose surface contamination.

6.3.7 Positive pressure air purifying respirators, air supplied masks, hoods, or suits may be worn for work where airborne radioactivity is expected to be significant. Self contained breathing apparatus will be utilized for very significant airborne radioactivity concentrations.

6.4. Elevated Airborne Radioactivity Response

6.4.1 Elevated airborne radioactivity associated with operations can result from many causes. It can be indicated by a CAM alarm, retrospectively by a portable or personal air sample exceeding the applicable limit of Section 10.2, or by visual observation of a radioactive system leak or rupture. General methods for controlling personnel exposure to airborne radioactivity are contained in Section 10.3. An appropriate response to elevated airborne radioactivity is given below:

6.4.2 Immediate Action. Operations identified to be the cause of elevated airborne radioactivity shall be stopped until adequate control is established. Unessential personnel shall be evacuated from the affected area. Essential personnel shall don respiratory protection in accordance with Section 6.7. Unfiltered ventilation from the affected spaces shall be secured. Ventilation systems which contain high efficiency filters in exhaust ducts need not be secured. The extent of the airborne radioactivity should be determined by sampling the affected area and adjacent areas using p0l1abie air samplers. If the elevated airborne radioactivity is indicated by alarm of a CAM monitoring a ventilation exhaust or a work area, the instrument should be checked to ensure the alarm is not the result an electrical transient. Gamma radiation levels at the CAM should be measured to determine if the CAM alarm was caused by high radiation levels external to the CAM. Supplementary actions need not be taken if the alarm is determined to be a false alarm.

6.4.3 Supplementary Action. Supplementary actions are carried out to facilitate recovery operations and the return of the plant to normal status. Sampling and analysis shall be performed to identify the source of the airborne radioactivity. In order to minimize the need for respiratory protection equipment, and reduce personnel exposures to airborne radioactivity, consideration shall be given to ventilating the facility with additional HEPA filtered ventilation systems. Gamma surveys of ventilation filters and ducts as well as surface contamination in the vicinity should be performed to facilitate recovery. When resuming operations, portable air samples are used to confirm the cause of elevated airborne radioactivity has been corrected.

Evacuated personnel should be monitored for contamination and decontaminated as necessary. Personnel exposed to elevated airborne radioactivity shall be evaluated for intake in accordance with Section 6.1.

6.4.4 Reports - A report of any occurrence involving elevated airborne radioactivity (above the limits of Section 6.2) in areas occupied by personnel not wearing respiratory equipment shall be made in accordance with Section 17. This report shall include the results of monitoring personnel for internally deposited radioactive material as required.

6.5. Monitoring for Airborne Radioactivity

6.5.1 The method used for monitoring airborne radioactivity shall have a Minimum Detectable Activity (MDA) equal to or less than 10% of the applicable DAC. Refer to Reference 2.1.7 for MDA calculations.

6.5.2 Airborne particulate surveys shall be performed with portable air samplers whenever airborne radioactivity levels above the limits of Section 6.1 are suspected.

6.5.3 Personnel air samplers (lapel type) shall be used whenever portable sampling cannot be positioned in such a manner to be representative of the breathing zone of the worker. Examples would include large work areas with intervening structures, components, etc., or activities which require the worker to be mobile.

6.5.4 Records of airborne radioactivity measurements are required for regulatory purposes. The records shall be maintained legibly and retained in the on site file in accordance with Section 17.0. These records should include at least the following information:

- Date and time of sample and measurement
- Location
- Reason for sample
- Sampling equipment and counting Instrument used
- Results of most recent efficiency, MDA, and background measurements
- Airborne radioactivity in µCi/ml
- Signature of RST
- Signature of persons reviewing records.

6.6. Air Sample Analysis

6.6.1 When handling air samples collected from areas known or suspected of containing airborne radioactivity care should be taken to prevent the spread of contamination and cross contamination of samples taken. If significant short lived radionuc1ide concentrations are expected, the samples shall be counted initially and then decay counted to determine the actual long-lived radioactivity.

6.6.2 Counting Activities. Low background automatic alpha/beta counting systems are used for screening and gross activity analysis. Spectroscopy is used to identify a particular radionuclide in an air sample. All systems used for air sample analysis shall be set up and operated in accordance with manufacturer's instruction.

6.6.3 Calculation of Airborne Radioactivity Concentration. Airborne radioactivity concentration is typically recorded in units of mCi/ml, and reported as a percentage of the applicable DAC. In order to calculate concentration, it is necessary to accurately determine the volume of air sampled and the radioactivity deposited on/in the air sample filter media. Additionally, due to unique characteristics of the filter media such as collection efficiency, self-adsorption, and flow rate, correction factors may be necessary to accurately calculate concentration.

6.6.4 Determination of DAC-Hours. A DAC-hour is a mathematical expression of intake, derived by dividing the measured concentration of radioactive material in air by the respective DAC for the radionuclide in question, and then, multiplying by the number of hours of exposure to that radionuclide. One ALI can be expressed as 2000 DAC-hours, which is equivalent to a CEDE of 5 rem.

6.6.5 An individual's expected intake in DAC-hours should be estimated during the work planning process by considering measured air concentrations, the expected stay time in the work area, and the nature of the activity. In the interest of maintaining radiation exposure ALARA, stay times, the use of engineered or administrative controls including respiratory protection, and the methods used to conduct the work activity can be optimized in order to minimize overall dose. A record of intake in DAC-hours shall be recorded in

order to demonstrate compliance with conditions of 10 CFR 20 (*OAC 3701:1-38*). Records shall be maintained in accordance with 10 CFR 20.2103 (*OAC 3701:1-38-20*) and section 17.0.

7. **Use of Respiratory Protection Equipment**

7.1. General

7.1.1 Table 1 of appendix B to 10 CFR 20 (*OAC 3701:1-38-12 Appendix C, Table 1*) lists the ALIs and DACs for occupational exposure to radioactive materials. GRD, Inc. is committed to design of processing facilities and control of work in such a manner as to maintain CEDE ALARA. However, when process or other engineering controls are not practical to control airborne radioactive materials below those contained in the definition of an airborne radioactivity area, intakes may be limited by use of respiratory protection equipment.

7.1.2 The RSO or designee is responsible to ensure that the qualification requirements are met and documented for personnel using respiratory protection equipment. A copy of this document shall be maintained by the RSO or designee in the on-site file.

7.1.3 The use, cleaning and inspection requirements for respiratory protection equipment shall be accordance with Reference 2.1.11.

7.1.4 No person shall wear a respiratory protection device for a period of more than four consecutive hours without a one ham break and for more than a total of six hours in any one day.

7.2. High Efficiency Particulate Air CHEPA) Filter Requirements

7.2.1 HEPA filtered systems shall be tested prior to use following each set up and after each filter change. Acceptance criteria is a transmission of 0.03% or less dioctylphthalate (DOP) (or use of equivalent testing methodology) particulate per applicable DOP test procedure.

7.2.2 Great care shall be used in installing HEPA filters to assure the filter material separators are in the vertical position, tight seals are made around the edges of the filters, and that filters are not damaged during installation. Minor damage will greatly reduce the efficiency of these filters.

7.2.3 Used filters shall be disposed of as radioactive waste since loose surface contamination could be present on interior pleats.

7.2.4 Instructions in manufacturers' manuals shall be followed for use and filter change-out.

7.3. Portable Ventilation System

7.3.1 A portable ventilation system can be constructed by adapting a portable blower with a HEPA filter. Such a system can be used during maintenance or an elevated airborne radioactivity condition to reduce airborne radioactivity without contaminating installed ventilation systems.

7.3.2 A vacuum cleaner with installed HEPA filter can also be used effectively to reduce airborne radioactivity in a space by re-circulating the air in the space through the high efficiency filter. Such a system must be tested prior to use as per Section 6.8.1.

7.4. Release of Airborne Radioactivity to the Environment

7.4.1 Releases of airborne radioactivity to the environment may require an Environmental Protection Agency (EPA) permit and/or a State Air Quality Control Permit. Required permitting and limits shall be evaluated prior to each project at a customer's facility. Such releases shall be evaluated for compliance with regulatory requirements (EPA, State, etc.) and the evaluation documented.

7.4.2 Airborne effluents should be controlled when possible through wet scrubbing and/or HEPA filtration of the exhaust. Monitoring is conducted by taking a representative sample at the exhaust stack during all periods of processing operation, and measuring for selected radionuclide. Processing of radioactive materials shall be stopped immediately if these systems are in-operative.

7.4.3 The site specific requirements for environmental monitoring may include air monitoring stations. The licensee requirements for the type and frequency will be followed. Analysis of these samples is performed to demonstrate compliance with Subpart D-Radiation Dose Limits for Individual Members of the Public of 10 CFR 20 dose limits (*OAC 3701:1-38-13*). Specific environmental monitoring guidelines are provided in Section 16.

8. **Surface Contamination Control**

8.1. General

8.1.1 It is the intention of GRD, Inc. to maintain generally accessible areas free of contamination. Office areas and other areas outside the RCA will be maintained to keep surface contamination levels as low as possible, but in no case greater than the unrestricted release criteria in Appendix B.

8.1.2 Surface contamination levels in the RCA will be maintained ALARA to facilitate optimum access for operations, use of personal protective equipment, and dose reduction in accordance with established plans, procedures and instructions. Should there be an increase in contamination outside the RCA, it will be investigated by the RSO or designee. Procedures to prevent recurrence will be implemented. Radioactive contamination of surfaces (such as floors, equipment, clothing and skin) may result from work operations, leaks of radioactive fluids, or gradual precipitation of airborne radioactive contamination onto exposed surfaces. The primary reason for limiting surface contamination is to minimize possible ingestion or inhalation of radioactive materials. In addition, surface contamination is limited to minimize transfer of radioactive materials to the environment beyond the control of GRD. In case of very high levels of surface contamination, control of external radiation exposure from this contamination may be necessary. Surface contamination is divided into two classes in this section: (1) loose contamination can be removed from surfaces with relative ease and may be readily dispersible, and (2) fixed contamination remains on affected surfaces and is not further reduced by normal non-destructive decontamination techniques. Areas where loose contamination levels exceed the applicable limits in Appendix B are posted and controlled as a Contamination area. The controls shall include conspicuous boundaries, restricted access, step-off pads, protective clothing requirements, and monitoring upon exit. A typical method for determining levels of loose contamination is to wipe the surface in question (usually a 100 sq. cm area) with a dry adsorbent material using moderate pressure, and then measuring the wipe for radioactivity. Levels of fixed contamination on a surface is determined by placing a radiation detector in direct contact with the surface, and either making a static measurement or scanning the surface by moving the detector slowly.

8.1.3 Contamination control procedures should be considered in planning and performance of all jobs. A dedicated set of "hot tools" should be used in the RCA to avoid the necessity to transfer the equipment across a contamination control boundary. When using clean tools or equipment in contaminated areas, the use of plastic sleeves or strippable paint to prevent contamination or facilitate decontamination is warranted. The extent of the contamination control procedures used should be commensurate with the amount of radioactive material being handled, and the nature of the task.

8.2. Surface Contamination in Uncontrolled Areas

8.2.1 Surface contamination levels for uncontrolled surfaces should be kept as low as possible. Areas where contamination exceeds established limits shall be either decontaminated in a timely manner, or painted or otherwise sealed to prevent the spread of contamination.

8.2.2 Acceptable surface contamination levels in uncontrolled areas are dependent upon (1) radionuclides being processed in the facility (2) applicable regulatory requirements, and (3) facility operating parameters.

8.2.3 Limits for loose and fixed contamination are usually dictated in the "NRC or Agreement State Radioactive Materials License, are based on the release limits found in Appendix B.

8.3. Surface Contamination in Radiologically Controlled Areas

8.3.1 The RCA is established, among other things, as a formal boundary to prevent the uncontrolled spread of radioactive materials. This boundary serves as the point at which certain precautions are taken, including training, protective clothing, and monitoring to prevent a worker from unknowingly contaminating his/her self, and transferring the contamination to the uncontrolled area. The RCA serves as a buffer between the more contaminated areas and those that are not contaminated. Significant levels of fixed contamination may exist in these areas; however, loose contamination levels are maintained to established limits.

8.3.2 Areas where surface contamination exceeds the established limits, areas "where equipment or materials are handled with exposed parts exceeding these levels, and areas where activities may cause contamination in

8.3.3 excess of the limits in Appendix B shall be designated as Contamination Areas (CA) until such areas, equipment, or materials have been adequately sealed or decontaminated to meet these limits. CAs may be established on a more permanent basis to facilitate operations. The CA boundary will serve as the initial and primary boundary to prevent the spread of contamination.

8.3.4 Access to a CA shall be limited by the conditions of a RWP to allow only personnel with appropriate anti-contamination clothing, monitoring equipment, and participation in the internal dosimetry program to enter. Choice of appropriate anti-contamination clothing is discussed in Section 12.1.

8.3.5 Personnel with open wounds shall not enter CA without prior approval of the RSO or designee. Open wounds shall be adequately protected from contamination prior to a person working in these conditions.

8.3.6 Entrances to CA shall be posted conspicuously with signs, stating the access restrictions, requirements for anti-contamination clothing and masks, levels of loose surface contamination and radiation dose rates. If the entrance to a CA and the step-off pad cannot be positioned at an existing barrier (door), magenta and yellow rope barriers or equivalent shall be used to mark the affected area clearly.

8.3.7 Smoking, eating, drinking and chewing shall not be permitted in CAs. Prescription medications may be taken under approved and controlled conditions. This provision is essential to minimize the possibility of transferring contamination from the hands or other areas to the mouth. For the same reason, hands should be kept away from the face, nose, mouth, and ears while in a CA.

8.3.8 Where operations such as grinding or machining are being performed without containment on contaminated components or equipment, the area of the operations shall be considered subject to the spread of loose contamination. The area shall be posted as a CA until such time as the work can be completed, the area surveyed, and down-posted.

8.3.9 Where surveys for loose contamination have not been made, but contamination is suspected, the area shall be posted as a CA pending the results of contamination surveys.

8.3.10 Levels and extent of loose surface contamination inside a CA shall be limited to control possible re-suspension of radioactive materials, to reduce airborne radioactivity, to reduce the potential for the spread of contamination, to simplify subsequent decontamination, and to minimize personnel radiation exposure.

8.3.11 Personnel leaving a CA shall (a) remove their outer anti-contamination clothing and (b) monitor or be monitored for surface contamination where background levels of radiation will permit.

8.4. Methods for Controlling Surface Contamination

8.4.1 The most effective means of controlling radioactive surface contamination is containment at the source through the use of ventilated enclosures around contaminated items to keep the radioactive material inside. Containments can be simple drapes, tents, or pans, or elaborate pre-fabricated glove-bags or large walk-in enclosures. Containments should be used as much as practical when working on the surfaces or components which have been exposed to radioactive materials. Plastic sheet, bags, or easily decontaminated containers may be used to enclose clean material and prevent contamination of clean items inside the enclosure. The following specific requirements shall be followed when working or handling contaminated equipment and materials.

8.4.2 Workers shall have been trained on the use of containments and instructions for using containment enclosures shall be readily available during work planning.

8.4.3 Containment enclosures shall be inspected prior to use to determine if they are properly constructed and ready for use. Enclosures shall then be marked to certify this inspection was completed. Personnel using containment enclosures shall inform radiological safety personnel of any damage to containment enclosures which occurs during work. When a containment enclosure is damaged or is unfit for use, the enclosure shall be conspicuously tagged to prevent its inadvertent use by personnel unaware of the problem until repaired. Containment enclosures shall not be removed or altered without approval of the RSO or designee.

8.4.4 Ventilation should be controlled during operations involving radioactivity to prevent spreading the radioactive contaminants through an area or to the environment. The basic methods of controlling contamination by ventilation are by providing clean supply air into the contaminated work area and by providing filtered local exhaust ventilation close to the work, or from a containment enclosure erected

around it. The exhaust capability should always exceed the supply including discharges from pneumatic tools.

8.4.5 HEPA filters (and HEPA system pre-filters) may become contaminated so that handling a used filter may spread contamination. Therefore, great care should be exercised when removing used filters. Contaminated used filters are normally removed by the bag-out method into plastic bags.

8.4.6 A buildup of detectable levels of surface contamination can occur through the deposition of radioactive material from the air without having significant levels of airborne radioactivity. Therefore, all process ventilation exhaust ducts or ventilation system ducts from radioactive work areas should be considered potentially contaminated. When opening these potentially contaminated systems, they should be surveyed and decontaminated as practical for similar reasons, if a portable exhaust blower is used in a contaminated space, surface contamination should be checked on surfaces exposed to the filtered exhaust of this blower.

8.4.7 When HEPA filters are installed in ventilation systems for radiological areas, labels should be prominently affixed verifying proper installation of the filters. These labels should be located so that they are destroyed when the filters are removed. HEPA filtered ventilation systems shall be tested in accordance with Section 10.8.

8.4.8 Potentially contaminated air that has not passed through a high efficiency filter should not be discharged to locations occupied by personnel or where supply ventilation can return it to an occupied area.

8.4.9 Consideration should be given to controlling contamination which has been collected in ventilation equipment and systems not normally used for radiological work, i.e. HVAC systems, and in particular those systems in adjacent spaces which may have become contaminated during a spill Prior to work on these items, radiation measurements should be taken, the items treated as contaminated, and radiological control precautions established to prevent spreading contamination.

8.5. Method for Measuring Surface Contamination

8.5.1 A rate meter with a thin window probe (G-M) or equivalent will detect radioactive beta-gamma surface contamination on materials and personnel by slowly scanning the probe held within about *1/2* inch of the surface. Alpha-emitting contamination is normally monitored using a sensitive proportional or scintillation detector. An instrument and detector should be used that has a MDA for contamination measurements of < 90% of the applicable limit with a goal of <10% of the limit. If background levels are higher than will permit the above stated NIDA, equipment or personnel to be monitored for release shall be relocated to an area of lower radiation levels or the area or instrument detector shielded to lower background levels. A reading of 100 cpm above background indicates excess contamination.

8.6. Method for Monitoring Personnel Contamination

8.6.1 Personnel monitoring (frequently referred to as "frisking" when done with a handheld instrument) shall be performed when exiting CAs or RCAs. Monitoring of personnel for surface contamination is typically done with all automated portal type personnel contamination monitor established at a formal control point.

8.6.2 Monitoring of personnel by taking swipes for loose surface contamination on the skin or clothing shall not be done since swipes may tend to imbed radioactive particles. Special circumstances may require the use of adhesive tape to remove contaminated particles for measurement.

8.6.3 When personnel have been adequately trained in frisking procedures, self monitoring will be permitted; however, frisking may be performed by a RST.

8.6.4 If facial contamination is detected, or it is suspected that radioactive material have been taken into the body even though no facial contamination is evident, the RSO or designee shall be notified and the individual monitored for internal radioactivity. Measurements of the radioactivity of nose and throat swabs may be used. Decontamination shall be performed in accordance with Section 13.4.

8.7. Frequency of Surveys for Monitoring Areas for Surface Contamination

8.7.1 Minimum site specific contamination survey requirements are dictated by the NRC or Agreement State Radioactive Materials License, and detailed in Reference 2.1.14.

8.7.2 Routine contamination surveys shall be performed at a frequency commensurate with the risk of loss of surface contamination control for the area in question. In the interest of ALARA, contamination surveys in High or Very High Radiation Areas are done only upon entry, or when a change of conditions dictates.

8.7.3 Sealed source leak testing, if required, will be performed in accordance with Reference 2.1.3.

8.7.4 Operations such as the following also require surveys:

- Decontamination and release of equipment
- Inspection or maintenance on components and piping which are associated with radioactive or potentially radioactive systems
- Areas where radioactive liquid leaks have occurred or where airborne radioactivity has exceeded the concentrations of Section 10.2. Surveys are required to determine the need for anti-contamination clothing and to determine the extent of contaminated areas
- Upon initial entry into tanks or voids potentially contaminated radioactive materials and when opening ventilation exhaust ducting from radioactive material work areas
- In addition, any normally uncontaminated system which is suspected of containing radioactive materials shall be surveyed when opened for inspection, maintenance or repair. Contamination control procedures should be used until the portion of the system being worked on is proven to be uncontaminated. Water drained or flushed from these systems shall be treated as radioactive and sampled as appropriate;
- Contamination surveys should be performed in plenums downstream of HEP A filters during routine filter replacement, to determine radioactivity buildup in ducts downstream of filters;
- Prior to replacing filters on HVAC ducts serving a radiological work area, filters should be surveyed to determine if radioactivity is present;
- Surveys for contamination fixed in paint should be performed prior to removal of paint in potentially contaminated areas. These surveys should be performed by counting paint scrapings for gross activity;
- Surveys to support RWP development or work planning.

8.8. Records of Contamination

8.8.1 Records of surface contamination surveys shall be maintained in the on site files throughout the duration of the operations in accordance with Section 17.0

8.8.2 Any occurrence which results in loose surface contamination greater than the applicable site specific free release limits for uncontrolled areas shall be reported in accordance with Section 17.0.

8.8.3 Any spread of contamination in the RCA or CAs which results in work being stopped for more than four hours or takes more than four hours to clean up shall be reported in accordance with Section 17.0.

8.8.4 Records of surface contamination surveys shall be retained in the on site file throughout the duration of the operations file in accordance with Section 17.0.

9. **Anti-Contamination Clothing and Equipment**

9.1. General

9.1.1 Anti-contamination clothing (Anti-Cs) is used to help prevent personal skin and clothing contamination, and the spread of radioactive materials outside the RCA or CAs. Anti-contamination clothing is required when either surface contamination or airborne radioactivity levels exceed prescribed limits.

9.2. Requirements for Wearing Anti-Contamination Clothing

9.2.1 The RSO or designee in consultation with other safety disciplines shall determine the appropriate requirements for Anti-Cs and shall so note on the applicable RWP. The recommended type of Anti-Cs for various applications and radiological conditions are provided in Reference 2.1.10. In addition, miscellaneous equipment used for the control of exposure to radioactive materials is described.

9.3. Donning and Doffing of Anti-Contamination Clothing

9.3.1 It may be necessary to remove personal clothing before putting on Anti-Cs for comfort when working in high temperature spaces. Typically, a modesty garment is worn from the change facility to and from the donning/doffing point for the Anti-Cs.

9.3.2 Anti-Cs shall be inspected by the wearer prior to donning to ensure the garment is free of rips, tears, missing buttons, or malfunctioning zippers. Damaged clothing shall not be worn.

9.3.3 Used Anti-Cs shall be removed at the appropriate step-off pad in a manner that will preclude personal skin or clothing contamination and the spread of contamination across the boundary. Used Anti-Cs shall be deposited in the appropriate receptacle upon doffing.

10. **Radioactive Decontamination**

10.1. General

10.1.1 Decontamination may be required for components, tools and equipment, work areas, clothing or personnel. Each of these subjects as well as alternatives to decontamination is discussed in this section. These include, in some case, storage for decay, disposal without decontamination, or restricted use without complete decontamination. By the very nature of decontamination process, the generation of secondary waste materials must be considered. Volumes of both solid and liquid wastes shall be minimized. Unauthorized chemicals shall not be used. These may cause difficulties in waste processing. Most radioactive contamination can be removed by normal cleaning. Wiping with a damp rag soaked with an appropriate cleaning agent will usually provide satisfactory decontamination.

10.1.2 If large variations in surface contamination levels exist on highly contaminated surfaces, cleaning shall be from less contaminated toward more contaminated areas to prevent radioactivity from being spread to less contaminated areas. Cleaning solutions and cloths used in these decontamination operations shall be disposed of as radioactive waste. During decontamination operations, precautions shall be taken to limit the spread of contamination, such as by taking care not to splash solutions, by properly wearing anti-contamination clothing, and by wearing masks as necessary" Filtered ventilation may be required to minimize the possibility of contamination being inhaled by personnel performing the decontamination.

10.2. Decontamination of Tools and Equipment

10.2.1 In decontaminating tools and equipment, appropriate radiological control shall be used to prevent the spread of contamination, and to control airborne radioactivity, and radiation exposure. The following applies to the decontamination of tools and equipment.

10.2.2 Tools and equipment which may be used again in contaminated areas may be temporarily stored in the contaminated area or in a "hot tool locker" without decontamination if proper radiological controls and procedures are used. If certain tools are to be used solely in CAs, these tools should be durable and distinctively marked to indicate they are always treated as potentially contaminated.

10.2.3 In some cases, the need for decontaminating tools may be minimized by taping some portions, such as the handles, prior to use and stripping off the contaminated tape after use. Large tools are often wrapped in plastic instead of tape. These tools need to be swiped or frisked at completion of decontamination to verify the effectiveness of the treatment.

10.2.4 Heavily contaminated tools can spread surface contamination. Therefore: such tools should be partially decontaminated as may be necessary several times throughout a work shift. Heavily contaminated tools can be readily identified without taking swipes by measuring their radiation level The purpose of decontaminating these tools will usually be to reduce their radiation levels rather than to remove all loose surface contamination.

10.2.5 When only a few tools require decontamination, wiping with cloths soaked in an approved decontamination solution is a convenient, effective procedure. This method is also useful when only a portion of a tool is contaminated. A disadvantage of wiping procedures is the potentially large amount of solid radioactive waste produced.

10.2.6 Mechanical decontamination methods, such as using abrasives which remove some of the surface of the tool, can be useful in special circumstances where contamination is not removed by chemical cleaning. In such cases, control of possible airborne radioactivity is essential.

10.2.7 In decontaminating oily or greasy tools or equipment, consideration should be given to the fact that oil or grease may inhibit waste processing or disposal only decontamination solutions approved by the RSO or designee may be used.

10.3. Decontamination of Areas

10.3.1 Contaminated areas shall first be isolated and radioactive materials then removed while being careful to avoid spreading contamination. In some cases, tape may be used to lift loose contamination from surfaces. If contamination levels are not sufficiently reduced, use of solvents (non-hazardous to prevent mixed waste), strong chemicals, or mechanical removal of some of the surface may be necessary. The areas shall be surveyed by approved methods prior to release to ensure surface contamination is below the established limits. On painted or covered surfaces, if washing will not remove the contamination, the paint or covering shall be removed. During the process of paint removal, control of airborne and surface contamination from dust and paint chips will be necessary.

10.3.2 Contaminated areas should be decontaminated as soon as practical to minimize spread of contamination and to facilitate removal before the contamination is fixed on the surface. If high radiation levels from the contamination contribute significantly to personnel radiation exposure during cleanup, it may be desirable to decontaminate the most heavily contaminated area first.

10.4. Decontamination of Clothing

10.4.1 Anti-contamination clothing shall be laundered and surveyed before reuse to minimize the possibility of spreading radioactive contamination to the wearer. This requirement does not apply to disposable Anti-Cs.

10.5. Decontamination of Personnel

10.5.1 Decontamination of personnel shall be performed within an established RCA (unless otherwise approved by the RSO or designee).

10.5.2 The objectives of skin decontamination are to remove as much of the radioactive material as practicable in order to reduce the skin dose rate and to prevent the ingestion or inhalation of the material An over-aggressive skin decontamination effort must be avoided since it may injure the natural barriers in the skin and so increase absorption.

10.5.3 Reports of skin contamination shall be made in accordance with the requirements of Section 17.

11. **Radioactive Waste Handling**

11.1. Packaging Radioactive Materials

11.1.1 Radioactive materials shipped for disposal or to another location shall be appropriately packaged and treated as required by USDOT, applicable federal and state regulations, and applicable disposal site criteria. Shipping shall be performed by the RSO or designee, or a Shipper/Broker in accordance with applicable plans, procedures, and/or instructions. The specific radioactive material handling and packaging requirements will be identified in operations procedures.

11.2. Radioactive Material Storage

11.2.1 Storage of radioactive materials will be in accordance with all applicable license requirements and, at a minimum, all radioactive material storage areas will be posted. Access to these areas will be controlled to prevent unauthorized access, unauthorized removal of radioactive material, and to minimize radiation exposure.

11.3. Fire Protection Practices

11.3.1 Proper selection of a fire resistant storage area for radioactive material will minimize release of radioactivity to the environment in the event of a fire. However, the following additional fire protection practices shall be considered for storage of radioactive material to minimize the possibility of a fire and spread of contamination in the event of a fire.

- Storage of radioactive material in fire-resistant containers or spaces is desirable to minimize contamination spread. In addition, containers of highly flammable radioactive materials shall be stored in areas segregated from other storage to reduce the risk: of spreading a fire. These areas will be approved by the RSO or designee.
- Smoking shall not be permitted in radioactive material storage areas.
- An up-to-date inventory of locations where radioactive materials are stored shall be available to personnel who might be called to fight a fire in such areas. This list shall also identify unusual hazards which may be present.

• Periodic inspections of radioactive material storage areas shall be made to identify fire hazards. Deficiencies shall be promptly corrected.

• Combustible materials shall be minimized inside radioactive material storage areas and should not be stored next to surrounding walls.

• Welding, burning, or other operations which may cause a fire shall not be conducted inside or next to radioactive material storage areas without prior authorization of the RSO or designee.

11.4. Contamination Control

11.4.1 Storage locations should be considered potentially contaminated. Personnel in these areas, particularly if they handle contaminated material, shall wear Anti-Cs commensurate with the task. Reasonable care shall be taken in packaging and storing contaminated items to prevent the spread of contamination and to ensure that entry to areas where such storage is permitted does not result in the contamination of personnel or other areas.

11.5. Radiation Exposure Control

11.5.1 Storage of radioactive materials can result in possible personnel radiation exposure in the storage area and surrounding areas. Facilities should store radioactive material so as to minimize the radiation exposure of personnel entering or working in the area and of personnel in surrounding spaces. Radiation surveys of the storage area and of spaces immediately around the storage area shall be performed to ensure proper posting of radiation areas and prevent inadvertent exposure of personnel in the storage space or surrounding spaces. When necessary, temporary shielding should be used to reduce radiation levels.

11.6. Outdoor Storage

11.6.1 Radioactive materials shall be stored where they are protected from adverse weather. Radioactive material shall not be stored outside the Restricted Area. Outdoor storage is only permitted in a covered storage area with a permanent roof, or during short periods to accommodate loading or unloading as required. It is important that packaged materials be stored in a manner that permits periodic monitoring of the area and adjacent containers to ensure there is no release of radioactive materials.

11.7. Minimize Radioactive Material in Storage

11.7.1 In order to minimize the complexities of accounting for a large amount of radioactive material and the possibility of losing radioactive material, it shall be consolidated in as few areas as practical and the amount of radioactive material in storage shall be minimized.

11.8. Labeling of Radioactive Material

11.8.1 Each container of radioactive material shall bear a durable clearly visible label which identifies the radioactive contents (radionuclides present, quantity of radioactivity present, material description, date for which the activity was estimated, and radiation levels), and depicts the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL". Exceptions include the following:

• The quantity of radioactive material is less than the amounts listed 111 Appendix C 10 CFR 20 *(OAC 3701:1-38-18, Appendix A)*

• The material is continuously attended by a trained radiation worker

• The material is in transport and is packaged and labeled in accordance with DOT regulations;

• The material is contained in installed process equipment such as piping, tanks, transfer equipment, and treatment units.

• Empty containers which are used or intended to be used for the packaging or handling of radioactive materials will be clearly marked "EMPTY", and any radioactive markings defaced or removed from any container released off-site for unrestricted use.

11.9. Shipping Radioactive Materials

11.9.1 All shipments or transfers of radioactive material over public areas (i.e., public highways, waterways, airways, etc.) including shipments made with private or government vehicles, must comply with appropriate USDOT, federal, state, and local transportation regulations.

11.9.2 Shipments of radioactive material shall be performed in accordance with established plans, procedures, and/or instructions. Records of radioactive material transfer shall be maintained in the permanent site files by the RSO or designee.

11.10. Contaminated Equipment Repair. Maintenance and/or Storage

11.10.1 Equipment which has been used in the nuclear industry may require repairs, maintenance, or storage. All work of this nature is performed per *RWPs* and plans, procedures and instructions as required.

11.11. Actions and Reporting in Case of Loss of Radioactive Material

11.11.1 If radioactive material associated with GRD operations is suspected of being lost, immediately notify the RSO and OM and conduct a search for the lost material. A primary purpose of this search is to ascertain that no persons will receive inadvertent internal or external radiation exposure from this material.

12. Radioactive Waste Management

12.1. General

12.1.1 Working with radioactive material can frequently lead to contamination of structures and equipment, protective equipment and clothing, and material used in decontamination. If any of the contaminated material cannot be used further, it becomes radioactive waste. Waste minimization consists of three primary objectives; (1) source reduction, (2) recycling, and (3) volume reduction. Waste minimization must be practiced on levels of the company, from top-level management down to the worker. Training programs, procedures, and work practices will be reviewed annually for waste minimization practices.

12.2. Source Reduction

12.2.1 Source reduction activities are those which reduce or eliminate the production of radioactive waste, or seek to reduce the volume or amount of clean material that comes in contact with radioactive material. Examples include:

- Taking care to 110tstore radioactive materials with non-radioactive materials
- Removal of packaging from clean material before taking the material into the
- RCA, or bringing the minimum amount of clean material into the RCA necessary to perform a task
- Taking care to not bring clean tools, equipment or material into the RCA unless a contaminated tool, equipment or material is not already available
- Taking care not to touch a contaminated surface or allow clothing, tools, or other equipment to do so;
- Confining radioactive material and contamination to as small an area as practical to minimize the decontamination effort later
- Avoiding the use of disposable liners, drip pads or plastic floor covers in the RCA. Do use smooth non-porous surfaces that can be easily decontaminated
- Minimizing loose surface contamination levels and airborne contamination levels to prevent inadvertent contamination of adjoining areas and equipment
- Choosing decontamination methods that generate the smallest total waste volume
- Preventing spills of contaminated materials.

12.3. Recycling

12.3.1 Recycling is using, reusing or reclaiming material that would become radioactive waste and aims to delay the point at which there is no further use for contaminated equipment or material Some strategies include:

- Returning contaminated waste generated at the site while processing a customer's material to the customer;
- Recycling contaminated laundry by using it in first stage decontamination of highly contaminated areas
- Using contaminated wood for cribbing inside burial boxes
- Choosing decontamination methods that recycle or regenerate the cleaning media
- Reusing contaminated equipment or areas with as little decontamination between jobs as practical, cross contamination and dose considerations taken into account

12.4. Volume Reduction

12.4.1 Volume reduction is reducing the waste volume to the minimum practical and is not strictly waste minimization, but is essential to conserve disposal site resources. Work practices will consider the following strategies;

- Packing material in burial containers to reduce void space to a minimum
- Cutting or segmenting of odd shapes to facilitate packing
- Using compaction for compressible material
- Evaporation of liquids as much as practical before disposal.

13. **Personnel Monitoring and Bioassay**

13.1. External Dosimetry Program

13.1.1 For purposes of monitoring exposure to radiation, personnel dosimetry shall be provided to an individual likely to exceed 10% of the limits in -Section 6.1.1. The specific monitoring requirements for personnel radiation exposure for all GRD .activities is determined and approved by the RSO. Reference 2.1.8 provides the procedure for the issue and processing of dosimetry, and the recording of personnel radiation exposure for all personnel working at the site.

13.1.2 All individuals shall wear appropriate personnel dosimetry for RCA entry Visitors or contract workers shall be issued personnel dosimetry (TLD or SRD) for Radiation Area entry and shall not be allowed access to High Radiation Areas or Airborne radioactivity Areas. Specific requirements for a particular work activity shall be communicated to personnel in the ALARA briefing conducted in accordance with Reference *2.1A.* The RSO may allow access by Visitors or Contractors to an RCA provided continually monitored by a Radiation Worker with appropriate monitoring and/or dosimetry.

13.2. Thermoluminescent Dosimetry (TLD) or Optically Stimulated Luminescent (OSL) Dosimetry

13.2.1 TLDs or OSLs shall be the dosimetry of record and shall be worn on the frontal area of the torso between the neck and the waist. TLD's will be processed and evaluated by a dosimetry processor who holds current accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP) for the radiation(s) most closely approximating the type of radiation(s) to which individuals are exposed. Normal issue TLDs or OSLs will be worn to assess whole body deep and shallow dose. If dose to the extremities or the lens of the eye is anticipated to exceed 10% of the limits in Section 6.1.1, special TLDs or OSLs will be issued.

13.2.2 In situations where beta radiation is significant, the lens of the eye shall receive special consideration. Personnel shall be shielded from the beta radiation using masks or eye protection (safety glasses), and/or anti-contamination clothing. If the beta radiation cannot be shielded, methods for controlling beta radiation exposure shall be evaluated and implemented to maintain exposures ALARA.

13.2.3 Certain radioactive isotopes commonly given for medical diagnostic purposes can result in measurable radiation levels for some period after receiving the administration. The dose received from this administration is exempt from regulation. All individuals shall notify the RSO if they have received such treatment. In such a situation, the person may be restricted from wearing dosimetry until the medical isotope is eliminated from the body to the extent that it will not affect TLD or OSL measurements. The purpose of the restriction is to avoid including radiation exposure from the medical isotope to that received from occupational sources.

13.2.4 Such personnel shall also be restricted from entering areas requiring monitoring for contamination until the medical isotope is eliminated from the body to the extent that it will not affect personnel monitoring equipment. In such situations, the RSO and the OM shall determine an appropriate work assignment for the individual until the restriction can be released.

13.2.5 Lost or damaged dosimetry shall be reported to the RSO.

13.2.6 Personnel dosimetry records for an individual shall be made available to an authorized requestor and to the individual upon written request. This information will be readily available to enable an individual to keep track of their own exposure.

13.3. Self-Reading Dosimeters (SRDs)

13.3.1 In addition to the TLD, SRDs shall be worn to monitor radiation exposure in certain circumstances. SRD's shall be worn in accordance with the applicable RWP. The following circumstances shall require SRD:

• All personnel entering a Radiation or High Radiation shall be monitored by a SRD WOl11 at the same location on the body as the TLD. The above does not preclude the use of SRDs for other exposure monitoring.
• Additional SRDs may be required if the location of the maximum dose on the body is not certain.
• Typically, devices used as SRDs include pocket ionization chambers or electronic dosimeters.

13.3.2 SRD Records. The RSO or designee shall maintain a log of all SRD results between routine TLD read-out cycles. Before an SRD is re-zeroed, the measured radiation exposure is recorded. The individual's monthly, quarterly and/or yearly exposure totals are determined. The individual is thereby prevented from inadvertently exceeding the administrative control levels

13.3.3 Reading SRDs. SRDs shall be read by the wearer prior to entering High Radiation or Very High Radiation Areas and periodically thereafter to maintain their own radiation exposure ALARA. To prevent an off-scale reading, dosimeters shall be read, re-zeroed, and doses recorded whenever the reading exceeds three-fourths of full scale. When a pocket dosimeter reading is off-scale or a dosimeter is lost under conditions such that an elevated exposure is possible, the person's TLD shall be processed immediately and the person restricted from work in radiological areas until their exposure bas been determined. The RSO or designee shall notify the OM for appropriate work assignment for the individual during the restriction.

13.3.4 SRD Testing Requirements. SRDs in use shall be tested at least every six months to ensure accuracy. If dosimetry performance is suspected to be unacceptable due to excessive drift or fails in use, the RSO shall initiate action to correct the problem.

13.4. Internal Dosimetry Program

13.4.1 The site internal dosimetry requirements for specific activities will be determined and approved by the RSO. Reference 2.1.9 provides the procedure for the internal radiation monitoring of individuals, submittal of bioassay samples, and the types and applications of various measurements. Specific requirements for a particular work activity shall be communicated to personnel during the ALARA briefing.

13.4.2 Internal radiation monitoring shall be performed when an individual is likely to receive an intake of radioactive material in excess of 10% of the Annual Limits on Intake (ALIs) as defined in 10 CFR § 20.1003 *(OAC 3701:1-38-12).* All personnel with the intake potential as defined above shall participate in the internal radiation monitoring program. Monitoring shall consist of baseline, routine, diagnostic, and termination bioassay sampling and/or in-vivo counts as determined to be appropriate by the RSO. Additionally, suspected intakes of radioactive materials as may be indicated by a positive routine bioassay, significant personnel contamination, elevated airborne radioactivity, or an ingestion of radioactive material shall be investigated by internal monitoring. Waivers of internal monitoring requirements may be granted by the RSO for contractors and visitors, provided the basis for the waiver is documented. Access restrictions for contractors and visitors are given in Section 6.1.7 above. Minors and declared pregnant women who are likely to receive in one year a CEDE in excess of 10% of the applicable limits in 10 CFR 20 *(OAC 3701:1-38)* shall participate in an internal monitoring program.

13.4.3 The following techniques for internal radiation monitoring shall be employed by the RSO or designee depending upon the workplace contaminant and conditions, and the nature of the activity:
• Air Sampling - Concentrations of radioactive materials in air in work areas may be used in lieu of bioassay measurements to determine internal exposure if the bioassay data is unavailable, inadequate, or the air sampling data is
demonstrated to be more accurate.
• Bioassay - An estimate of the amount of internal exposure can be calculated by measuring the quantity of radionuclides in bodily excreta (collections of
urine, feces, etc.) and relating the excretion rate to body burden by the use of biokinetic models.
• In-vivo counting - An estimate of the amount of internal contamination by gamma emitting radionuclides is obtained by measuring the gamma radiation emitted from the body and analyzing the pulse height spectrum. This technique can also be used to measure the bremsstrahlung from energetic beta emitters.

13.4.4 Each occupational intake of radioactive material that is confirmed by a positive bioassay shall be investigated and an estimate of the initial intake calculated using standard retention models.

13.4.5 For a confirmed intake, the CEDE will be determined and entered in the individual's exposure record. An intake resulting in a CEDE of greater than 0.1 rem will require an investigation to determine cause and identify corrective actions. .A. CEDE of greater than 0.5 rem will result in a restriction from radiological areas pending completion of the investigation and an exposure evaluation.

13.4.6 Procedures for the collection of in-vitro bioassay samples are found in Reference 2.1.9. The services of an accredited laboratory will be used to perform the analysis of samples. In-vivo counting shall be performed by an approved vendor.

13.4.7 All reports of internal radiation monitoring shall be maintained on site in a readily retrievable file in accordance with Section 17.0. Copies of these reports shall be made available to the monitored individual upon written request, as required by Section 17.0.

13.4.8 Exposure Records. The RSO or designee shall maintain records of personnel exposure and shall forward those records and data as required by 10 CFR 20 (OA C 3701: 1-38).Occupational exposure records are recorded on NRC Form 5 or equivalent. GRD will demonstrate compliance with the requirements of 10 CFR 20 (OAC 3701:1-38) by summing external and internal doses. Any recorded eye dose, skin dose, or planned special exposure dose will be maintained separately. Dose evaluation reports are prepared, maintained, and submitted per 10 CFR 20 (OAC 3701:1-38) and provided to workers per 10 CFR 19.13 (OAC 3701:1-38-10).

NEW YORK STATE DEPARTMENT OF HEALTH

RADIOACTIVE MATERIALS LICENSE

Pursuant to the Public Health Law, Part 16 of the New York State Sanitary Code, Industrial Code Rule 38, and in reliance on statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing radioactive material(s) for the purpose(s), and at the place(s) designated below. The license is subject to all applicable rules, regulations, and orders now or hereafter in effect of all appropriate regulatory agencies and to any conditions specified below.

1. NAME OF LICENSEE	3. LICENSE NUMBER
FEIN 45-0917795 Greater Radiological Dimensions, Inc. Phone (937) 260-3533	C5514 4. EXPIRATION DATE March 21, 2022
2. ADDRESS OF LICENSEE	5a. REFERENCE b. AMENDMENT NO.
1527 Ridge Road Lewiston, New York 14092	**DH 11-1048** -

6. Radioactive Materials (elements in mass number)	7. Chemical and/or physical form	8. Maximum quantity licensee may possess at any one time
A. Any	A. Any, as potentially or known contaminated materials	A. Any, as present at client site(s)

9. Authorized use.

Condition 6.A.:

For use incident to providing radiation protection and general health physics support to clients, as authorized under this license and approved by the Department, and in accordance with the documents referenced in Condition 11 of this license.

10. A. The Radiation Safety Officer (RSO) for this License is George Weissenburger.

B. Licensed material shall be used by, or under the supervision of, George Weissenburger, by persons with the training and experience described in Condition 16 of the License.