Jacobs

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Shepperd Hall
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DATE: 30 June 2021

RE: *Final Addendum No. 1, Work Plan for Remedial Action-Operations, Monitoring, and Project Closeout at Site 6 (Suspected Spill Area), 109th Airlift Wing, New York Air National Guard Stratton Air National Guard Base, Scotia, New York*
Contract GS00Q14OADU120, Delivery Order W9133L20F3599

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If the material received is not as listed, please notify us at once.

Copy To:

Jennifer Kotch (e-Deliverable PDF via email)
Brian Jankauskas, P.E. (e-Deliverable PDF via email)
Eric Barefoot (e-Deliverable PDF via email)

INSTALLATION RESTORATION PROGRAM

Final
Addendum No. 1
Work Plan for Remedial Action-Operations, Monitoring, and Project Closeout at Site 6 (Suspected Spill Area)

109th Airlift Wing, New York Air National Guard
Stratton Air National Guard Base
Scotia, New York

Prepared for:
U.S. Air National Guard/A4VR
Shepperd Hall, 3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

June 2021

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Prepared for:
U.S. Air National Guard/A4VR
Shepperd Hall, 3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Prepared by:
Jacobs

June 2021

Contents

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Acronyms and Abbreviations

µg/L	microgram(s) per liter
amsl	above mean sea level
ANG	Air National Guard
AW	Airlift Wing
bgs	below ground surface
COC	constituent of concern
DCE	dichloroethene
DO	dissolved oxygen
DoD	U.S. Department of Defense
DTW	depth to water
ELAP	Environmental Laboratory Approval Program
EPA	U.S. Environmental Protection Agency
ft	foot (feet)
HASP	Health and Safety Plan
ID	identification
IDW	Investigation-derived waste
IRP	Installation Restoration Program
ISCO	in situ chemical oxidation
mg/L	milligram(s) per liter
mS/cm	millisiemen(s) per centimeter
MS/MSD	Matrix spike/matrix spike duplicate
mV	millivolt(s)
NFA	no further action
NGB	National Guard Bureau
NY ANG	New York Air National Guard
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
ORP	oxidation reduction potential
PCE	tetrachloroethene
RA	remedial action
RA-O	remedial action operations
RDW	remediation-derived waste
ROD	record of decision

SOM02.4	Superfund Organic Methods, multi-media, multi-concentration
TC	top of casing
TCE	trichloroethene
TOC	total organic carbon
VC	vinyl chloride
VI	vapor intrusion
VOC	volatile organic compound

1. Introduction

The National Guard Bureau (NGB) has contracted with Jacobs to provide Installation Restoration Program (IRP) services under NGB Contract GS00Q14OADU120 at eight Air National Guard (ANG) installations across the United States. This project is being performed for the 109th Airlift Wing (AW) of the New York Air National Guard (NY ANG) in Scotia, New York. The 109th AW NY ANG Base (Base) is located at the Schenectady County Airport and includes IRP Site 6. IRP Site 6 encompasses 0.96 acre near the southeastern corner of the Schenectady County Airport.

Previous remedial actions (RAs) at Site 6 included soil excavation, enhanced bioremediation, and in situ chemical oxidation (ISCO). In accordance with the final *Work Plan for Remedial Action-Operations, Monitoring, and Project Closeout at Site 6 (Suspected Spill Area), 109th Airlift Wing, Schenectady Air National Guard Base, Scotia, New York* (Work Plan; Leidos, 2016), groundwater monitoring is being performed to monitor the effectiveness of the RAs in reducing concentrations of constituents of concern (COCs) in site groundwater to levels below the New York State Department of Environmental Conservation (NYSDEC) criteria.

This work plan addendum (Addendum No. 1, RA-O [remedial action operations] Work Plan at Site 6) summarizes the site status and outlines the changes to the groundwater monitoring program under the new contract. Specifically, this work plan addendum accomplishes the following:

- Optimizes the sampling locations, analyses, and frequency.
- Provides updated project organization and contact information.
- Serves as the project instructions for the field sampling team, including providing an updated Health and Safety Plan (HASP).

This work plan addendum also provides clarification regarding the site closure process to be implemented in accordance with the *Defense Environmental Restoration Program Final Record of Decision for Sites 3 and 6, 109th Airlift Wing, NYANG, Scotia, New York* (ROD; ANG, 2012).

1.1 Site Status

The most recent enhanced bioremediation injection event was completed in May 2020. The fourteenth groundwater monitoring event was conducted on 06 April 2020, prior to the injections. Two locations (wells 6MW-24 and 6MW-25) were sampled for volatile organic compounds (VOCs) and total organic carbon (TOC). The fifteenth groundwater monitoring event was conducted on 15 June 2020, following the injections. The same two locations were sampled for VOCs and TOC.

The May 2020 injections and April and June 2020 groundwater monitoring events are summarized in this section. Details are provided in the *Seventh Semiannual Monitoring Report for Installation Restoration Program Site 6 (Suspected Spill Area), 109th Airlift Wing, NYANG, Stratton ANGB, Scotia, New York* (Leidos, 2020b). Historical sampling results at wells 6MW-24 and 6MW-25 are shown on Figure 1-1.

April 2020 Monitoring Event

- **6MW-24.** No NYSDEC screening criteria were exceeded; however, trichloroethene (TCE) (3.5 J micrograms per liter [µg/L]) and cis-1,2-dichloroethene (DCE) (1.9 J µg/L) were detected. The TOC and the dissolved oxygen (DO) concentrations were 3.3 milligrams per liter (mg/L) and 6.09 mg/L,

respectively. The oxidation reduction potential (ORP), pH, and specific conductivity were 111.1 millivolts (mV), 7.1, and 0.973 milliSiemens per centimeter (mS/cm), respectively.

- **6MW-25.** NYSDEC screening criteria exceedances were observed for cis-1,2-DCE (8.1 µg/L) and vinyl chloride (VC) (39 µg/L); neither PCE (tetrachloroethene) nor TCE were detected. The TOC and DO concentrations were 5 mg/L and 0.18 mg/L, respectively. The ORP, pH, and specific conductivity were -223.2 mV, 6.75, and 0.654 mS/cm, respectively.

May 2020 Injection Event

A mixture of emulsified vegetable oil (450 gallons), sodium lactate (56 pounds), sodium bicarbonate (335 pounds), and water (3,614 gallons) were injected into injection wells 5 through 9 and infusion gallery points IP2-3 and IP3-2. Ten liters of a bioaugmentation culture was subsequently injected into injection wells 5 through 9. The injection mixture was visually observed at adjacent injection and monitoring wells. The observation of trace amounts of the injection mixture in the downgradient interceptor trench and sump indicates greater distribution than was observed during previous injection events.

June 2020 Monitoring Event

- **6MW-24.** The VC concentration (2.8 J µg/L) exceeded its NYSDEC screening criterion; TCE (2.6 J µg/L) and cis-1,2-DCE (2.5 J µg/L) were detected. The TOC and the DO concentrations were 68 mg/L and below detection limits, respectively. The ORP, pH, and specific conductivity were -119 mV, 8.56, and 0.888 mS/cm, respectively.

- **6MW-25.** The VC concentration (20 J µg/L) exceeded its NYSDEC screening criterion; no other VOCs were detected. The TOC and DO concentrations were 1,700 mg/L and below detection limits, respectively. The ORP, pH, and specific conductivity were -110 mV, 7.89, and 2.51 mS/cm, respectively.

The April 2020 monitoring event demonstrated that residual contaminant mass persists in the groundwater at two well locations and TOC concentrations were below the optimal range (20 to 50 mg/L) for sustaining biodegradation, as referenced in the final *Sixth Semiannual Monitoring Report for Installation Restoration Program Site 6 (Suspected Spill Area), 109th Airlift Wing, NYANG, Stratton ANGB, Scotia, New York* (Leidos, 2020a). Elevated DO concentrations and ORP values at well 6MW-24 indicated a geochemical environment that was not ideal for anaerobic bioremediation. After the injection, the groundwater geochemistry was favorable for anaerobic bioremediation based on the low DO concentrations (below detection limits) and ORP values (below -110 mV) and increased TOC concentrations. The increase in VC concentrations at well 6MW-24 and the decrease in VOC concentrations at 6MW-25 indicate the positive influence of the injections on the anaerobic bioremediation process. Continued groundwater monitoring is required to evaluate performance of the RAs and determine when NYSDEC closure criteria have been achieved.

1.2 Optimization of Quarterly Groundwater Monitoring

The groundwater monitoring program that has been in place since 2016 included baseline, performance monitoring, and closeout monitoring events with varying sampling frequencies and analytical parameters. Based on the performance monitoring results since 2016, NYSDEC has agreed to reduce the number of sampling locations from six to two (wells 6MW-24 and 6MW-25) and analyze the groundwater samples for VOCs and TOC. This change was initiated during the April 2020 sampling event. VOC concentrations at the other four Site 6 wells (6MW-20, 6MW-22, 6MW-23, 6MW-26) have been below NYSDEC screening criteria for four or more consecutive quarterly events.

Per this work plan addendum, the optimized sampling approach will continue for eight quarterly groundwater monitoring events (March 2021 through December 2022). Although groundwater levels will be measured, the other four Site 6 wells (6MW-20, 6MW-22, 6MW-23, 6MW-26) will not be sampled; the most recent historical data for these wells will be used to document site closure. All site activities associated with this scope of work are anticipated to be completed in a single field day. Table 1-1 lists the monitoring locations that will be used during the upcoming quarterly groundwater monitoring events.

Table 1-1. Updated Groundwater Monitoring Network
Addendum No. 1, RA-O Work Plan at Site 6, 109th Airlift Wing ANG, Scotia, NY

Well ID	Coordinates (Northing)	Coordinates (Easting)	TC Elevation (ft amsl)	Screen Interval (ft bgs)	Sampling Requirements
6MW-20	4744646.7	588169.1	305.44	5.0-15.0	DTW Only
6MW-22	4744679.5	588163.3	309.83	4.0-9.0	DTW Only
6MW-23	4744667.4	588151.3	308.37	4.0-9.0	DTW Only
6MW-24	4744689.9	588174.1	310.60	4.0-9.0	DTW, VOCs and TOC
6MW-25	4744658.4	588163.7	306.12	4.0-9.0	DTW, VOCs and TOC
6MW-26	4744666.0	588172.6	307.05	4.0-9.0	DTW Only

Notes:
Coordinates shown are WGS84 UTM Zone 18 North (feet)
DTW = depth to water
ft bgs = feet below ground surface
ft amsl = feet above mean sea level
ID = identification
TC = top of casing
TOC = total organic carbon
VOC = volatile organic compound

Quarterly Groundwater Monitoring Procedures

Prior to sampling, water levels will be gauged in the six monitoring wells listed in Table 1-1 and shown on Figure 1-2 in accordance with the procedures outlined in the Work Plan (Leidos, 2016). General sampling procedures will continue to be performed for wells 6MW-24 and 6MW-25 according to NYSDEC low-flow sampling protocols and the Work Plan (Leidos, 2016).

Consistent with the previous monitoring events, a peristaltic pump with Teflon-lined tubing will be used for low-flow sampling. The sampling inlet will be set at mid-screen depth (refer to Table 1-1). Field parameters will be collected with a flow-through cell water quality meter with optical DO sensor, which will be calibrated according to manufacturer recommendations prior to use. The following field parameter values must be stabilized and recorded prior to sampling: pH, temperature, specific conductivity, DO, ORP and turbidity.

Once the field parameters have stabilized, the sample tubing will be disconnected from the water quality meter flow cell and groundwater samples will be collected in laboratory-supplied containers with appropriate sample preservative. Samples for VOC analysis will be collected with zero headspace. Samples

will be placed immediately on ice in a cooler and the cooler will be shipped to Pace Analytical - National priority overnight via FedEx at the end of the field day. Pace Analytical - National has New York State (Environmental Laboratory Approval Program [ELAP]) and U.S. Department of Defense (DoD) laboratory certification (DoD ELAP).

After use at each location, any equipment that could have contacted groundwater will be decontaminated using distilled water and Alconox. The field team will work from "clean" to "dirty" locations when performing the depth-to-water survey and groundwater sampling; based on the June 2020 results, well 6MW-25 will be gauged and sampled last. The subsequent order will be adjusted based on the latest quarterly monitoring data. Quality control/quality assurance samples will be sent to the laboratory with the groundwater samples and include the following: one trip blank per cooler, one field duplicate per event, one matrix spike/matrix spike duplicate per event, and one equipment blank per day. Guidelines for sampling, documentation, laboratory analysis, quality assurance/quality control procedures, qualitative and quantitative goals for precision, accuracy, representiveness, comparability, completeness, sensitivity and reporting requirements are defined in the 2016 Final Quality Assurance Project Plan included in the Work Plan (Leidos, 2016). Additionally, the data package will be validated by the project chemist using a process analogous to that outlined in the following guidance documents: *U.S. Department of Defense General Data Validation Guidelines* (DoD, 2019), *U.S. Department of Defense Data Validation Guidelines Module 1: Data Validation Procedure for Organic Analysis by GC/MS* (DoD, 2020), U.S. Environmental Protection Agency's (EPA's) *National Functional Guidelines for Superfund Organic Methods Data Review* (SOM02.4) (540-R-2017-002; EPA, 2017), and respective EPA region guidelines. The data review and validation process will be independent of the laboratory's checks and focus on the usability of the data to support the project data interpretation and decision-making process.

Lab Shipping Address:

Pace Analytical - National
12065 Lebanon Road
Mt. Juliet, TN 37122

FedEx Dropoff Location:

OfficeMax – FedEx ShipSite
70 W Campbell Rd
Rotterdam, NY 12306
Latest Express Dropoff Time 5:45 PM

Sample Nomenclature

Primary sample identifications (IDs) will consist of the four-letter base identifier (STRN) followed by the IRP site (6), the alpha-numeric well identifier (for example, MW24), and the date (for example, 032521 for March 25, 2021). Therefore, if location 06MW24 is sampled during the upcoming spring 2021 event on March 25, the sample ID would be "STRN-6-MW24-032521."

Duplicate sample IDs will consist of the parent ID with a "P" between the location and date identifier. For example, a duplicate collected at 06MW25 during the spring 2021 event would have the label "STRN-6-MW25P-032521." Sample times for the parent ID and the duplicate ID should be different.

Matrix spike and matrix spike duplicates (MS/MSD) will consist of the parent ID plus "-MS" and "-MSD" at the end of the sample ID. For example, if MS/MSD was collected at 06MW24 on March 25, 2021, the

sample IDs would be "STRN-6-MW24-032521-MS" and "STRN-6-MW24-032521-MSD." Sample times for the parent ID and MS/MSD will be the same.

Field blanks will consist of base and site identifiers, then blank type and blank number, followed by date. For example, an equipment blank collected on March 25, 2021 would have the sample ID "STRN-6-EB01-032521," while the trip blank ID would be "STRN-6-TB01-032521."

Remediation-derived Waste Handling and Storage

Remediation-derived waste (RDW) will be containerized in 55-gallon steel drums and stored in a nearby shed. The Base environmental manager will direct the field team to the RDW storage area upon mobilization for the first event. All RDW will be separated into like-waste streams: purged groundwater will be stored in a drum and tubing, personal protective equipment, and contaminated waste (paper towels, string, etc.) will be stored in a separate drum. Waste will be sampled for a waste characterization profile to be generated, and then the drums will be labeled with appropriate waste classification. Non-hazardous waste classification is anticipated. After several drums have been generated, they will be removed from the site and disposed of at an offsite facility in accordance with the policy on *Memorandum for ANG/CEV, CEV 05-1, Policy on Air National Guard Investigation or Remediation-derived Waste (IDW/RDW) Management* (ANG, 2005).

1.3 Updated Project Contact Information

Updated contact information for the project team is provided in Table 1-2. Communication with the onsite environmental manager, Jennifer Kotch, is required at least 1 week prior to mobilization, though 2 weeks is preferred. Jennifer Kotch is located on base at 1 Air National Guard Rd, Scotia, New York. A single field lead will be identified to receive a badge for recurring base access. The person identified will be the primary field lead for the upcoming quarterly events. The field lead and the task manager will prepare for the event and remain in contact during the field activities. If any issues or incidents arise, the task manager will inform the Jacobs project manager.

Table 1-2. Updated Project Team Contact Information
Addendum No. 1, RA-O Work Plan at Site 6, 109th Airlift Wing ANG, Scotia, NY

Contact	Role	Phone No.	E-Mail
Mark Dickerson	A4VR Contracting Officer	(240) 612-8445	mark.dickersonv@us.af.mil
William Myer	NYANG A4VR Program Manager	(774) 994-7265	myer507enbn@gmail.com
Eric Barefoot	BB&E Project Manager	(830) 388-9359	ebarefoot@bbande.com
Jennifer Kotch	NY ANG 109th AW Base Environmental Manager	(518) 344-2341	jennifer.kotch.1@us.af.mil
Brian Jankauskas	NYSDEC Project Manager	(518) 402-9626	brian.jankauskas@dec.ny.gov
Steve Glennie	Jacobs ANG Program Manager	(703) 376-5122	steven.glennie@jacobs.com
Christopher Houck	Jacobs ANG Project Manager	(703) 376-5140	christopher.houck@jacobs.com
Mike Perlmutter	Jacobs Senior Technical Consultant	(404) 751-5671	mike.perlmutter@jacobs.com
Kimberley Amley	Jacobs Program Quality Manager	(248) 412-7532	kimberly.amley@jacobs.com
Juan Acaron	Jacobs Project Chemist	(352) 384-7002	juan.acaron@jacobs.com
Taylor Salsburg	Jacobs Task Manager	(862) 242-7031	taylor.salsburg@jacobs.com
Liz Martin	Pace Analytical - National Laboratory Project Manager	(225) 769-4900	liz.martin@pacelabs.com
Mark Orman	Jacobs HSE Manager	(414) 712-4138	mark.orman@jacobs.com
Lisa Schwan	Jacobs Environmental Manager	(404) 414-2505	lisa.schwan@jacobs.com

1.4 Site Closure

The overall objective for Site 6 is to achieve site closure with no land use restrictions in accordance with the 2012 ROD (ANG, 2012), which defines the remedial action objectives for Site 6:

- Prevent ingestion and direct contact with contaminated soil
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil
- Prevent contact with or inhalation of volatiles from contaminated groundwater
- Prevent migration of contaminants that would result in groundwater or surface water contamination
- Restore groundwater aquifer to pre-disposal or pre-release conditions, to the extent practicable
- Prevent impacts to biota from ingestion and direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain

Achieving the remedial action objectives through the application of the selected groundwater remedial action should allow for the unrestricted future uses of the Defense Environmental Restoration Program at Site 6, according to the 2012 ROD (ANG, 2012).

Site Closure Summary for Soil

No Further Action (NFA) for soil at Site 6 was attained in 2015; therefore, there are no remedial action objectives remaining for soil at Site 6.

Site Closure Summary for Groundwater

Enhanced bioremediation and ISCO have been performed to treat affected groundwater, and in accordance with the ROD, four quarterly groundwater sampling events with COC concentrations below NYSDEC criteria are required to achieve NFA for groundwater. Enhanced bioremediation and ISCO have been effective because groundwater COCs have been below their respective NYSDEC criteria for four or more quarters in four of six wells in the groundwater monitoring program (6MW-20, 6MW-22, 6MW-23, 6MW-26). Groundwater monitoring will continue at the two remaining wells (6MW-24 and 6MW-25) where VC and cis-1,2-DCE concentrations remain above their respective NYSDEC criteria until the site closure requirements are attained and/or NYSDEC concurs with the NFA recommendation for groundwater. The four other wells (6MW-20, 6MW-22, 6MW-23, 6MW-26) will not be sampled again. The existing analytical data from these four wells will be used to support a groundwater NFA recommendation for Site 6 once the NYSDEC closure requirements are met at wells 6MW-24 and 6MW-25.

Site Closure Summary for Soil Vapor

A vapor intrusion evaluation for Site 6 was conducted in accordance with applicable guidance from NYSDEC (NYSDEC, 2006) and the New York State Department of Health (NYSDOH, 2006):

- Soil gas sampling was performed in September 2007 to characterize the potential for soil vapor migration from the dissolved chlorinated volatile organic compound plume at Site 6 to the closest indoor air receptor, Building 18. Building 18 is located 475 feet cross-gradient to the Site 6 groundwater plume. Two locations (SG-1 and SG-2) were analyzed for chlorinated hydrocarbons using modified Method TO-15 (refer to Figure 1-2 for soil gas sampling locations). No detections of COCs were found at either soil gas sampling location. Since the 2007 soil gas sampling was performed, the potential sources of soil gas have been removed or reduced. Specifically, contaminated soil has been removed and COC concentrations in groundwater have mostly decreased to levels below NYSDEC standards.

- The most recent COC concentrations in soil and groundwater at Site 6 are summarized as follows:

    - Soil: No soil contamination remains at Site 6 above NYSDEC unrestricted use regulatory levels (Leidos, 2016). Soil remediation is complete for Site 6, and NYSDEC has approved NFA for soil.

    - Groundwater: Only two of the six monitoring wells sampled consistently at Site 6 since 2016 continue to have concentrations of COCs that exceed NYSDEC standards: 6MW-24 and 6MW-25. During the most recent sampling event in June 2020, only VC exceeded the NYSDEC Class GA Groundwater Standard of 2 µg/L, when the VC concentrations were 2.8 J µg/L and 20 J µg/L, at 6MW-24 and 6MW-25, respectively.

- There are currently no occupied structures within 100 feet of Site 6 and there are no plans to construct occupied structures at or near Site 6 in the foreseeable future. There is very limited potential for future land use changes given that Site 6 is located on an active ANG base and is in close proximity to an active runway for the Schenectady County Airport.

Once COCs in groundwater at monitoring wells 6MW-24 and 6MW-25 decrease to levels below NYSDEC Class GA Standards for four quarterly events, a recommendation for NFA will be provided in the corresponding groundwater monitoring report. The report will include a summary of work performed, a description of site conditions, and a statement that the soil vapor intrusion evaluation requirement in the ROD (ANG, 2012) no longer applies since the remedial action objectives for both soil and groundwater at Site 6 have been attained, soil gas sources have been effectively removed, and there are no plans for land use changes at Site 6.

Upon NYSDEC's concurrence with the recommendations in the groundwater monitoring report providing the NFA recommendation, ANG will prepare a Site Closeout Work Plan to describe how the site monitoring wells and remediation infrastructure at Site 6 will be properly abandoned and/or removed. Completion of the site closure work will be documented in a Site Closeout Report. The Site Closeout Work Plan, field work, and report are not included in the current contract scope of work.

1.5 Updated HASP

The updated HASP is attached as Appendix A. Updates are based on contract scope, updated staff and client contact information, recently revised Jacobs Business Management System Procedures and Work Instructions, and Jacobs' COVID-19 guidance.

2. References

Air National Guard (ANG). 2005. *Memorandum for ANG/CEV, CEV 05-1, Policy on Air National Guard Investigation or Remediation-derived Waste (IDW/RDW) Management*. March.

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Leidos. 2020b. *Seventh Semiannual Monitoring Report for Installation Restoration Program Site 6 (Suspected Spill Area), 109th Airlift Wing, NYANG, Stratton ANGB, Scotia, New York*. Final. July.

Jacobs. 2020. *Kickoff Meeting Minutes, Nationwide Long-term Monitoring at Multiple Installations.* Contract No. GS00Q14OADU120; Delivery Order W9133L20F3599. Teleconference. November.

Jacobs. 2021. *Stratton National Guard Base IRP Site 6 Kickoff Meeting Minutes.* Contract No. GS00Q14OADU120; Delivery Order W9133L20F3599. Teleconference. January.

New York State Department of Environmental Conservation (NYSDEC). 2006. *DER-13/Strategy for Evaluating Soil Vapor Intrusion at Remedial Sites in New York*. October.

New York State Department of Health (NYSDOH). 2006. *Guidance for Evaluating Soil Valor Intrusion in the State of New York*. October.

U.S. Department of Defense (DoD). 2019. U.S. Department of Defense General Data Validation Guidelines.

U.S. Department of Defense (DoD). 2020. U.S. Department of Defense Data Validation Guidelines Module 1: Data Validation Procedure for Organic Analysis by GC/MS.

U.S. Environmental Protection Agency (EPA). 2017. *National Functional Guidelines for Superfund Organic Methods Data Review* (SOM02.4) (540-R-2017-002). January.

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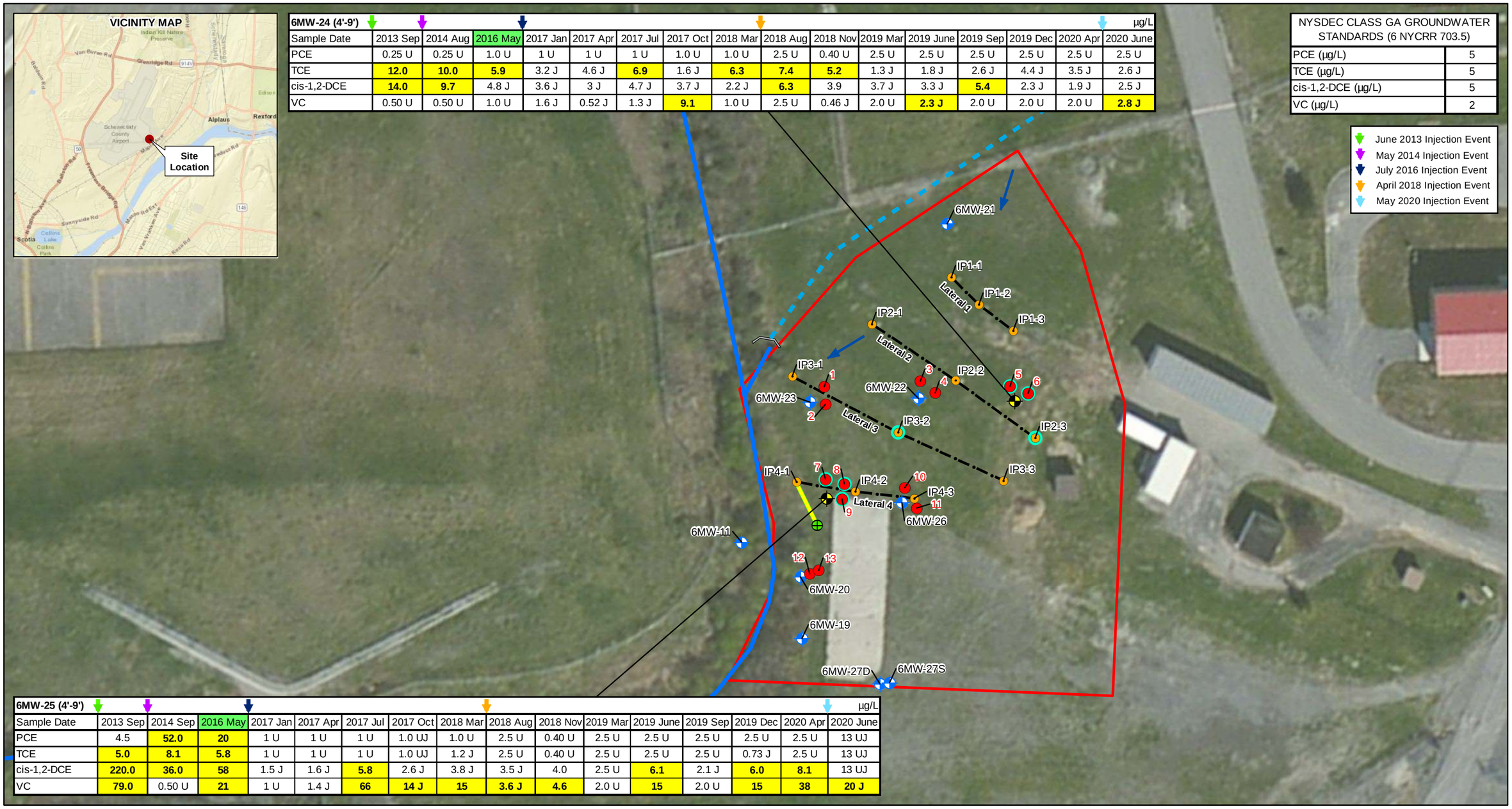
Figures



6MW-24 (4'-9') — µg/L

Sample Date	2013 Sep	2014 Aug	2016 May	2017 Jan	2017 Apr	2017 Jul	2017 Oct	2018 Mar	2018 Aug	2018 Nov	2019 Mar	2019 June	2019 Sep	2019 Dec	2020 Apr	2020 June
PCE	0.25 U	0.25 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	2.5 U	0.40 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
TCE	**12.0**	**10.0**	**5.9**	3.2 J	4.6 J	**6.9**	1.6 J	**6.3**	**7.4**	**5.2**	1.3 J	1.8 J	2.6 J	4.4 J	3.5 J	2.6 J
cis-1,2-DCE	**14.0**	**9.7**	4.8 J	3.6 J	3 J	4.7 J	3.7 J	2.2 J	**6.3**	3.9	3.7 J	3.3 J	**5.4**	2.3 J	1.9 J	2.5 J
VC	0.50 U	0.50 U	1.0 U	1.6 J	0.52 J	1.3 J	**9.1**	1.0 U	2.5 U	0.46 J	2.0 U	**2.3 J**	2.0 U	2.0 U	2.0 U	**2.8 J**

NYSDEC CLASS GA GROUNDWATER STANDARDS (6 NYCRR 703.5)	
PCE (µg/L)	5
TCE (µg/L)	5
cis-1,2-DCE (µg/L)	5
VC (µg/L)	2

6MW-25 (4'-9') — µg/L

Sample Date	2013 Sep	2014 Sep	2016 May	2017 Jan	2017 Apr	2017 Jul	2017 Oct	2018 Mar	2018 Aug	2018 Nov	2019 Mar	2019 June	2019 Sep	2019 Dec	2020 Apr	2020 June
PCE	4.5	**52.0**	**20**	1 U	1 U	1 U	1.0 UJ	1.0 U	2.5 U	0.40 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	13 UJ
TCE	**5.0**	**8.1**	**5.8**	1 U	1 U	1 U	1.0 UJ	1.2 J	2.5 U	0.40 U	2.5 U	2.5 U	2.5 U	0.73 J	2.5 U	13 UJ
cis-1,2-DCE	**220.0**	**36.0**	**58**	1.5 J	1.6 J	**5.8**	2.6 J	3.8 J	3.5 J	4.0	2.5 U	**6.1**	2.1 J	**6.0**	**8.1**	13 UJ
VC	**79.0**	0.50 U	**21**	1 U	1.4 J	**66**	**14 J**	**15**	**3.6 J**	**4.6**	2.0 U	**15**	2.0 U	**15**	**38**	**20 J**

LEGEND

- Injection Well
- Optimized Monitoring Well
- Monitoring Well
- Infusion Gallery Point
- Collection Sump
- 2020 Injection Location
- Approximate Location of Stormwater Drain
- Interceptor Trench
- Horizontal Infusion Well
- Drainage Ditch
- General Groundater Flow Direction
- Weir Dam
- Surface Water
- Stormwater Outfall
- Site 6 Boundary

\\DC1VS01\GISPROJ\A\AIRNATIONALGUARD\SCHENECTADY\MAPFILES\FIGURE_1-1_SITE6_GWM_RESULTS.MXD AESPEJO 12/23/2020

Basemap Source: ESRI World Imagery (Clarity)

Notes:
DCE = Dichloroethene
TCE = Trichloroethylene
PCE = Tetrachloroethene
VC = Vinyl Chloride
J = Results are an estimated concentration
U = Results are below detection limit
ND = Non-Detect
XXX = Concentration exceeds NYSDEC GA
2016 = Baseline Sampling Event for Task Order 0004

Groundwater Standards
(1) Select calendar year 2014, 2015, and 2016 sampling events were deleted so most recent data can be clearly inserted.
(2) June 2020 sample for 6MW-25 was diluted (500X for the regular sample and 5X for the duplicate) due to presence of emulsified vegetable oil in the well. Results shown are for duplicate sample.

N

0 50 100
Approximate scale in feet

Figure 1-1. 2020 Groundwater Monitoring Results at Site 6
New York Air National Guard
109th Airlift Wing
Scotia, New York

Jacobs

LEGEND

- Injection Well
- Program Monitoring Well
- Monitoring Well
- Infusion Point
- Collection Sump
- Approximate Location of Stormwater Drain
- Interceptor Trench
- Horizontal Infusion Well
- Drainage Ditch
- General Groundwater Flow Direction
- Weir Dam
- Surface Water
- Stormwater Outfall
- Site 6 Boundary
- Depth to Water Location
- Historical Soil Gas Sample Locations

Notes:
1) Basemap Source: ESRI World Imagery (Clarity)
2) Historical soil gas sample locations are approximate

N

0 50 100
Approximate scale in feet

\\DC1VS01\GISPROJ\A\AIRNATIONALGUARD\SCHENECTADY\MAPFILES\SITE6_SAMPLE_LOCATIONS_DTW.MXD TSALSBUR 5/18/2021

Figure 1-2
Quarterly Groundwater Monitoring Network at Site 6
New York Air National Guard
109th Airlift Wing
Scotia, New York

Jacobs

Appendix A
Updated Health and Safety Plan

Remedial Action-Operations, Monitoring, and Project Closeout at Site 6 (Suspected Spill Area)

Site 6 – 109th Airlift Wing Air National Guard

Project Health, Safety and Environment Plan

OASIS Pool 1

Air National Guard

March 2021

Approvals

This Project Health, Safety, and Environment Plan (PHSEP) has been written for use by Jacobs only. Jacobs claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific project and site conditions and identified scope(s) of work and must be amended if those conditions or scope(s) of work change.

By approving this PHSEP, the Project Health and Safety Lead, or Project Health and Safety Manager (HSM) certifies that the personal protective equipment has been selected based on the task hazard/impact identification and risk assessment (HIIRA).

Author:	Mark Orman, CSP
Project Health and Safety Manager Approval:	Mark Orman, CSP
Project Manager Approval:	Chris Houck
Contract Number:	GS00Q14OADU120

Document history and status

Revision	Date	Description of Revisions	Author	Approved By/Title:
0	1 March 2021	Initial safety plan	Mark Orman	 Health and Safety Manager Project Manager 

Contents

Project Emergency Contacts

WorkCare 24-hour Injury Care – 1-888-449-7787	
Medical Emergency—911 (if on base, identify that the incident is on base) See local hospital information and route to hospital below	**Non-Emergency medical Injuries** (no matter how minor) WorkCare: 1-888-449-7787 (call as soon as injury occurs)
Fire/Spill Emergency—911 **Security & Police—**911 (if on base, identify that the incident is on base)	**Utilities Emergency Phone Numbers** Water: 911 Gas: 911 Electric: 911
Jacobs Project Manager Name: Christopher Houck/WDC Phone: 206-979-2575	**Jacobs Project Health and Safety Manager (HSM)** Name: Mark Orman Phone: 303-944-5214
Jacobs Safety Liaison (SL) Name: Joe Spies Phone: 862-242-7147	**Jacobs Project Environmental Manager (EM)** Name: Linda Colella Phone: 720-320-2590 **Jacobs Project Waste Manager (WM)** Name: Lisa Schwan Phone: 404-414-2505
Jacobs US Security Officer Name: Keith Waddell Phone: 214-920-8327	**Media Inquiries Corporate Strategic Communications** Name: Lorrie Paul Crum Phone: 469-941-8845
Automobile Accidents **Rental**: Vehicle Accident Form required to be sent to AutoClaims@jacobs.com (see Vehicle Accident Guidance attached to this plan) **Fleet Vehicle**: Karyna Zarate 281-721-8634	**Human Resources Department** Submit a request through Global People Services on Jacobs Connect Workman's Compensation Claims: WCClaims@jacobs.com
Facility/Site Alarms: Inclement weather alarms (lightning within 5 miles or tornado warning)	**Federal Express Dangerous Goods Shipping** Phone: 800-238-5355 **CHEMTEL (hazardous material spills)** Phone: 800-255-3924
Facility/Site Evacuation Route(s): TBD by Safety Liaison at each new location	**Evacuation Assembly Areas(s):** TBD by Safety Liaison at each new location

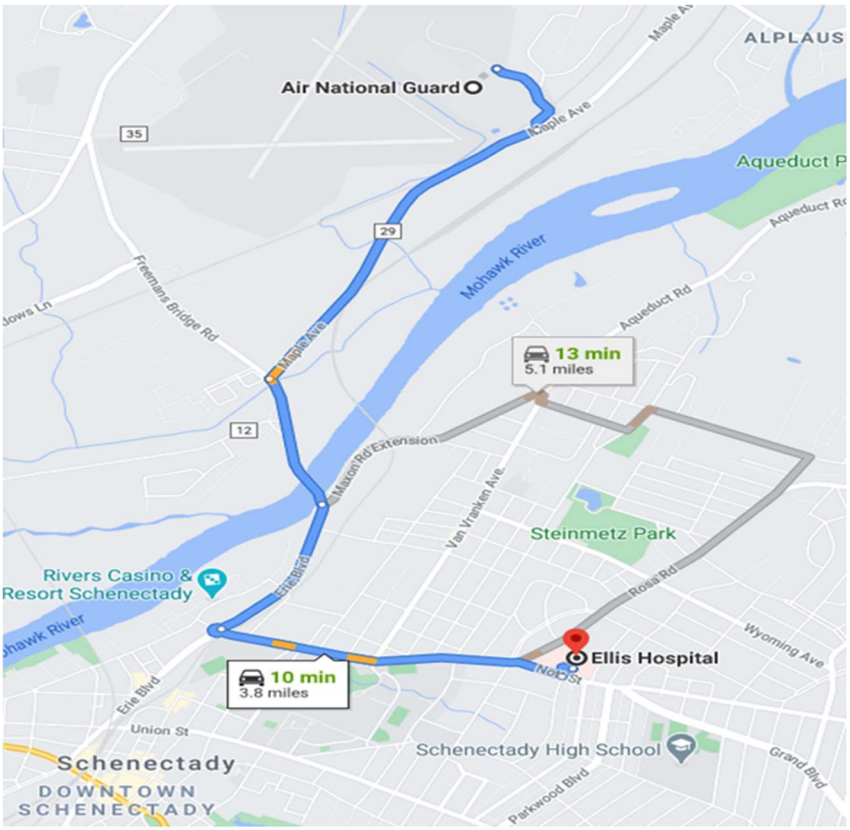
Local Hospital:

Ellis Hospital

1101 Nott St, Schenectady, NY 12308

Phone: 518-243-4000

Directions and Map to Local Hospital



Air National Guard
1 Air National Guard Rd, Scotia, NY 12302

- Head southeast on Ronald Reagan Way toward Jordan Ln
  - Partial restricted usage road
  - 0.3 mi
- Turn right onto Maple Ave
  - 1.3 mi
- Turn left onto Freemans Bridge Rd
  - 0.5 mi
- Continue onto Erie Blvd
  - 0.6 mi
- At the traffic circle, take the 3rd exit onto Nott St
  - 1.0 mi
- Turn left at Lowell Rd
  - 223 ft
- Turn left
  - Destination will be on the right
  - 164 ft

Ellis Hospital
1101 Nott St, Schenectady, NY 12308

Applicability

This PHSEP applies to:

All Jacobs staff, including subcontractors and tiered subcontractors of Jacobs working on the site;

- All visitors to Jacobs construction or remediation sites in the custody of Jacobs (including, but not limited to, visitors from the Client, the Government, or the public,).
- In addition, subcontractors and tiered subcontractors shall also follow any of their company HSE programs, and site-specific PHSEPs and task hazard/impact identification and risk assessment (HIIRA) (e.g., activity or job hazard analyses). Even though this plan applies to non-Jacobs personnel as stated above, each employer is ultimately responsible for the health, safety, and well-being of their employees.

This PHSEP does not apply to the third-party contractors, their workers, their subcontractors, their visitors, or any other persons not under the direct control or custody of Jacobs.

The objective of this PHSEP is to ensure that project hazards and environmental impacts are eliminated or mitigated through the identification of hazards, environmental impacts assessment of risk and the application of effective control measures and to achieve a safe and healthy workplace for ourselves and subcontractor to whom we have a legal and moral duty of care. Further, there is a requirement to ensure that our activities are conducted in an environmentally friendly and responsible manner.

Jacobs has undertaken a structured hazard/impact identification and risk assessment process and shall implement a Safe System of Work (SSoW) for delivery of our services on this project. As part of the SSoW, this PHSEP defines the procedures and requirements for the health and safety of staff and visitors when they are physically on the work site. The work site includes the project area (as defined by the contract documents) and the project offices, trailers, and facilities thereon.

This PHSEP will be kept onsite during field activities and will be reviewed as necessary. The PHSEP will be reviewed at least annually and revised as project activities or conditions change or when supplemental information becomes available. The PHSEP adopts, by reference, the Jacobs Business Management System Global Health, Safety and Environment (HSE) and People and Places Solutions (P&PS) HSE Procedures and Work Instructions, as appropriate. In addition, applicable requirements contained in the Jacobs Federal and Environmental Services (F&ES) Field Handbook (Handbook) will be implemented. The Handbook is attached to this PHSEP. The PHSEP may adopt procedures from the project Work Plan and any governing regulations. If there is a contradiction between this PHSEP and any governing regulation, the more stringent and protective requirement shall apply.

All staff and subcontractors must sign the employee sign-off form (Attached to this PHSEP) to acknowledge review of this document. Copies of the signature page will be maintained onsite by the Safety Liaison (SL).

1. General Project Information

1.1 Project Information and Background

Project Number: D3440900	Project/Site Name: Remedial Action-Operations, Monitoring, and Project Closeout at Site 6 (Suspected Spill Area), Stratton Air National Guard Base
Client: Air National Guard Bureau	Site Address: Stratton Air National Guard Base Scotia, New York
Date HSE Plan Prepared: 2/2021	Date(s) of Site Work: March 2021-December 2024

1.2 Site Background, Setting and Map

Jacobs h (CH2M HILL) has been contracted by the National Guard Bureau (NGB) to provide Installation Restoration Program (IRP) services under NGB Contract GS00Q14OADU120 at eight Air National Guard (ANG) installations in the westernacross the United States. This project is being performed for the 109th Airlift Wing (AW) of the New York Air National Guard (NY ANG), Scotia, New York. The 109th AW NY ANG Base (Base) is located at the Schenectady County Airport and includes IRP Site 6. IRP Site 6 encompasses a 0.96 acre area near the southeast corner of the Schenectady County Airport.

The groundwater monitoring program that has been in place since 2016 included baseline, performance monitoring, and closeout monitoring events with varying sampling frequencies and analytical parameters. Based on the performance monitoring results since 2016, NYSDEC agreed to reduce the number of sampling locations from six to two (6MW-24 and 6MW-25) and only analyze the groundwater samples for VOCs and TOC. This change was initially implemented during the April 2020 sampling event. VOC concentrations at the other four Site 6 wells (6MW-20, 6MW-22, 6MW-23, 6MW-26) have been below NYSDEC screening criteria for four or more consecutive quarterly events.

1.3 Description of Tasks

Below is a description of the tasks covered by this plan. Any additions or changes in scope will require a revision to this PHSEP; see Change Management below.

Scope of work covered by this PHSEP includes:

- Mobilization and Demob
- Quarterly groundwater sampling at 2 wells using peristaltic pumps
- IDW Mgmt

Figure 1: Site Map

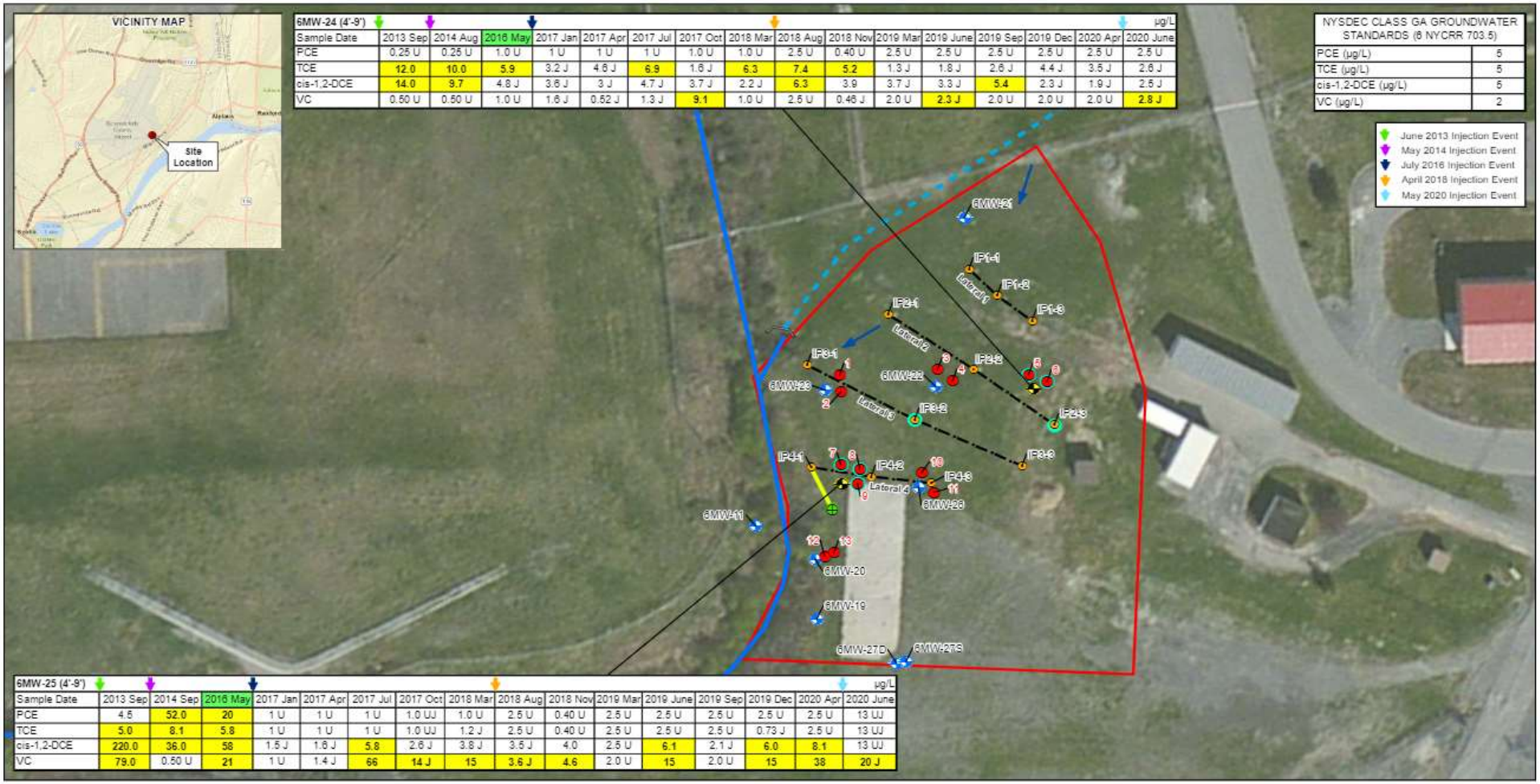


Figure 1-1, 2020 Groundwater Monitoring Results at Site 6
New York Air National Guard
109th Airlift Wing
Scotia, New York

1.4 Change Management

Changes to this PHSEP shall be documented and approved by the HSM for the project. The following are examples of changes that may require a revision to the plan:

- Change in staff listed by name in this plan;
- New subcontractor to perform work;
- New chemicals brought to site for use;
- Change in scope or addition of new tasks;
- Change in contaminants of concern (COCs) or change in concentrations of COCs;
- New hazards or hazards not previously identified that are not addressed in this PHSEP; and
- New environmental impacts or environmental impacts not previously identified that are not addressed in this PHSEP.

1.5 Changes to Project Health, Safety and Environment Plans

Changes to the PHSEP shall be documented and accepted by using the Health and Safety Field Change Request (FCR) form (included in Attachments) or by resubmitting a revised PHSEP for acceptance. A revised PHSEP should be produced when several changes using FCRs have been issued. The Project Manager (PM) and HSM shall be responsible for the review and acceptance of the FCR, and the HSM will maintain an FCR log of approved changes. FCRs are not required for safety-related changes that a Safety Liaison (SL) or HSM would normally make in the field, such as upgrade or downgrade to PPE within pre-established action levels, expansion or reduction of work control zones based on air monitoring results, and similar changes made within the operating parameters of the PHSEP. The field copy of the PHSEP shall be kept up to date by annotating the appropriate section to indicate that an FCR is in effect; copies of FCRs should be kept with the PHSEP. The FCR number must be referenced in the PHSEP and available for review.

1.6 Daily Safety Meetings and Point of Work Risk Assessments

Daily safety meetings are a means to coordinate project HSE activities and review HSE performance on a regular basis. Daily safety meetings are to be held with all project personnel in attendance, including subcontractors, to review the hazards, controls, and task HIIRAs that apply for each day's activities, as well as any environmental impacts, requirements and/or best management practices. Site supervisors/Field Team Leads (FTL) shall lead the daily safety meeting. Everyone involved in the day's work needs to participate and sign a sign-in form to show they've attended the meeting.

Point of Work Risk Assessments (POWRAs) (previously known as Safe Plan of Action or Pre-Task Safety Plans) shall be completed by individual crews to focus on those hazards and environmental impacts posed by their specific work, taking into account field conditions and/or hazards at the point of work. If a POWRA shows an unacceptable level of risk, field crew shall contact the PM and HSM.

A copy of the POWRA, form is included as an Attachment to this PHSEP.

1.7 Readiness Review

The PM shall complete a HSE readiness review with the project site supervisor, SL, HSM, and EM prior to field work. The readiness review shall discuss work scope, schedule, equipment, safety plan, training, hazards and controls.

1.8 StepBack Process

(Reference BIAF Global Guide, BIAF-350-G-01, HSE StepBack Process)

The StepBack process applies to all Jacobs employees and subcontractors that are performing tasks in an office or at a site location. It is a critical thinking process to supplement HSE planning tools such as the POWRA, task HIIRA, and PHSEPs and should be applied at the start of shift, after a break, when the task or location change, when adjacent work may present additional hazards, or any other hazard or change to task is identified. The StepBack questions are included as an attachment to this plan. See the Handbook for additional information.

2. Management of Subcontractors to Jacobs

2.1 Procurement and Pre-Start

The Project Manager subcontracting any field or site-based work activity will take reasonably practicable steps to ensure that our subcontractor is competent and able to carry out work safely before they start work. Specifically, they will:

- Ensure subcontractors are pre-qualified for health and safety and environmental activities
- Carry out competency checks i.e., view safety policy, risk assessments, ascertain experience, technical knowledge & competence
- Provide the subcontractor with information on foreseeable hazards and the controls required by Jacobs
- Communicate Jacobs HSE expectations in our subcontract and at start-up
- Discuss job/safety requirements and coordinate work activities
- Request and review the subcontractor's task/location specific safe systems of work and risk assessments
- Ensure that the subcontractors' personnel are briefed on their own risk assessments and safe systems of work
- Coordinate work activities which may require an emergency response with the Client Representative
- Provide a Jacobs induction
- Ensure a Client induction is given where required

2.2 During work

The Project Manager will:

- Ensure that our subcontractor attends a pre shift briefing and has completed a point of work risk assessment immediately before commencement of work
- Ensure Jacobs oversight is planned for the tasks listed above
- Hold our subcontractor accountable for any substandard HSE performance

2.3 Subcontractor HSE Chartering Meeting

(Reference P&PS Work Instruction, IB-HS-WI-0520, Health, Safety, and Environmental Requirements for Subcontractors)

A subcontractor HSE chartering meeting shall be held with subcontractors performing field work on the project. The purpose of the meeting is to discuss and agree on key HSE requirements on a project, and to emphasize and reinforce expectations for subcontractor HSE performance. The target audience includes key project staff with HSE responsibilities (e.g., PM, HSM, SL, EM FTL) and key subcontractor staff (e.g., project manager, supervisors,

designated field HSE contact, drill team leads, foreman). The subcontractor crew members should attend if available. The meeting should be held prior to mobilization with enough time to ensure that HSE issues identified can be addressed prior to the start of work. The meeting can be held over the phone or in person depending on project needs. An example agenda can be found attached to this PHSEP, titled “Site Work HSE Pre-Start Meeting Agenda”.

3. Project HSE Objective Targets and Indicators

All project personnel and its visitors are to strive to meet the project-specific HSE goals outlined below.

- Project management to demonstrate a top-down commitment to HSE;
- Create an incident-free environment;
- Establish and share the BeyondZero® culture;
- Accomplish zero loss incidents (e.g., injuries, spills, vehicle incidents property damage);
- Reduce risks to our health and the environment by identifying, assessing, and mitigating hazards and environmental impacts;
- Continually improve project environmental performance (e.g., reduce number of spills, achieve compliance with any applicable environmental permit);
- Ensure 100% participation in training programs, conformance to company requirements and HSE compliance;
- 100% participation in safety meetings;
- 100% on-schedule completion of environmental, safety and security corrective actions from audits or incidents;
- Achieve recognition from the client for outstanding performance;
- Participate in the BZO process and strive for recognition in the BZO of the month awards; and
- Recognize project and subcontractor HSE excellence through project or corporate reward and recognition programs.

4. Project Organization and Responsibilities

A full description of responsibilities, including Employee Responsibilities and Authority, can be found in the Handbook, Section 3, "Roles and Responsibilities."

4.1 Client

Contact Name:	Jody Murata
Phone:	240-612-8120
Facility Contact Name:	Jennifer Kotch
Phone:	518-344-2341

4.2 Jacobs

Project Manager
PM Name: Christopher Houck
Office: Washington, DC
Cell: 206 979 2575

Safety Liaison
SL Name: Joe Spies
Cell: 862-242-7147

Responsible Health and Safety Manager
Project HSM Name: Mark Orman
Office: Knoxville, TN
Cell: 414-712-4138

Environmental Manager
EM Name: Linda Colella
Office: Colorado Springs, CO
Cell: (720) 320-2590

Manager of Projects/Program Manager
MoP Name: Steve Glennie
Office: Washington, DC
Telephone number: (703) 376-5122

4.3 Subcontractors

Subcontractor: IDW
Scope:
Contact Name:
Telephone number:

Subcontractor:
Scope:
Contact Name:
Telephone number:

4.4 Client Contractors

Client Contractor: none at this time
Contact Name:
Telephone number:
Cellular Number:

Client Contractor:
Contact Name:
Telephone number:
Cellular Number:

This PHSEP does not cover contractors that are contracted directly to the client or the owner. Jacobs is not responsible for the health and safety or means and methods of the client contractor's work, and we must never assume such responsibility through our actions (such as advising on health and safety issues).

5. Task Hazard/Impact Identification and Risk Assessment

(See P&PS Work Instruction IB-HS-WI-0101-IB, P&PS Risk Assessment and Safety System of Work)

As part of the SSoW, a hazard identification and environmental impact risk assessment (HIIRA) must be undertaken for all tasks performed by Jacobs and their subcontractors. A task hazard/impact identification (Table 1) has been completed for this project. Specific project tasks are listed in Table 1 with a designation of who could be affected by the hazards associated with the task; Jacobs, subcontractor, or both. The environmental impacts are also included in the table and visitors and members of the public, when on or near the site, will be assumed to be affected by the same hazards and impacts as Jacobs or subcontractor personnel. Initial risk and residual risk associated with the hazards identified below shall be documented in the task HIIRA form (see attachments for form). Visitors that are trained and qualified to enter the work area must be escorted and briefed on the hazards they may be exposed to by reviewing applicable portions of the PHSEP and task HIIRAs.

The SSoW to mitigate these hazards includes:

- The hazard control sections listed in this plan (or referred to in the Handbook)
- The task HIIRA for each project task listed in Table 1; and
- The POWRA performed by the workers prior to performing the task.

Jacobs' task HIIRAs for the tasks below are attached to this plan. Jacobs' subcontractors are required to submit a similar SSoW (e.g., job or activity hazard analyses, HSE plan) specific to their scope of work for acceptance by Jacobs prior to the start of work. Additions or changes in field activities, equipment, tools, or material used to perform work or hazards not addressed requires an updated to be prepared and reviewed by Jacobs.

Table 2: Project Tasks and Associated Hazards and Environmental Impacts

Associated Hazard Section	Project Activity GW Sampling, IDW Management
General Hazards – Refer to General Hazards and Controls in the F&ES HSE Field Handbook, Section 7, or Jacobs HSE Procedures and Work Instructions.	
Bloodborne Pathogens (if first aid is rendered)	J, S
Chemical and Petroleum Storage	J, S
COVID-19 Exposure	J, S
Driving Safety ***(Critical Risk – Driving)***	J, S
Extended Work Hours & Fatigue Management (when applicable)	J, S
Field Ergonomics and Manual Lifting	J, S
Field Vehicles ***(Critical Risk – Driving)***	J, S

Table 2: Project Tasks and Associated Hazards and Environmental Impacts

Associated Hazard Section	Project Activity GW Sampling, IDW Management
Fire Prevention	J, S
General Practices and Housekeeping	J, S
Hazard Communication	J, S
Knife Use	Open-bladed knife use (leatherman, pocket knife) not permitted. Contact HSM if use becomes necessary
Lighting	J, S
Occupied Facility Siting	Not applicable to this project. No field trailer, work primarily in residential areas.
Personal Hygiene	J, S
Personal Security	J, S
Shipping and Transportation of Hazardous Waste	J, S
Substance Abuse	J, S
Unknown or Suspect Objects/Material	J, S
Project-Specific Hazards – Refer to the F&ES HSE Field Handbook, Section 8, and the additional project-specific controls in this plan when specified.	
Compressed Gas Cylinders (calibration gas)	J, S
Drum and Portable Tank Handling	J, S
Drum Sampling Safety	J, S
Groundwater Sampling/Water Level Measurements	J, S
Hand and Power Tools	J, S
Portable Generators	J, S
Public Safety (see hazard section below)	J, S
Slips, Trips and Falls	J, S
Spotters during Vehicle Backing Operations ***(Critical Risk – Mobile Equipment)***	J, S

Table 2: Project Tasks and Associated Hazards and Environmental Impacts

Associated Hazard Section	Project Activity: GW Sampling, IDW Management
Traffic Control, if necessary	J, S
Winter Driving (see hazard section below)	J, S
Working Alone (see hazard section below)	J, S
Physical Hazards – Refer to Physical Hazards in the F&ES HSE Field Handbook, Section 9, and the additional project-specific controls in this plan when specified.	
Noise	J, S
Ultraviolet Light exposure (sunburn)	J, S
Temperature Extremes	J, S
Biological Hazards – Refer to Biological Hazards in the F&ES HSE Field Handbook, Section 10, and the additional project-specific controls in this plan when specified.	
Aggressive Dogs (residential areas, see hazard section below)	J, S
Bees and Other Stinging Insects	J, S
Hantavirus	J, S
Spiders – Brown Recluse and Black Widow	J, S
Ticks	J, S
Environment Impacts – Refer to additional project-specific controls in this plan, specific HIIRAs, or in the project's stand-alone environmental plan (if applicable).	
Waste Management (see field project instructions)	J, S

J – Hazard identification applicable to Jacobs personnel
S – Hazard identification applicable to Subcontractor personnel

* For activities above identified as Critical Risks, refer to Jacobs Global Work Instruction JJ-HS-WI-0303-JJ, *Critical Risk Management,* the Critical Risk Awareness Booklet, and the Critical Risk Awareness Guide for Managers and Supervisors. For Environmental Aspects, refer to P&PS Work Instruction IB-HS-WI-0101-IB, *Risk Assessment and Safe System of Work,* Table 9.4.

6. Hazards and Controls

(See P&PS Work Instruction IB-HS-WI-0101-IB, P&PS Risk Assessment and Safety System of Work)

Safe work practices and hazard control measures to reduce or eliminate potential hazards as identified in Table 1 are stated in the Handbook, Sections 7-10, the associated Jacobs Procedure, Work Instruction, or Guideline, and/or are addressed in task HIIRAs. Any additional project-specific control measures, or those hazards requiring additional emphasis, are identified in the following sections.

Always consult the appropriate Procedures or Work Instruction referenced in the hazard sections to ensure all requirements are implemented. All employees and subcontractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. Jacobs employees and subcontractors who do not understand any of these provisions should contact the HSM for clarification prior to commencing with work.

A POWRA shall be performed at the start of each shift or when conditions significantly change. Implement the StepBack process throughout the duration of the task.

6.1 General Hazards and Controls

See the associated general hazard section of the Jacobs HSE Field Handbook for hazards identified in Table 1.

6.2 Project-Specific Hazards and Controls

6.2.1 Client Safety

Due to the fact that part of this work involves work in active client areas (Well Install, groundwater sampling on base), emphasis must be placed on warning and directing client personnel. Work areas will be clearly demarcated and durable, weatherproof signs will be posted to indicate no authorized entry.

Should a client employee inadvertently enter the work area, site personnel shall cease all work until the unauthorized person is escorted out of the work area.

6.2.2 Winter Driving

Although JACOBS field work isn't planned in winter weather, driving in Colorado and Wyoming in spring and fall months may present winter driving hazards. Check the weather forecast prior to travel. If storm conditions arise, contact PM to discuss staying at a hotel to wait until a storm is less severe.

Black Ice

Black ice is ice which forms on a roadway, usually due to snow melting and refreezing. Since it is almost invisible, black ice conditions may be hard to detect and if you drive at normal speeds, losing control of the vehicle is often the result. Always be alert to the possibility of black ice when temperatures are near or below freezing. Pavement that looks dry but appears darker in color and dull-looking should alert you to the presence of black ice.

Following Distance and Braking

Failing to allow yourself enough time to stop is a major cause of winter driving accidents. During slippery conditions, stopping distances can triple. Driving at a slower speed, anticipating stops at traffic lights and intersections, and applying brakes sooner than normal will help ensure accident-free stops. Abrupt braking can cause lock-up and loss of steering control. If you have anti-lock brakes, apply constant, firm pressure to the pedal. Always allow plenty of extra space between you and other vehicles to minimize the need for quick stops.

Maneuvering

Accelerating, turning, and passing also present dangers during winter. Accelerate slowly to avoid loss of traction and subsequent loss of control. Turn slowly, with caution, to avoid sliding into a stationary object or the path of an oncoming vehicle. Avoid sudden movements. Pass with care because passing lanes are sometimes not maintained as well as driving lanes. Again, leave extra space between yourself and other vehicles so there's room to maneuver in case something goes wrong. During a skid, steer cautiously in the direction of the skid (turn into the skid) to regain control.

Other Tips

- "Ice and Snow, Take it Slow" Drive for conditions. Don't get overconfident with four-wheel drive. It won't help you stop any faster.
- Turn on your headlights during adverse weather conditions. Clear snow from both headlights and taillights.
- Clear snow and ice from all vehicle windows before starting to drive, and warm the vehicle up to prevent potential window fogging.
- Bridges and overpasses freeze before the roadway. Use extra caution on these.
- Look farther ahead in traffic. Action by other drivers will alert you to problems and give you extra time to react.
- Avoid using cruise control or overdrive.
- Remember that driving in winter weather conditions causes physical and mental fatigue and reduces reaction times. Get plenty of rest and adequate nutrition. Don't drive while you're drowsy.
- 24-hour automated road condition information can be accessed by dialing 511(out of state call1-866-511-UTAH) .

6.3 Physical Hazards and Controls

See the associated physical hazard section of the Jacobs HSE Field Handbook for hazards identified in Table 1.

6.4 Biological Hazards and Controls

6.4.1 Coronavirus Disease 2019 (COVID-19)

Coronavirus disease 2019 (COVID-19) is a respiratory illness that can spread rapidly from person to person. Field personnel can potentially be exposed to COVID-19 while mobilizing/demobilizing to and from the project site, while working in areas with ongoing spread of the virus, and while working in close proximity to other field staff that have been previously exposed to the virus. COVID-19 is thought to spread mainly between people who are in close contact with one another (within about 6 feet) through respiratory droplets produced when an infected person talks, coughs, or sneezes. It also may be possible that a person can get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or possibly their eyes.

Common signs of infection include but are not limited to: fever or chills, cough, shortness of breath, fatigue, muscle or body aches, headache, new loss of taste or smell, sore throat, congestion or runny nose, nausea or vomiting, diarrhea. Symptoms may appear 2 to 14 days after exposure to the virus. Currently, there is no specific treatment or vaccine to protect against COVID-19.

See Jacobs COVID Pandemic Management Strategy and Field Checklist, attached to this PHSEP, for further precautions and controls measures for COVID-19. If showing signs of COVID-19, do not report to project site for work. Contact the project SL, HSM, PM and supervisor to immediately report symptoms to your supervisor.

The following control measures should be implemented to reduce the risk of contracting, and further spreading of, COVID-19, check Jacobs and CDC COVID-19 webpages frequently for updates:

- Review and follow Jacobs Global Security Companywide Travel Restriction and FAQ
- Review signs and symptoms of Coronavirus with all field staff. Utilize CDC guidance document (Appendix A to Jacobs COVID-19 Management Plan) to review COVID-19 awareness information.
- If project team member has specific COVID-19 concerns (e.g. in high risk category, high risk locations), speak with PM and supervisor. Accommodations shall be made by the PM and supervisor.

Additional COVID-19 field project control measures:

- Jacobs is requiring that all individuals performing work will wear cloth face coverings when they cannot maintain 6 feet of social distance in public areas or work areas.
- On project sites, where possible, undertake site work such as inspections during quieter times (early mornings, scheduled breaks, and lunch) to reduce interaction with other employees and maintain social distancing of at least 6 ft or more from all persons at all times.
- Where close contact or contact with individuals is unavoidable but critical, the tasks must be risk assessed with the support of an HSE professional (and if necessary, industrial hygienist or medical professional). The principles of prevention must be applied, and if necessary, as a last resort, PPE must be provided such as disposable coveralls, safety glasses, face-masks, nitrile gloves, and any other protective clothing deemed necessary. However, where work presents a risk that cannot be mitigated, the work shall not continue. If there is a need to provide the disposable coveralls and nitrile gloves, ensure an appropriate disposal receptacle is provided. Garbage must be double bagged.
- Work in the smallest groups possible (e.g., alone where it makes sense for low-risk activities while staying in communication). Consider keeping similar teams together on shift or in working groups. This will limit the chance of cross-infection across multiple groups and limiting contact across groups can help reduce risk of large percentage of staff needing to be quarantined.
- Monitor local public health agencies communications and state requirements. Follow all local agency guidance and restrictions.
- Ensure FTL and Safety Liaison have cell phone number of all field staff for communication to project teams.
- Identify project specific telework opportunities where feasible (e.g. work from hotel room).
- Frequent hand washing is required. Hand wash facilities are typically required at temporary job locations (e.g. at portapotty at field office). Wash hands with soap and water for at least 20 seconds. If a handwashing sink is not feasible (e.g. mobile staff), utilize disinfectant hand wipes.
- Provide hand sanitizer at all field project locations. If using alcohol based (>60% alcohol) hand sanitizer, cover all surfaces of your hands and rub them together until they feel dry.
- Be familiar with cough and sneeze etiquette and avoid touching eyes, nose, mouth.
- Refrain from person to person contact (e.g., handshakes, high-fives, etc.). Refrain from sharing personal items such as pens, glasses/mugs, cellphone, etc.
- Use disinfectant to frequently clean shared surfaces including, but not limited to rental cars; hotel room touch points; temporary office trailer touch points (e.g. door handles, workstations). For rental cars: steering wheels, control knobs/touch screens, shift knob, door handles, window switches, locks.
- If entering residential project site locations – ask occupants if they have signs of illness prior to entry. Do not enter residential locations with occupants that have signs/symptoms.

7. Required Permits

(See Jacobs Global Work Instruction JJ-HS-WI-0305-JJ, Safe Work Permits)

Safe work permits are used as a work control process for defined hazardous activities. The use of work permits may be required by clients or as a result of task risk assessment.

Coordinate work with the project team and client's operations representative (if required) as necessary to ensure that a properly filled out work permit is issued and includes relevant supporting information:

- The hazards/impacts and limitations at the site are assessed;
- All precautions are taken and safe practices followed;
- A work area review is conducted prior to signing and authorizing work; and
- Verify by means of a signature that the work permit has been reviewed and limitations and controls measures understood

Inspect the permit and tasks to ensure the permit requirements are still being met. Immediately stop work and notify supervision if any changes in job conditions or hazards take place. Ensure the permit is closed out where required.

8. Hazard Communication

(See P&PS Work Instruction IB-HS-WI-0202-IB, Chemical Hazard Communication)

As indicated in Section 7 of the Handbook, under "Hazard Communication," the hazard communication (HazCom) coordinator (the SL or qualified designee) must perform the following (additional HazCom duties are outlined in the Handbook):

- Complete an inventory of chemicals brought on site by Jacobs using the chemical inventory form included as an attachment to this PHSEP;
- Confirm that an inventory of chemicals brought on site by subcontractors is available;
- Request or confirm locations of Globally Harmonized System (GHS) compliant (i.e., consisting of 16 sections that appear in the same order and contain uniform information regarding the chemical) safety data sheets (SDSs) from the client, contractors, and subcontractors for chemicals to which Jacobs employees potentially are exposed;
- For chemicals used by Jacobs workers, before or as the chemicals arrive onsite, obtain a SDS for each hazardous chemical, include on the chemical inventory sheet (attached to this PHSEP), and maintain SDSs in an accessible binder onsite long with the chemical inventory sheet . Ensure everyone knows where SDSs are kept;
- The six required elements of the GHS label must include the product identifier, pictograms, signal word, hazard statements, precautionary statements, and the name, address, and telephone number of the chemical manufacturer, importer or other responsible party;
- The manufacturer's original label on any incoming regulated product must not be removed or defaced. The manufacturer's label and markings must be retained on the package or container until it is sufficiently cleaned of residue and purged of vapors to remove any potential hazards;
- Ensure all secondary containers are labeled in compliance with GHS labeling requirements. If GHS compliant information has not yet been provided by the manufacturer or chemical distributor, the HCC must contact the manufacturer or chemical distributor and document in the chemical inventory when the GHS labeling information will be available, until the labeling requirement is fulfilled;
- In the United States, the container label shall be in English, although labels in other languages may be kept as well. Container labels in other languages for non-speaking English-speaking workers will be made available when specified by the client for their project site or facility;
- Give employees required chemical-specific HazCom training using the chemical-specific training form included as an attachment to this PHSEP and ensure that the GHS training module on Jacobs' E3 Learning and Development platform has been completed.
- Ensure that chemical use is included in the task HIIRA.

9. Contaminants of Concern

The table below summarizes the potential contaminants of concern (COC) and their occupational exposure limit and signs and symptoms of exposure. The table also includes the maximum concentration of each COC and the associated location and media that was sampled (groundwater, soil boring, surface soil). These concentrations were used to determine engineering and administrative controls described in the "Project-Specific Hazard Controls" section of this PHSEP, as well as PPE and site monitoring requirements.

Table 3: Contaminants of Concern

Contaminants of Concern					
Contaminant	**Location and Maximum[a] Concentration (ppm)**	**Exposure Limits[b]**	**IDLH[c]**	**Symptoms and Effects of Exposure**	**PIP[d] (eV)**
cis-1,2-Dichloroethene	GW: 8.1 µg/L	200	1000	Irritation eyes, respiratory system; central nervous system depression	9.65
Trichloroethylene (TCE)	GW: 5.2 µg/L	10 ppm	1,000 Ca	Headache, vertigo, visual disturbance, eye and skin irritation, fatigue, giddiness, tremors, sleepiness, nausea, vomiting, dermatitis, cardiac arrhythmia, paresthesia, liver injury	9.45
Tetrachloroethylene (PCE)	GW: 20 µg/L	25 ppm	150 Ca	Eye, nose, and throat irritation; nausea; flushed face and neck; vertigo; dizziness; sleepiness; skin redness; headache; liver damage	9.32
Vinyl Chloride	GW: 20 µg/L	1 ppm	NL Ca	Weakness, abdominal pain, gastrointestinal bleeding, enlarged liver, pallor or cyanosis of extremities	9.99

Footnotes:

[a] Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), SS (Surface Soil), SL (Sludge), SW (Surface Water).

[b] Appropriate value of permissible exposure limit (PEL), recommended exposure limit (REL), or threshold limit value (TLV) listed.

[c] IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen.

[d] PIP = photoionization potential; NA = Not applicable; UK = Unknown.

eV = electron volt

mg/kg = milligram per kilogram

mg/m^3 = milligrams per cubic meter

ug/m^3 = micrograms per cubic meter

Potential Routes of Exposure		
Dermal: Contact with contaminated media. This route of exposure is minimized through use of engineering controls, administrative controls and proper use of PPE.	**Inhalation:** Vapors and contaminated particulates. This route of exposure is minimized through use of engineering controls, administrative controls and proper use of respiratory protection when other forms of control do not reduce the potential for exposure.	**Other:** Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before drinking or smoking).

10. Site Monitoring

10.1 Direct Reading Monitoring

For each task listed in the table below, perform the associated monitoring ensuring the equipment is calibrated daily (or bump tested) according to the manufacturer's recommendations.

Note: The term "calibration" is used but it may actually be a "bump test" depending on what the manufacturer requires. There is a difference between actually calibrating (manually adjusting sensors to read a value) and "bump testing" (field verification that the instrument is reading what it's supposed to.) Many equipment manufacturers now say that performing actual calibration daily can damage the sensors, so they recommend a "bump test" daily or before use to verify the instrument is reading correctly, and they state a prescribed calibration frequency requirement. Refer to the manufacturer's instrument manual on the recommended daily calibration or bump test requirements. Be sure the calibration/bump test is documented.

Use the Daily Site Monitoring Form (or equivalent) to document the calibration (or bump test) and the readings taken. Retain area monitoring readings with project records.

Personal Breathing Zone and Area Samples

Personal breathing zone and area sampling is not anticipated at this time for this scope of work.

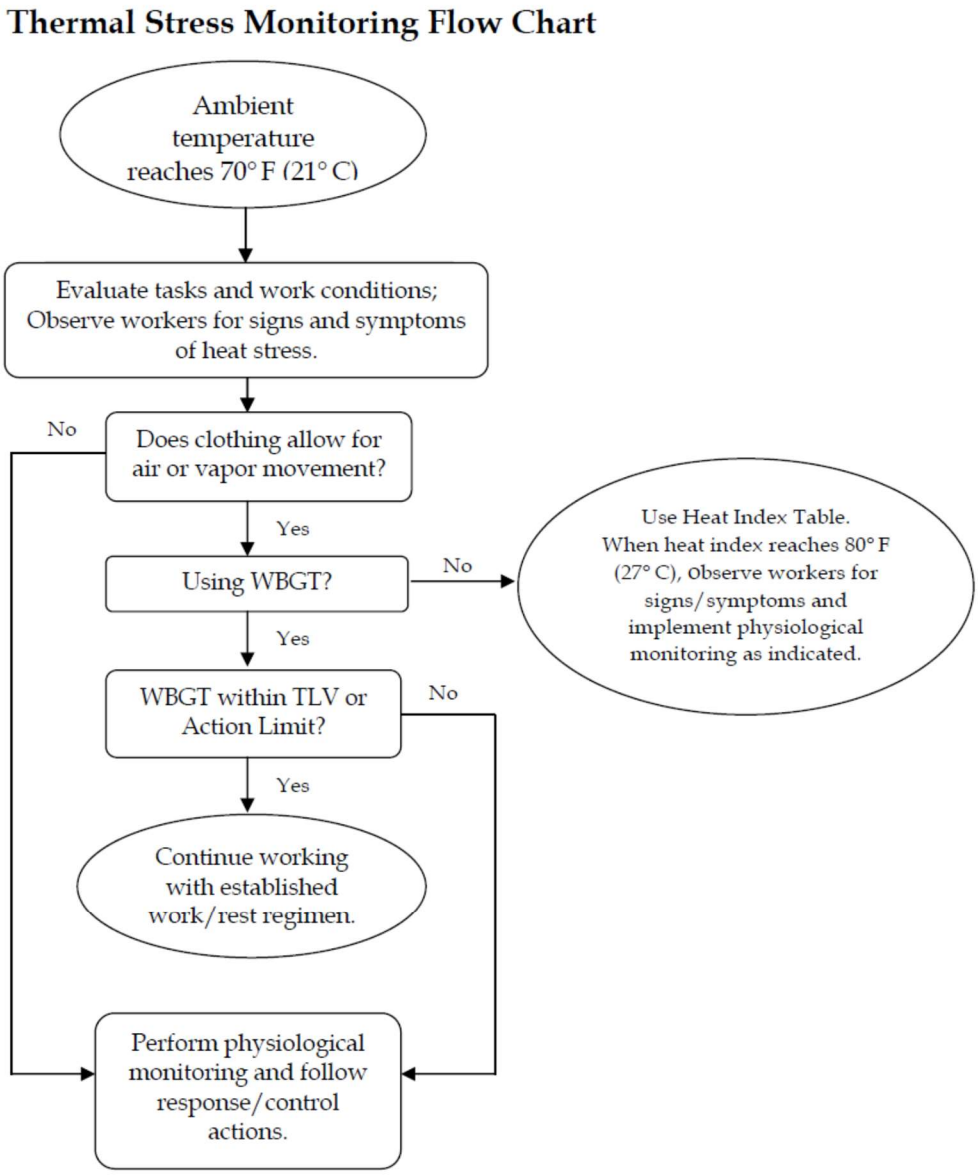
Subcontractors are responsible for air monitoring and performing integrated personal sampling for their employees as documented in their PHSEP.

Table 4: Direct Reading Monitoring Specifications

Instrument	Tasks	Action Levels[a] (above background in worker BZ)	Action to be Taken when Action Level reached	Frequency [b]
PID: MiniRAE with 10.6eV lamp	Collecting groundwater samples at monitoring wells	<1 ppm ® Level D ≥1 ppm ® Collect colormetric tubes, Vinyl Chloride **is NOT** detected, then: 1-5 ppm ® Level D >5 ppm → Stop work; Notify HSM If Vinyl Chloride **IS** detected, then: Stop work; Notify HSM; Level B necessary ** Small fans placed on the ground adjacent to flush-mounted wells, pushing any escaping VOCs downwind of operations, may be used as an engineering control, if feasible.	Initially and periodically during task	Daily
Detector Tube or CMS: Vinyl Chloride specific	All activities when PID Action Levels are exceeded	No Color Change → See PID Color Change → See PID	Initially and periodically when PID ≥0.5ppm	Not applicable
Heat Stress Monitor - Refer to Flow Chart Below ☒ Ambient Temperature ☒ Heat Index ☐ WBGT ☒ Physiological ☒ Pulse ☐ Temperature	All tasks	Refer to the Handbook for the type of monitoring conducted.	Refer to the Handbook for the type of monitoring conducted.	When Heat Index reaches criteria.

Figure 1: Heat Stress Monitoring Flow Chart

Use the flow chart below and refer to the applicable protocol in Section 9 of the Handbook for heat stress monitoring.



11. Personal Protective Equipment

11.1 Required Personal Protective Equipment (PPE)

(See P&PS Work Instruction, IB-HS-WI-0310-IB, Personal Protective Equipment Minimum Standards and IB-HS-WI-0310-US, PPE Guidance - USA))

PPE must be worn by employees when actual or potential hazards exist and engineering controls or administrative practices cannot adequately control those hazards.

A PPE assessment has been conducted by the HSM based on project tasks (see PPE specifications below). Verification and certification of assigned PPE by task is completed by the HSM that approved this plan. Refer to the Handbook, Section 11, "Personal Protective Equipment," for requirements on the use, care, and maintenance of PPE.

The table below outlines PPE to be used according to task based on project-specific hazard assessment. If a task other than the tasks described in this table needs to be performed, contact the HSM so this table can be updated. Task-specific PPE is also contained in task HIIRA for each task.

Ensure that all PPE is inspected prior to use and that you have been trained in its use. Ensure the PPE used fits properly. Contact the HSM if there are deficiencies or you haven't been trained on care, use, and limitations of PPE.

Table 5: PPE Requirements

Project-Specific Personal Protective Equipment Requirements[a]				
Task	**Level**	**Body**	**Head**	**Respirator [b]**
General field work outside in Support Zone Mobilization and Demob	D	☒ Work clothes (sleeved shirt, long pants) ☒ Safety-toed Boots ☒ Gloves (leather) ☒ ANSI/ISEA 107-2010 high visibility vest	☒ANSI Z89.1 Hardhat [c] ☒ANSI Z87.1 Safety glasses ☐Hearing protection [d]	None required
Tasks where there is a potential to contact COC's with hands or shoes; GW sampling	Modified D	☒ Work clothes ☒ ANSI/ISEA 107-2010 high visibility vest ☒ Safety-toed boots ☒ Outer boot covers ☒ Inner surgical-style nitrile ☒ Outer work gloves.	☒ANSI Z89.1 Hardhat [c] ☒ANSI Z87.1 Safety glasses ☒Hearing protection [d]	None required
Tasks where there is a potential to contact COC's with the entire body;	Modified D	☒ Tyvek ☐ ANSI/ISEA 107-2010 high visibility vest ☒ Safety-toed boots ☒ Outer boot covers ☒ Inner surgical-style nitrile ☒ Outer chemical-resistant work gloves.	☒ANSI Z89.1 Hardhat [c] ☒ANSI Z87.1 Safety glasses ☒Hearing protection [d] ☐ Face shield ☐ Chemical goggles	None required.
Reasons for Upgrading or Downgrading Level of Protection (with approval of the RHSM)				
Upgrade[f]		**Downgrade**		
• Request from individual performing tasks.		• New information indicating that situation is less hazardous than originally thought.		

Project-Specific Personal Protective Equipment Requirements[a]				
Task	**Level**	**Body**	**Head**	**Respirator [b]**
• Change in work tasks that will increase contact or potential contact with hazardous materials. • Occurrence or likely occurrence of gas or vapor emission. • Known or suspected presence of dermal hazards. • Instrument action levels in the "Site Monitoring" section exceeded.		• Change in site conditions that decrease the hazard. • Change in work task that will reduce contact with hazardous materials.		

[a] Modifications are as indicated. Jacobs will provide PPE only to CH2M employees.
[b] No facial hair that would interfere with respirator fit is permitted.
[c] Hardhat and splash-shield areas are to be determined by the SL.
[d] Ear protection should be worn when conversations cannot be held at distances of 3 feet (1 meter) or less without shouting.
[e] See cartridge change-out schedule.
[f] Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been approved by the RHSM, and an SL qualified at that level is present.

11.2 Respiratory Protection

(See P&PS Work Instruction, IB-HS-WI-0323-IB, Respiratory Protection)

Respirator use is not anticipated. If upgrade is necessary based on air monitoring or a new task, this plan will be updated.

12. Worker Training and Qualification

12.1 Jacobs Worker Training

(See P&PS Work Instruction, IB-HS-WI-0200-IB; HSE Training and Competency)

The Project Manager shall ensure that all employees, including subcontractor employees, have the correct training, skills and experience to undertake the tasks they are engaged in. All project staff will have the necessary licenses to drive vehicles, operate equipment and undertake specialized work as required by law.

The following training is required for Jacobs personnel working onsite, in addition to their assigned worker category training (SLHW, HWW, HWWL). Copies of training will either be available onsite, or readily available from the Jacobs Learning Management System (LMS) training database system. Refer to Section 12 of the Handbook for a description of HAZWOPER-related and Safety Liaison training.

Table 6: Jacobs Required Worker Training

Required Jacobs Worker Training	Jacobs Task or Equipment-Specific Training (if performing task)
☒ 40-hour HAZWOPER Training	☐ Aerial Lift Operator Training
☒ 8-hour HAZWOPER Refresher	☐ Confined Space Entry Training
☒ 3-day HAZWOPER OJT	☐ Excavation Safety Training
☒ Jacobs PHSEP Training	☐ Fall Protection (site-specific)
☒ Jacobs F&ES HSE Field Handbook	☐ Forklift Operator
☒ Jacobs task HIIRA	☒ Hazard Communication
☒ Subcontractor PHSEP	☐ On-Track Railroad Safety Training
☐ 10-hour OSHA Construction Safety Training	☐ NFPA 70E Subcontractor Oversight Training (if energized electrical is performed) (refer to worker category for all applicable training needed)
☒ At least one SLHW (refer to worker category for all applicable training needed)	☐ Qualified Earthmoving Equipment Operator
☒ HWW (refer to worker category for all applicable training needed)	☐ Scaffold Training
☐ At least one SL-C (refer to worker category for all applicable training needed)	☒ ADT Driver Training/Jacobs Permit to Drive
☐ Other (specify)	☐ Other (specify):
Project-Specific Required Training (available on Jacobs' E3 Learning and Development platform)	
☐ 3R Munitions Safety Awareness Training	☒ Hand Safety Training
☐ Benzene Training	☐ Lockout/Tagout Training, if necessary for LOTO tasks

Required Jacobs Worker Training	Jacobs Task or Equipment-Specific Training (if performing task)
☐ Cadmium Training	☒ Manual Lifting Training
☐ Cal-OSHA Heat Stress Illness Prevention Training	☐ Methylene Chloride Training
☐ Gold Shovel	☒ Noise Training
☐ Chromium Training	☐ NFPA 70E Awareness for Oversight of Work
☐ Confined Space Awareness Training	☐ Radio Frequency Safety Awareness
☒ Drum Handling Training	☐ Railroad Safety On-line Training
☐ EETW Release of Victim Refresher	☐ Respirators Level C Training
☐ Electrical Safety Training	☐ Stairways and Ladders
☐ Excavation Safety Training	☐ Traffic Safety Training
☒ Globally Harmonized System Training (HazCom)	☐ Other (specify)

The designation of competent person is a specific position of knowledge and authority for a particular activity with defined roles and responsibilities and, in some cases, requisite qualifications. When Jacobs is self-performing work, a qualified competent person must be designated for certain activities. The following tasks on this project require a competent person. The PM or designee will coordinate with the HSM to verify that the employee assuming this role has the requisite training and experience to be identified as the competent person.

12.2 Subcontractor Worker Training

The following training is required for subcontractor personnel working onsite. Copies of training shall be available onsite.

Table 7: Subcontractor Required Worker Training

Required Subcontractor Worker Training	Subcontractor Task or Equipment-Specific Training (required if performing this work)
☒ 40-hour HAZWOPER Training	☐ Demolition Competent Person
☒ 8-hour HAZWOPER Refresher	☐ Excavation Competent Person
☒ 8-hour HAZWOPER Supervisor	☐ Fall Protection (site-specific)
☒ 3-day HAZWOPER OJT	☐ Flagger Training
☒ Jacobs PHSEP Training	☒ Forklift Operator, if used
☒ Jacobs F&ES HSE Field Handbook	☒ Hazard Communication
☒ Subcontractor SSoW (safety plan, task HIIRA,)	☐ Ladder Safety Training, if used

Required Subcontractor Worker Training	Subcontractor Task or Equipment-Specific Training (required if performing this work)
☒ Subcontractor PHSEP	☐ Lead Training
☐ 10-hour OSHA Construction Safety Training	☒ Lockout/Tagout Training
☐ 30-hour OSHA Construction Safety Training	☐ On-Track Railroad Safety Training
☐ Respiratory Protection Training	☐ NFPA 70E Training (energized electrical safety training), if working near or on energized electrical system
☒ First Aid/CPR/Bloodborne Pathogens	☒ Qualified Drill Rig Operator
☐ Aerial Lift Operator Training	☐ Qualified Earthmoving Equipment Operator
☐ Asbestos Competent Person	☐ Qualified Rigger
☐ Asbestos Training (Supervisor, Worker)	☐ Qualified Crane Signaler
☐ Confined Space Entry Training	☐ Respirator Training, Medical and Fit Test
☐ Certified Crane Operator	☐ Scaffold Training
☐ Crane Assembly/Disassembly Competent Person	☐ Other (specify):

12.3 HAZWOPER-Exempted Tasks

The following tasks are not within the scope of the HAZWOPER standard so HAZWOPER training is not required for workers performing these tasks:

In general, the regulation doesn't apply if:

- Workers work exclusively within uncontaminated areas of the hazardous waste site,
- Do not enter areas where hazardous waste may exist, are stored or are processed, and
- Are not exposed to health or safety hazards related to hazardous waste operations.

Note—tasks below must meet all three bulleted items above.

Task	Task
Site walks	

13. Medical Surveillance and Qualification

The following medical surveillance is required for Jacobs and subcontractor personnel working onsite. Copies of physician's medical opinion will either be available onsite, or for Jacobs staff, readily available from the Jacobs Learning Management System database. Refer to Section 13 of the Handbook for a description of HAZWOPER, respirator user, and hearing conservation medical surveillance.

Table 8: Medical Surveillance Requirements

General Required Medical Surveillance	Job or Activity-Specific Medical Surveillance (required if performing this work)
☒ HAZWOPER Medical Clearance	☒ Noise
☒ Respirator Medical Clearance	☐ Baseline Blood Lead
	☐ Asbestos Medical Clearance
	☐ Other (specify):

14. Site Control Plan

Site control is established to prevent the spread of contamination at the site and to ensure that only authorized individuals are permitted into potentially hazardous areas.

Use of the buddy system will be implemented unless a Working Alone protocol has been established and approved as indicated in Sections 5 and 6 above. The SL will implement site control procedures for Jacobs work, or verify that site control is implemented by subcontractors. Site control will vary dependent upon the activity taking place.

For activities such as groundwater sampling, extraction well work, site control shall be dependent upon the potential for unauthorized personnel entering the work space. If there is potential, cones, flagging or some other form of demarcating the work zone shall be used.

Establish onsite communication consisting of the following:

- Line-of-sight and hand signals
- Air horn
- Two-way radio or cellular telephone if available
- Establish offsite communication.
- Establish and maintain the “buddy system.”
- Initial air monitoring is conducted by the SL in appropriate level of protection.
- The SL or subcontractor is to conduct periodic inspections of work practices to determine the effectiveness of site control. Deficiencies are to be corrected by the subcontractor or SL and noted in the field log book.

15. Decontamination

Refer to the Handbook, Section 15, "Decontamination," for a complete description of decontamination activities and diagrams of typical decontamination areas. Decontamination areas will be established for work in potentially contaminated areas to prevent the spread of contamination. Decontamination areas should be located upwind of the exclusion zone where possible and should consider any adjacent or nearby projects and personnel. No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones.

All contaminated material generated through the personnel and equipment decontamination processes (e.g., contaminated disposable items, gross debris, liquids, sludges) will be properly containerized and labeled, stored at a secure location, and disposed in accordance with project plans.

Personnel	Sample Equipment	Heavy Equipment
• Body-suit removal • Inner-glove removal • Hand wash/rinse • Face wash/rinse • Shower ASAP • Contain PPE for disposal	• Wash/rinse equipment • Contain rinsate for disposal	• Removal of gross contamination (brushes, hand tools)

16. Communications

A primary and backup means of communication for field crews have been established as described below:

Type of Communication	Primary Means	Backup Means
Communication between field crew	☒ Voice	☐ Voice
	☐ Radio	☒ Radio
	☐ Phone	☒ Phone
Communication with Office crew	☐ Radio	☐ Radio
	☒ Phone	☒ Phone
Communication with Fire and Emergency Services	☐ Radio	☐ Radio
	☒ Phone	☒ Phone

17. Required Facilities and Equipment

(See P&PS Procedure, IB-HS-PR-0600-IB, Health and Well Being)

The following facilities and equipment are required and used for safe completion of work:

Facility	Type	Location
☒ Restrooms	Portable; in authorized indoor locations (buildings)	Varies, portable sanitary facilities when needed for extended field work or if indoor locations are not authorized by the base
☒ Supplementary Illumination (as needed)	Portable type if needed	At work site
☒Emergency Eyewash	Squeeze bottle type or full eyewash capable of flushing eyes for 15 minutes (e.g., injections or other chemical)	In field vehicles, staged at work area
☒ First aid kit/supplies, bloodborne pathogen kit	Portable, Class A, Type IV	In field vehicles
☒ Fire extinguishers	Type ABC	In vehicles
☒ Potable Water		In field vehicles
☒ Shade/rest area	Portable tarps/canopies, A/C vehicle	Varies as needed
☒ Restrooms	Portable; in authorized indoor locations (buildings)	Varies, portable sanitary facilities when needed for extended field work or if indoor locations are not authorized by the base
☒Emergency Eyewash	Squeeze bottle type or full eyewash capable of flushing eyes for 15 minutes (e.g., injections or other chemical)	In field vehicles
☒ COVID Mitigation supplies such as hand sanitizer, disinfectant wipes	hand sanitizer, disinfectant wipes	In field vehicles

18. Emergency Response Plan

Personnel responsible for coordinating emergency situations during site activity are identified below. The Emergency Contacts Page and a site map showing assembly points and directions to the authorized medical facility is at the front of this plan. Documented rehearsal and critique of this plan is required at least once during the task, or more often as necessary.

Responsibility	Name	Phone Number(s)
Emergency Response Coordinator (ERC)	Joe Spies	(862) 242-7147
Alternate ERC	Chris Houck	(206) 979-2575

If an emergency situation develops which requires evacuation of the work area, the following steps shall be implemented.

Evacuation Step	Methods and comments:
Notify affected workers	Notify Jacobs workers of any evacuation needed via voice, radio or phone, use evacuation route and rally point. Notify subcontractors.
Evacuate to safe location	Evacuate to the designated rally point (determined daily by SL)
Assemble and account for workers	SL to account for all workers, contact subcontractor and ensure subcontractor has accounted for all workers
Notify Supervisor/Manager	Notify Jacobs PM, HSM, (EM if needed) of incident
Complete incident report	HSM or EM to complete with input from SL

Potential emergency situations and response actions are identified below.

In case of:	Response actions:
Injury or illness	Major Medical: FA/CPR trained personnel respond. If additional response required, contact local emergency responders and 911. Have a designee assist with guiding ambulance service to site if needed. If Jacobs P&PS employee, call WorkCare at 888-449-7787. Minor Medical: FA/CPR trained personnel respond. If Jacobs P&PS employee, call WorkCare at 888-449-7787. Transport to occupational health clinic if advised to do so.
Chemical exposure	Decon affected employee, seek medical treatment if necessary. Utilize eyewash if needed. If additional response required, contact local emergency responders. If Jacobs P&PS employee, call WorkCare at 888-449-7787.
Fire or explosion	Evacuate site to designated location, call 911. Provide necessary first aid, seek treatment if necessary. For small fires, only respond to trash can size fires with site fire extinguishers.
Adverse weather	Shut down work; rally to nearest structure as directed by base.
Heat Stroke	Call 911, have a designee give location and directions to ambulance service if needed. If Jacobs P&PS employee, call WorkCare at 888-449-7787.
Material spill or release	Appropriate spill response materials for all chemicals must be present at the job site. Only qualified (by training and previous experience) who have proper

	PPE and equipment available shall provide spill response operations, when safe to do so. Immediately identify the character, exact source, amount, and areal extent of any released materials, if safe to do so.
Active Shooter	Have a plan when working on client premises—look for at least 2 evacuation routes/points. Program emergency numbers in your phone (client emergency service numbers, HSM, PM, Supervisor, US Security Officer, Keith Waddell (214-920-8327). If an active shooter is on the premises follow Run, Hide, Fight: • Run: Leave belonging behind. Try to get out of the building or danger area if possible using exits. Call 911 when in a safe area and then call Keith Waddell, Security, PM and HSM. • Hide: Act quickly - Find a place, closet or office, or something to hide behind out of the vision of shooter. Lock or barricade or otherwise secure the spot if possible. Turn off lights, silence cell phones. Stay calm and quiet • Fight: Last resort! If your life is at risk—work alone as or as a group. Use improvised weapons, act aggressively, disarm or injure the shooter, commit to your actions. When law enforcement arrives – stay calm—show hands, spreading fingers. Avoid sudden movements, yelling or pointing. Allow law enforcement to do their job to control the area. Their first priority is finding the shooter. Once you are safe – be sure to notify your supervisor, the PM, and HSM of your status. The PM/Supervisor shall follow the incident reporting process, including notification in accordance with the incident reporting flowchart. HSM will complete an Intelex report.

Evacuation Signals:	Meaning:
Grasping throat with hand	Emergency-help me.
Thumbs up	OK; understood.
Grasping buddy's wrist	Leave area now.
Continuous sounding of horn	Emergency; leave site now.

In the event of a large quantity spill notify emergency services. Personnel discovering a spill shall (only if safe to do so):

- Stop or contain the spill immediately (if possible) or note source. Shut off the source (e.g., pump, treatment system) if possible. If unsafe conditions exist, then leave the area, call emergency services, inform nearby personnel, notify the site supervisors, and initiate incident reporting process. The SL shall be notified immediately;
- Extinguish sources of ignition (flames, sparks, hot surfaces, cigarettes);
- Clear personnel from the spill location and barricade the area;
- Use available spill control equipment in an effort to ensure that fires, explosions, and releases do not occur, recur, or spread;

- Use sorbent materials to control the spill at the source;
- Construct a temporary containment dike of sorbent materials, cinder blocks, bricks or other suitable materials to help contain the spill;
- Attempt to identify the character, exact source, amount, and extent of the released materials. Identification of the spilled material should be made as soon as possible so that the appropriate cleanup procedure can be identified;
- Keep incompatible wastes separate from spilled materials area until spill cleanup is complete;
- Contact the HSM and project EM in the event of a spill or release immediately so evaluation of reportable quantity requirements and whether agency reporting is required;

- Assess possible hazards to human health or the environment as a result of the release, fire or explosion, including the effects of any toxic, irritating, or asphyxiating gases that are generated, or the effects of any hazardous surface water run-off from water or chemical agents used to control fire and heat-induced explosions;
- Make arrangements to manage and dispose of spilled materials and used spill control materials appropriately;
- Replace spill control materials and decontaminate/clean spill control equipment (if needed) that were used in the response; and Follow incident notification, reporting, and investigation section of this plan.

19. Incident Notification, Reporting, and Investigation

(See P&PS Work Instruction IB-HS-WI-0400-IB, P&PS Incident Reporting and Investigation)

19.1 Incident Notification

All employees and subcontractors' employees shall immediately report any incident (including "near misses,") in which they are involved or witness to their supervisor.

The Jacobs or subcontractor supervisor, upon receiving an incident report, shall inform his immediate supervisor and the Jacobs SL (see incident notification flowchart at the end of this section).

The SL shall immediately verbally report the following information to the HSM and PM by phone and e-mail (an initial incident notification form is available as an attachment to this PHSEP):

- Project Name and Site Manager;
- Date and time of incident;
- Description of incident;
- Extent of known injuries or damage;
- Level of medical attention; and
- Preliminary root cause/corrective actions

If the incident was an environmental permit issue (potential permit non-compliance, other situation that result in a notice of violation) or a spill or release, contact the Project EM immediately so they can evaluate reportable quantity requirements and if subsequent agency notification is required.

19.1.1 Determine the Actual Severity and Worst Potential Severity

Work with your HSM or EM and use the severity table below to determine the Actual Severity (AS) and the Worst Potential Severity (WPS) of the incident. WPS is a way of rating the incident based on what harm may have realistically been experienced considering the controls in place at the time had the incident realized its full potential. Once the AS and WPS are determined, ensure the verbal reporting take place at the time period specified. Ensure that both operations and HSE chains are notified. AS and WPS with increasing severity requires a higher level of notifications. See table and incident notification flowchart.

AS or WPS (specific Operations reporting requirements)	Injury/Illness	Environment	Reputation	Economic / Material Production	Motor Vehicle Incident (MVI)
5 (Report up to LoB President and CEO within 2 hours)	Fatality or total permanent disability or kidnapping	Serious off-site impact, significant remediation required	International media coverage; regulatory sanction	USD$ > 3 million	Collision with another vehicle or object with at least one vehicle moving at high speed; >50mph (80kph) or an incident involving vehicle roll-over or striking a pedestrian, bicycle or motorcycle
4 (Report up to LoB SVP within 2 hours)	Partial disability; life changing; intensive care or aggravated assault	Significant off-site impact, some remediation required	National media coverage; regulatory action	USD$ 300k-3mill	Collision with another vehicle or object with at least one vehicle moving at medium speed; >40 and 65kph and < 80kph)
3 (Up to VP/GM within 2 hours)	Urgent treatment; surgery or assault	Release significantly above reportable limit or some local impact	State media coverage; Prohibition Notice	USD$ 30k-300k	Collision with another vehicle or object with at least one vehicle moving at medium speed; >30 and < 40mph (>48kph and < 65kph)
2 (Up to Regional Ops within 1-2 hours)	Medical treatment to prevent deterioration (i.e., more than first aid) or harassment	Release above reportable limit or minor impact	Local media coverage; citations/ fines	USD$ 3k-30 k	Low speed collision (< 30mph or 48kph) with another vehicle or object
1 (up to PM by end of the day)	Simple, immediate treatment or simple threat	Small release contained onsite and no impact	No media coverage	USD$ < 3 k	Minor collision while stationary or moving at slow speed while parking, backing, or maneuvering

19.2 Intelex and Incident Report Form

The HSM or EM shall complete an entry into the Intelex system located on JacobsConnect. The SL shall summarize or use the P&PS Initial Incident Notification form (attached to this plan) and forward it to the HSM within 24 hours.

19.3 WorkCare Injury Management and Return to Work (for U.S./Puerto Rico-based P&PS Jacobs Staff Only)

In the event of an injury, or potential injury (i.e., involvement in motor vehicle collision with no apparent injury; a puncture wound with no bleeding or apparent infection, etc.), the following actions shall be taken:

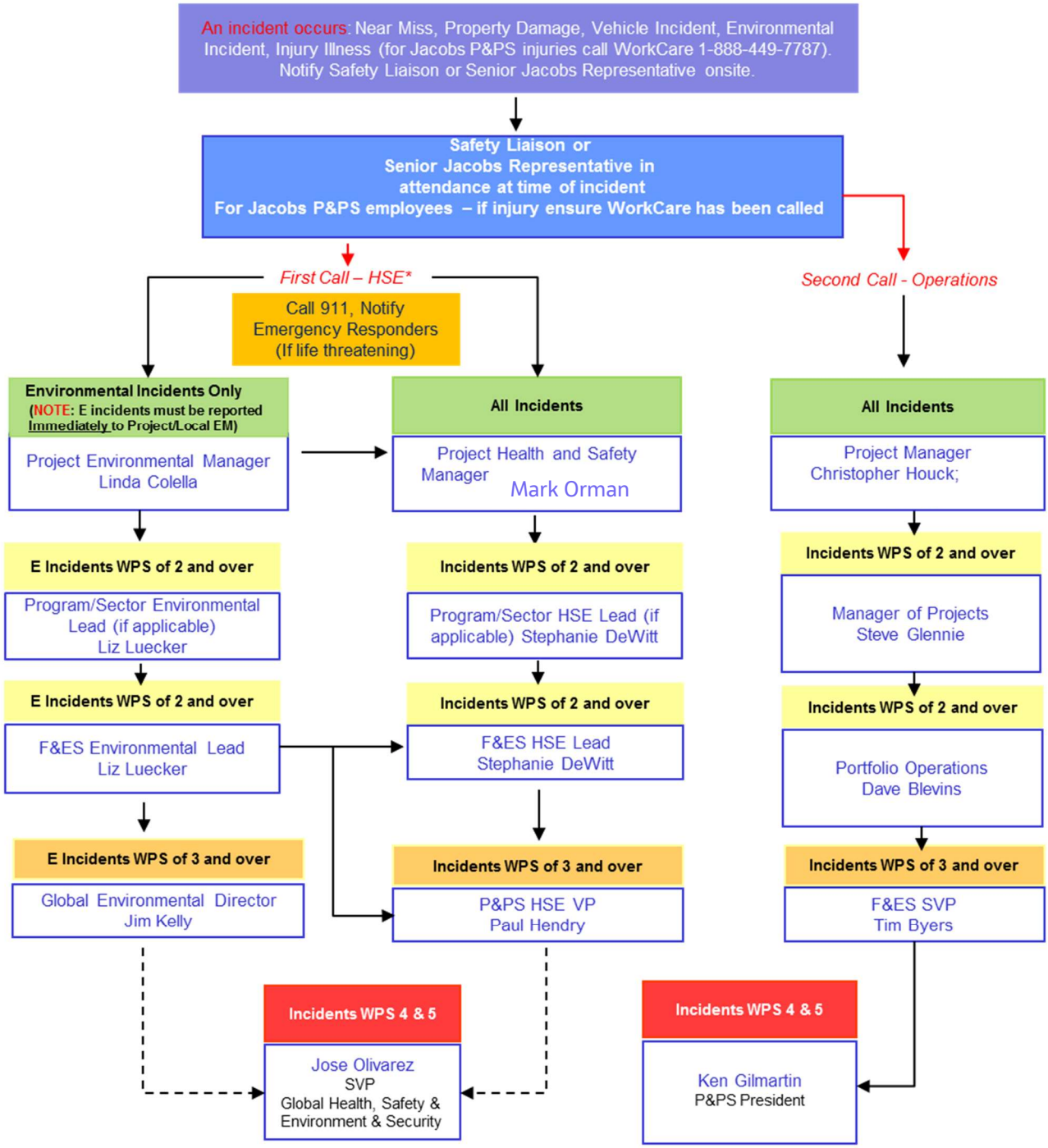
- Employee informs their supervisor.
- Employee calls the Injury Management Program toll free number 1-888-449-7787 immediately and speaks with the Occupational Injury Nurse. This number is operable 24 hours per day, 7 days a week. **Employees are encouraged to enter this phone number into their cell phones prior to starting field work.**
- Supervisor ensures employee immediately calls the Injury Management Program number. Supervisor makes the call with the injured worker or for the injured worker, if needed.

- Nurse assists employee with obtaining appropriate medical treatment, as necessary schedules clinic visit for employee (calls ahead, and assists with any necessary follow up treatment). The supervisor or SL accompanies the employee if a clinic visit is necessary to ensure that employees receive appropriate and timely care.
- SL or designee shall verbally notify the HSM and PM. The SL or designee may use the hardcopy Incident Report attached to this plan to forward to the HSM for Intelex entry. HSM completes the Intelex entry within 24 hours.
- Nurse notifies appropriate Jacobs staff by e-mail (supervisor, Health & Safety, Human Resources, Workers' Compensation).
- Nurse communicates and coordinates with and for employee on treatment through recovery.
- Supervisor and/or PM ensures suitable duties are identified and available for injured or ill workers who are determined to be medically fit to return to work on transitional duty (temporary and progressive).
- Supervisor and/or PM ensures medical limitations prescribed (if any) by physician are followed until the worker is released to full duty.

Verbal incident notification is made to both the HSE and the Operations chains to the indicated group depending on the severity, and any project, geographic, or client specific notification and reporting requirements as shown in the flowchart below (Also refer to P&PS Work Instruction IB-HS-WI-0400-IB, Incident Reporting and Investigation). The HSM (EM for E incidents) will complete an Intelex report.

Updated October 2020

F&ES Verbal Chain for Reporting all Field Incidents



* First call HSE – If the incident is an environmental incident, immediately (within 15 minutes) call the EM to ensure timely reporting to external agencies, if necessary. If any other type of incident, call the HSM as the first call.

Notes:

1. Worst Potential Severity (WPS) definitions are to be found in Global Work Instruction JJ-HS-WI-0400-JJ, HSE&S Incident Mgmg.
2. Actual 4 and 5 must be communicated to Legal and Communications by the HSE VP or GVP
3. All incidents involving Jacobs employees or a subcontractor under Jacobs control (including motor vehicle accidents, injuries, environmental incidents and near-misses) shall be reported as soon as possible **in person or by telephone**.
4. If your Project Manager is not your Line Manager it is essential that a call is made to both.
5. Calls must be made to both the relevant HSE and operations chains. These are not alternatives.
6. Security and Sustainability Directors / VP's will be notified where appropriate by HSE&S VP / HSE VP
7. Where required by legislation, a Jacobs HSES&S Manger will make the necessary report to the enforcing authorities.

19.4 Drug and Alcohol Free Workplace

(See Jacobs Human Resource Policy PL-EB-PL-6830-PL, Drug and Alcohol-Free Workplace)

All employees, subcontractors, and other employed individuals are expected to arrive at work fit to carry out their jobs and to be able to perform duties safely without any limitations due to the use or after effects of alcohol or drugs (whether prescribed, over the counter, or illegal).

It is forbidden to be present at the workplace after consuming alcohol or drugs and/or possess and/or consume alcohol or drugs at the workplace. Any employee or subcontractor who violates these rules will not be permitted to work. Immediate supervisors are responsible for monitoring adherence to the policy.

When an employee, subcontractor or employed individual arrives at work or during the workday and a supervisor reasonably believes that they are under the influence of alcohol or drugs, the supervisor must immediately contact Human Resources in order that the person can be provided with assistance and an investigation can be undertaken.

20. Inspections

20.1 Inspections and Audits

(See P&PS HSE Procedures IB-HS-PR-0400-IB, HSE Governance)

Various types of inspections may be conducted, including the HSE Site Inspection Report, Leadership HSE Site Walks, project activity self-assessments, Beyond Zero Observations, Agency inspections, and operational project reviews which are described below.

For medium or low risk projects, the HSE Site Inspection Report shall be performed monthly. It is available as an attachment to this plan or can be filled out electronically through the Intelex Audit Module (also available on mobile devices). If using a hard copy form, be sure to keep with the project files. Forward copy to HSM / EM as completed.

Additional environmental inspections may be required based on the scope of the project. These can include weekly hazardous waste container inspections, daily hazardous waste tank inspections, monthly oil Spill Prevention Control and Countermeasures (SPCC) inspections, and routine stormwater inspections. Contact your Environmental Manager to determine what environmental inspections may be needed. A separate plan (e.g., waste management, environmental, spill plan) may be appropriate and may include environmental inspection checklists; such a plan can be referenced in this section.

HSE project audits will be determined and scheduled based on the risk profile of the project and input from the LOB or Regional BU HSE Lead. The F&ES HSE Project Audit Plan will be populated with the audit schedule and kept on the F&ES HSE SharePoint Site.

20.2 Project Activity Self-Assessment Checklists

The following self-assessment checklists are required when the task or exposure is initiated and weekly thereafter. The checklists shall be completed by the SL or other Jacobs representative and maintained in project files.

Groundwater Sampling	Waste Management

20.3 BeyondZero Observations

(Reference Jacobs Global Work Instruction, JJ-HS-WI-0306-JJ, BeyondZero Observations)

BZOs are a required element of our BeyondZero Culture of Caring and can be performed for project observations as well as away from work. The minimum frequency on this project is to submit a BZO is once per week when Jacobs personnel are onsite, using the BZO mobile app of Intelex platform on JacobsConnect.

Reach out to your HSM/EM if you need help entering aa BZO. Be sure to add the HSM (or EM if an environmental observation) to the “additional notifications” field of the BZO form so they are notified. Attach photos whenever possible.

* Note: Entering the correct Worst Potential Severity (WPS) code is important! The WPS code is a way of rating an event based on the likelihood of what could have happened versus what actually happened. When a WPS of 3, 4, or 5 is indicated, the BZO form will require close-out by the PM. **Ensure your HSM, Supervisor, and/or PM are notified of the event prior to submitting an BZO with a WPS of 3 or greater.** Likewise, if any follow-up action is needed, regardless of WPS, notify the HSM and/or PM and supervisor.

Worst Potential Severity Table

WPS	Injury -Illness	Environment	Property Damage
5	Fatality or total permanent disability	Serious offsite impact, significant remediation required	USD$> 3 million
4	Partial disability; life changing; intensive care	Significant offsite impact, some remediation required	USD$ 300K-3 million
3	Urgent treatment, surgery	Release significantly above reportable limit of some local impact	USD$ 30K-300K
2	Medical treatment to prevent deterioration	Release above reportable limit or minor impact	USD$ 3K-30k
1	Simple, immediate treatment	Small release contained onsite and no impact	USD$ less than 3K

20.4 Agency Inspections

If a Federal or local agency (e.g., OSHA, local water board, EPA, Department of Environmental Quality) announces it will be performing inspection, either announced or unannounced, refer to the attachment, Agency Inspections, in this plan. Contact the PM, HSM and EM as soon as you receive notice.

21. Records and Reports

Refer to the Handbook, Section 19, “Records and Reports,” for a complete description of HSE recordkeeping requirements.

22. PHSEP Induction Record

EMPLOYEE SIGNOFF FORM

By signing below, I have been instructed by the Project Manager (or their designee) in the following HSE requirements:

- Project HSE Plan
- Safe Work Methods
- General Workplace Hazards and Controls.
- I have been trained in the use of PPE
- I am aware of the project emergency procedure requirements.
- I have been introduced to the scope of work and general work locations
- I have completed an orientation of my work area with my supervisor

Project Name: Project Number:

EMPLOYEE NAME (Please print)	**EMPLOYEE SIGNATURE**	**COMPANY**	**DATE**

Appendix A. Attachments

F&ES HSE Field Handbook

Fact Sheets

- Agency Inspection Fact Sheet
- Tick Fact Sheet
- Critical Risk Booklets (employee and supervisor)
- Information on Battery Charging
- NSC Cold Weather Guidance
- US & Canada Vehicle Accident Instructions and Form
- Checklists and Forms

Checklists and Forms

- Chemical Inventory
- Chemical Specific Training
- FCR Form
- FCR Tracking Log
- Daily Site Air Monitoring Report
- F&ES Hazard Impact Identification and Risk Assessment (HIIRA) (blank form)
- F&ES Point of Work Risk Assessment Form (POWRA) and Daily Safety Meeting Sign-in
- Groundwater Monitoring Self-Assessment Checklist
- Hand and Power Tools Self-Assessment Checklist
- Heat Stress Monitoring Form
- Working Alone Call-In form
- HSE Site Inspection Report
- P&PS Incident Initial Response Checklist
- P&PS Initial Incident Notification (hard copy)
- Site Work HSE Pre-Start Meeting Agenda
- StepBack Card
- US & Canada Vehicle Accident Intake Form 2020
- Waste Management Analysis and Characterization Self-Assessment Checklist

COVID-19 Attachments

- COVID-19 Field Checklist
- COVID-19 Pandemic Management Strategy (Rev 2)
- COVID-19 Social Distancing/Cloth Face-Covering Poster
- Handwashing Poster (CDC)
- Stop the Spread of Germs Poster (CDC)

Jacobs

HIRA (Hazard Identification, Risk Assessment & Safe System of Work)		Date: 22 February 2021	Page: 1
Task: GW sampling	Project Manager: Chris Houck	Site Supervisor: Joe Spies	Version
Safety Liaison: Joe Spies	Environmental Manager: Linda Colella	Health and Safety Manager: Mark Orman, CSP	

Brief description of work	GW Sampling performed by Jacobs	**Project #.**	D3440900
Site/ Location of work	Site 6 – 109th Airlift Wing Air National Guard	**Project Name:**	Remedial Action-Operations, Monitoring, and Project Closeout at Site 6 (Suspected Spill Area), Stratton Air National Guard Base
Assessed by	Mark Orman, CSP		
Review cycle	Where any significant change to work or environment occurs, a thorough review of the risk assessment must take place and a new method statement written if required.		

Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Risks (List how people or the environment may be harmed?)	Initial Risk LxS = IR*	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Residual Risk LxS = RR*
General preparation	Forgotten safety equipment, no cell phone coverage, lack of emergency preparedness, untimely reporting of an injury or other incident	4	• Check for cell phone coverage. • Designate rally point and evacuation point (daily if working in new locations each day). • Check daily weather report and plan activities around severe weather. • Review, inspect and locate safety equipment including fire extinguisher, first aid kit, insect repellant/bug-out suits, PPE as specified in HSP, water, spill kits, thermometer or stop watch for heat stress monitoring, access to shade, etc. • Be sure to review the requirements for incident notification, reporting and investigation section of the HSP. Report all injuries, no matter how minor. If you are unsure whether an event should be reported, contact your RHSM. Be sure to report near misses.	1

Note: * Likelihood x Severity = Residual Risk refer to the Severity Table in IB-HS-WI-0101-IB Risk Assessment and Safe System of Work

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HIRA (Hazard Identification, Risk Assessment & Safe System of Work)		Date: 22 February 2021	Page: 2
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Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Risks (List how people or the environment may be harmed?)	Initial Risk LxS = IR*	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Residual Risk LxS = RR*
Mobilize to site and demobilize	Vehicle accident, struck by vehicle	4	Discuss work area setup prior to moving and staging equipment. Follow defensive driving procedures from the HSE Handbook. Do not use wireless devices while operating a motor vehicle. Always wear a seatbelt, even for short vehicle movements onsite. Make sure equipment is secured in vehicle before driving. Use tie-downs as needed. Walk around vehicle prior to moving. Apply GOAL (Get Out and Look). Try to position your vehicle so that you don't have to back it up. Back into the space, if possible, when you're parking. Back to the left, if possible, so that you can see objects on the driver's side. Have a spotter guide you as you back your vehicle up. Obey speed limits. Be aware of blind spots or other hazards associated with low visibility. Practice defensive driving techniques, such as leaving plenty of room between your vehicle and the one ahead of you. Do not drive while drowsy or distracted. Maintain focus on driving. Follow site traffic control protocols. Wear high-visibility clothing onsite. Monitor weather conditions. Cease operations during electrical storms or when electrical storms are imminent. Cease operations during high winds or severe rain.	1
Access Site	Biological Hazards, weather, dogs/wildlife	9	Inspect area for biological hazards. Follow the biological hazard precautions, guidelines, and fact sheets in the HSP for ticks, rodents, spiders, snakes, poisonous plants, etc. Wear and use proper clothing and sprays to protect against ticks, mosquitoes, poison ivy, and other biological hazards. Personnel should dress appropriately for ambient temperatures which would include but not limited to dry layered clothing.	5

Note: * Likelihood x Severity = Residual Risk refer to the Severity Table in IB-HS-WI-0101-IB Risk Assessment and Safe System of Work

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Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Risks (List how people or the environment may be harmed?)	Initial Risk LxS = IR*	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Residual Risk LxS = RR*
			For cold weather, work schedules should be adjusted to provide sufficient break periods in a heated area For hot weather, work schedules may need to be adjusted to provide time intervals for replenishing fluids and which is free of contamination. Check the fire extinguisher on drill rig to verify inspection and charge. Acclimatize to work in hot weather by working in heat and taking more frequent breaks, systematically building up tolerance to heat Conduct field activities in the early morning if possible to avoid heat or inclement weather. Having enough water onsite so that each worker can consume at a minimum, one quart per hour per shift. Frequent reminders and/or water breaks shall be taken so that each person can consume enough water. Access to shade (i.e., blockage from direct sunlight) shall be provided and shall be reasonably close to the work area (either A/C vehicle or canopy/tarp). Workers shall be allowed to take a work-free cool down rest/recovery periods at any time when they feel the need to do so to protect themselves from overheating, or at the first sign of heat illness-related symptoms (NOTE: if heat related symptoms are occurring, contact the RHSM). Training on risk factors, signs and symptoms of heat illness, importance of hydration and acclimatization, and importance of reporting symptoms and what to do in case of heat illness emergency, and contacting emergency medical services (see HSP, Temperature Extremes section). Follow the requirements for physiological monitoring as stated in the HSP. (e.g., During work in Tyvek in temperatures above 70 degrees , perform physiological monitoring—see safety plan if not wearing Tyvek for when to start monitoring) and document on the heat stress physiological monitoring form.	

Note: * Likelihood x Severity = Residual Risk refer to the Severity Table in IB-HS-WI-0101-IB Risk Assessment and Safe System of Work

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Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Risks (List how people or the environment may be harmed?)	Initial Risk LxS = IR*	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Residual Risk LxS = RR*
			Be conscious of your individual tolerance to work in hot weather and monitor yourself and co-workers for signs and symptoms of heat stress. Persons who experience signs of heat or cold stress should contact the SC, PM and RHSM. Call the occupational nurse first if symptoms are severe at 1-888-449-7787. Read and follow cold stress precautions specified in the HSP. Wear layers and ensure you're dressed adequately for site conditions. Takes breaks in a warm location as necessary and stay hydrated with warm fluids (avoid caffeine). Monitor your co-workers for signs of cold stress. Persons who experience signs of heat or cold stress should contact the SC, PM and RHSM. Call the occupational nurse first if symptoms are severe at 1-888-449-7787. Wear light colored long sleeve shirts and pants. Use repellent on exposed skin (with at least 35% DEET) if ticks/other biting insects are suspected in the area. Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the product. Tape bottoms of pant legs or tuck pants into socks. Wear protective clothing such as Tyvek or Bug-out suits if ticks are abundant in addition to controls above. Have tick removal kits accessible. Use the buddy system and perform tick inspections prior to entering the field vehicle. If ticks were not planned to be encountered and are observed, do not continue field work until these controls can be implemented. See Tick Fact Sheet attached to the HSP for further precautions and controls to implement when ticks are present. If bitten by a tick, follow the removal procedures found in the tick fact sheet, call the occupational nurse at 1-888-449-7787. Keep exposed skin to a minimum.	

Note: * Likelihood x Severity = Residual Risk refer to the Severity Table in IB-HS-WI-0101-IB Risk Assessment and Safe System of Work

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Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Risks (List how people or the environment may be harmed?)	Initial Risk LxS = IR*	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Residual Risk LxS = RR*
			Carry a kit if you have had allergic reactions in the past, and inform your supervisor and/or a buddy. Ensure that first-aid kits contain over-the-counter allergy and itch medication (e.g., Benadryl, Claritin, etc) as well as other over-the-counter medications. If bees or other stinging insects are known to be present, determine whether additional protective clothing should be donned before entering/working in brushy areas. If you encounter a wasp, back away slowly and calmly, do not run or swat at the insect. Wait for it to leave, or gently move or brush it off gently with a piece of paper or other light object. Do not use your hand. If you are stung, contact the occupational nurse at 1-888-449-7787, no matter how minor it may seem. If a stinger is present, remove it as soon as possible using something with a thin, hard edge (e.g., credit card) to scrape the stinger out. Be sure to sanitize the object first with hand sanitizer, alcohol or soap and water. Wash and disinfect the wound, cover it, and apply ice. Watch for an allergic reaction if you have never been stung before. Call 911 if the reaction is severe. Refer to the HSP for controls on other biological hazards possibly present dependent on season/location, including snakes, spiders, and poisonous plants. Sudden inclement weather can rapidly encroach upon field personnel. Preparedness and caution are the best defences. Carry clothing appropriate for inclement weather. Take heed of the weather forecast for the day and pay attention for signs of changing weather that indicate an impending storm. Signs include towering thunderheads, darkening skies, or a sudden increase in wind. If stormy weather ensues, field personnel should discontinue work and seek shelter until the storm has passed. Seek shelter when thunder is heard or lightning is seen If caught in one, seek shelter.	

Note: * Likelihood x Severity = Residual Risk refer to the Severity Table in IB-HS-WI-0101-IB Risk Assessment and Safe System of Work

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Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Risks (List how people or the environment may be harmed?)	Initial Risk LxS = IR*	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Residual Risk LxS = RR*
			Avoid low lying areas such as washes after rain as they can flood. Take time to review where the closest structure that can be used when severe weather occurs and what route will be used to get there. Listen to weather reports and plan for severe weather. Designate an emergency evacuation assembly area and evacuation routes for non-weather related emergencies (fire, etc.). Keep a copy of the Emergency Contact page from the HSP accessible. If you are threatened by a dog, remain calm, do not scream, and avoid eye contact. If you say anything, speak calmly and firmly. Do not turn and run, try to stay still until the dog leaves, or back away slowly until the dog is out of sight or you have reached safety (e.g. vehicle). Identify the nearest "safe" location for each property and work area e.g. vehicle, building, etc. If you believe the dog will attack use the repellant and immediately evacuate the area. If attacked, retreat to vehicle; attempt to place something between you and the dog.	
Collecting GW samples - Accessing and opening well	Strains and sprains	9	• Use hoist, truck, forklift, dolly, etc. when possible to move materials. • Ensure that two-person lifts are used for materials weighing more than 40 pounds.	1
	Slip, trip, fall	9	• Remove trip hazards or mark them. •	1
	Illness from contact with contaminated water or inhaling contaminants	5	• Stand up-wind of well head when opening and allow to vent, if necessary. • Follow action levels in the APP/SSHP for photoionization detector (PID) and dust monitor readings in the breathing zone. Call PM and HSM if action levels are exceeded.	1

Note: * Likelihood x Severity = Residual Risk refer to the Severity Table in IB-HS-WI-0101-IB Risk Assessment and Safe System of Work

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Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Risks (List how people or the environment may be harmed?)	Initial Risk LxS = IR*	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Residual Risk LxS = RR*
	Exposure, Contact, Slips, Trips, Falls		• Know the limitations of all hand tools. Use socket wrench and, if necessary, bolt cutters to remove old, rusty locks. Never use shop or homemade tools. • Do not open large manholes without appropriately designed lifting equipment. • Watch hand placement when removing well lid to access monitoring well. Do not place hands around lip or well head where well lid could pinch. Use pry bar to lift well lid if possible. • Stand upwind of well when opening lid. Allow well to vent, use air monitoring equipment to follow action levels in the Accident Prevention Plan (APP) and contact health and safety manager if readings exceed action levels. • Review constituents of potential concern (COPCs) listed in APP and be aware of site health hazards. • Do not eat or drink onsite, except in designated areas. • Wear leather gloves if necessary to avoid sharp edges or pinch points; wear nitrile gloves when there is a potential for contact with water • Set up an exclusion area around well. Use site control as specified in APP. • Use appropriate traffic control, including delineators and caution tape. Never conduct sampling in parking areas or roadways without traffic control. • Do not work alone. Always use buddy system when sampling. Review security requirements in Site Reconnaissance AHA. • Inspect well head for biological hazards, such as spiders. Wear gloves and long-sleeve shirts. Use a stick to clear the location of webs and insects. Review biological hazards and control measures in Site Reconnaissance AHA.	

Note: * Likelihood x Severity = Residual Risk refer to the Severity Table in IB-HS-WI-0101-IB Risk Assessment and Safe System of Work

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Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Risks (List how people or the environment may be harmed?)	Initial Risk LxS = IR*	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Residual Risk LxS = RR*
			• Wear proper PPE: safety glasses with side shields, hard hat, safety boots, chemical resistant gloves. • Stay alert while logging soil samples of all drilling activities. • Maintain clean work area, keep walkways clean and clear, tools picked up, and soil in drums. • Use dedicated pen for logging information into field book to prevent potential contact with contaminants. STAY ALERT. • Handle sample containers safely, if a container is broken make sure leather work gloves are used during clean up • Air monitoring will be performed in breathing zone in accordance with site HSP. Action levels will be followed in site HSP.	
Using generator/ batteries	Electrical hazards/shock from generator or battery Carbon monoxide Generator/noise hazard	5	• Use GFCI and grounding rods or ground to vehicle. Place generator at extension cord length distance downwind of site. • Verify all cords are in good condition. Ensure ground is present on extension cord. • Cords should be heavy duty and designed for exterior use. • Ensure cords are not laying in water. • Do not use gas powered generator in an enclosed area. • Use equipment in compliance with manufacturer's guidelines and only for applications for which they were designed. Do not remove guards. • If vehicle batteries are used, care must be taken when using 12-volt DC batteries. Follow manufacturer instructions for maintenance of batteries. Follow equipment manufacturer's instructions for battery use in that equipment and or for charging. • Using hearing protection or move the generator away from work area.	1

Note: * Likelihood x Severity = Residual Risk refer to the Severity Table in IB-HS-WI-0101-IB Risk Assessment and Safe System of Work

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HIRA (Hazard Identification, Risk Assessment & Safe System of Work)		Date: 22 February 2021	Page: 9
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Safety Liaison: Joe Spies	Environmental Manager: Linda Colella	Health and Safety Manager: Mark Orman, CSP	

Work Task Sequence (List steps needed to complete the task)	Associated Hazards/Risks (List how people or the environment may be harmed?)	Initial Risk LxS = IR*	Hazard/Risk Control Measure (List specific controls for each hazard/risk – consult the HSE Plan and note any hold points	Residual Risk LxS = RR*
Sample Collection	Placing or removing pump from well/pinch points, muscle strain Sample preservatives/vapors released once water is added or splashing of preservative/groundwater on skin Broken glass and tape gun, sharp edges	9	• Be aware of hands as pump is lowered and recoiled, do not allow pump head to fly out of well. • Stand upwind when adding sample preservatives (if outside); do not hold sample containers on your lap when adding preservative. • Review Safety Data Sheet (SDS)/labels of preservatives, may be corrosive. • Hold sample containers away from face when filling and wear proper PPE including nitrile gloves and safety glasses • Do not overtighten caps. Carefully handle so containers do not break. Wear cut resistant gloves if glass breaks.	4
Well Development	Exposure, Exertion Hazards	9	• Whether using pumps or manually developing a well, use proper lifting techniques and take breaks as necessary. • Wear proper PPE: safety glasses with side shields or chemical goggles if there is a splash hazard, hard hat, safety boots, high visibility safety vest, leather and/or chemical resistant gloves, and an apron or coated tyvek if there is potential for contacting potentially contaminated groundwater. • Conduct air monitoring in breathing zone in accordance with site HSP. Follow action levels in HSP and stop work if action levels are exceeded. • Appropriately containerize purge water and use mechanical means to move drums (drum dolly, lift gate, etc.). Use the correct waste container for liquids (i.e., not a roll-off. Sludge box, tank or drums for liquid or saturated soils).	5

Note: * Likelihood x Severity = Residual Risk refer to the Severity Table in IB-HS-WI-0101-IB Risk Assessment and Safe System of Work

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Equipment to be Used (List equipment, supplies, PPE, to be used during the task)	Inspection Requirements (List inspection requirements, checklists to be filled out, or permits needed)		Training Required (List training and/or medical monitoring required to complete the task)	Specific Access Arrangements (if applicable)
• Hand and power tools • Sampling equipment/containers • CGI/PID • Fire extinguisher(s) • Fuel storage/equipment • Portable eye wash • First Aid/Bloodborne pathogen/CPR kit • Traffic control equipment • Support vehicles • Sunscreen • Timer, ear thermometer (for heat stress monitoring) • Spill kit/materials • SDS for any chemicals used onsite	• Inspect all vehicles, equipment, tools, and PPE prior to each use (remove from service any defective equipment) • Calibrate CGI and PID prior to use • Visual Inspections of work area daily • Use of applicable project self-assessment checklists • Ensure cell phone has coverage and have fully charged. • Determine daily rally point/evacuation route.		• OSHA 40-hour HAZWOPER initial training, current refresher, 3-day OJT, and medical clearance. • Hazard Communication training, as appropriate • Training on CH2M HILL HSP and Subcontractor's applicable AHAs • Qualified subcontractor operators (for equipment such as drill rigs) • Documented training on SDSs for any chemicals used (see HSP on how to document). • Qualified SC-HW • Additional training as specified in HSP .	Site badge and/or pre-approved vetting site pass

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Incident Severity						Incident Likelihood or Probability				
						Highly unlikely	Unlikely	Possible	Likely	Highly Likely
Injury/illness	Environment	Reputation	Economic/ Material/ Production (in USD)	Motor Vehicle Incident (MVI)	Incident Actual or Potential Severity Level	1	2	3	4	5
Fatality or total permanent disability or kidnapping	Catastrophic damage; substantial widespread remediation; penalty in Economic column range, and/or litigation	International media coverage; regulatory sanction	Greater than $3 million	Collision with another vehicle or object with at least one vehicle moving at high speed (greater than 80 kph [50 mph]) or an incident involving vehicle rollover or striking a pedestrian, bicycle or motorcycle	5	5	10	15	20	25
Partial disability; life changing; intensive care or aggravated assault	Significant environmental damage and remediation; penalty in Economic column range	National media coverage; regulatory action	$300,000 to $3 million	Collision with another vehicle or object with at least one vehicle moving at medium speed (greater than 65 kph and less than 80 kph [greater than 40 mph and less than 50 mph])	4	4	8	12	12	20
Urgent treatment; surgery or assault	Correctable environmental damage; significant regulatory noncompliance; penalty in Economic column range	State media coverage; Prohibition Notice	$30,000 to $300,000	Collision with another vehicle or object with at least one vehicle moving at medium speed (greater than 48 kph and less than 65 kph [greater than 30 mph and less than 40 mph])	3	3	6	9	12	15
Medical treatment to prevent deterioration or harassment	Limited and correctable environmental damage; regulatory noncompliance; penalty in Economic column range	Local media coverage; citations/ fines	$3,000 to $30,000	Low-speed collision (less than 48 kph [30 mph]) with another vehicle or object	2	2	4	6	8	10
Simple, immediate treatment or simple threat	No significant consequences or impacts; minor regulatory noncompliance; penalty in Economic column range	No media coverage	Less than $3,000	Minor collision while stationary or moving at slow speed while parking, backing, or maneuvering	1	1	2	3	4	5

Risk Mitigation	High	Work activity or operation is not permitted. Additional controls must be implemented to reduce risk to an acceptable or manageable level.	Medium	Work or operation permitted with a time limited waiver endorsed by management. This means that there is management oversight and approval for specific work activities or operations that fall in the Yellow zone.	Low	Work or operation is permitted with implementation of core HSE program elements (PHSEP, SPA, SOR, SER, appropriate training, etc.).

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Activity Hazard Analysis (Hazard Identification, Risk Assessment & Safe System of Work) Sign-Off			
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Print Name	Signature	Role on Project	Date/Time
Total Crew Members for Task (Jacobs):		Total Crew Members for Task (Subcontractors):	