Revised Sampling Plan for

Lunker Federal #2-33-4H

April 5, 2013

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ACRONYMS

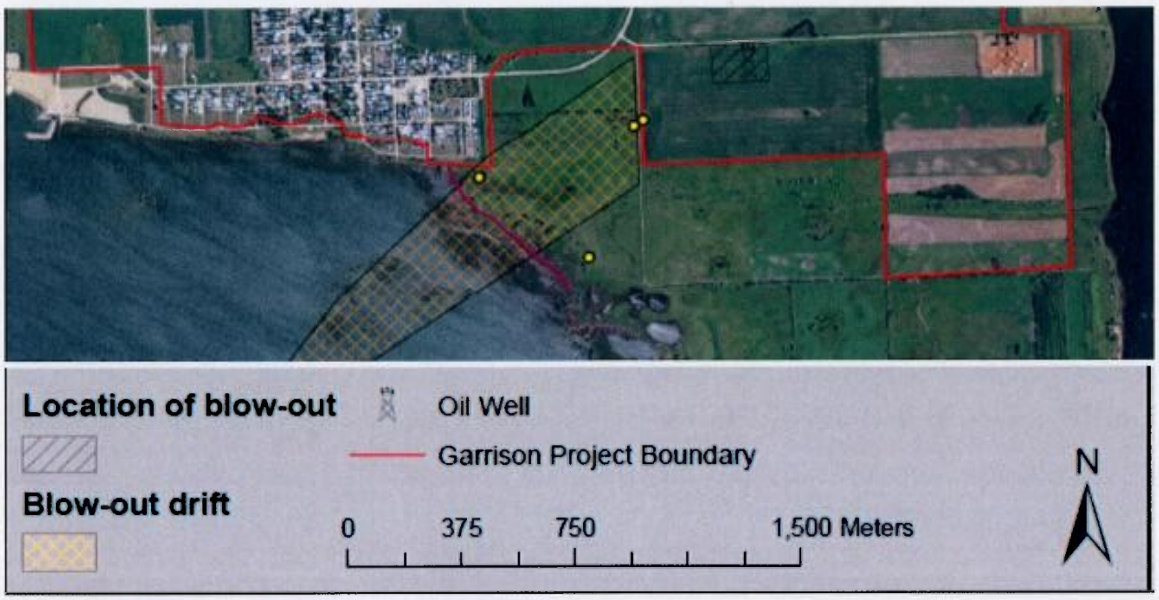
BGS	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
DRO	Diesel Range Organics
ESC	ESC Lab Sciences
GRO	Gasoline Range Organics
PAH	Polyaromatic hydrocarbons
Slawson	Slawson Exploration Company
WMA	Wildlife Management Area

PROPOSED SAMPLING PLAN FOR LUNKER FEDERAL #2-33-4H

1. PROJECT INFORMATION

Lowham Walsh is pleased to provide the sampling plan detailed in this document to investigate extent of impacts to land neighboring the Slawson Exploration Company (Slawson) Lunker Federal #2-33-4H well site. This proposed investigation involves soil and water sampling campaigns upon an adjacent Wildlife Management Area (WMA). Figure 1 shows the impacted land, as detailed by William Harlon of the U.S. Army Corps of Engineers.

Figure 1. Arial Image Depicting Well Blowout Site and Petroleum and Produced Water Drift.



This investigation will focus on sampling of areas utilized as nesting grounds by the Piping Plover. A total of three sampling events will be held. The first event will be conducted about the onset of the spring thaw season. The second will be conducted about the bird arrival season (potentially mid-April). The third will be conducted post-thaw (early May).

Sample parameters that are requested for the soil samples include:

- Diesel Range Organics (DRO) via modified Method 8015 (C_{40} maximum)
- Gasoline Range Organics (GRO) via Method 8015
- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) via Method 8015
- Specific Conductance by Method 9050A
- SAR via Method 9056
- pH via Method 9045C

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- Total metals by Method 3050 and either Method 6010 or Method 7421 for aluminum, antimony, arsenic, barium, boron, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, zinc
- Bromide
- Sulfates
- Polyaromatic hydrocarbons (PAH) by Method 8270.

Sample parameters that are requested on the water samples include:

- Diesel Range Organics (DRO) via Method 8015 (C_{40} maximum)
- Gasoline Range Organics (GRO) via Method 8015
- North Dakota Department of Health Group 7 total metals by Method 3050 and either Method 6010 or Method 7421 for aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, iron, lead, manganese, nickel, selenium, silver, thallium, and zinc.
- North Dakota Department of Health Group 30 for ammonia, Kjeldahl nitrogen (TKN), nitrate-nitrite, phosphorus (total), and total nitrogen.
- North Dakota Department of Health Group 187 (less analytes from Groups 7 and 30) for alkalinity (total), bicarbonate, calcium, carbonate, chloride, dissolved solids (calculated), fluoride, hardness, hydroxide, magnesium, pH, potassium, silica, sodium, specific conductance, sulfate (percent), and turbidity.
- Bromide
- Benzene, Toluene, Ethyl benzene, Xylene (BTEX) via Method 8015
- Polyaromatic hydrocarbons (PAH) by Method 8270-SIM.

The sample locations proposed by U.S. Army Corps of Engineers are shown in Figure 2.

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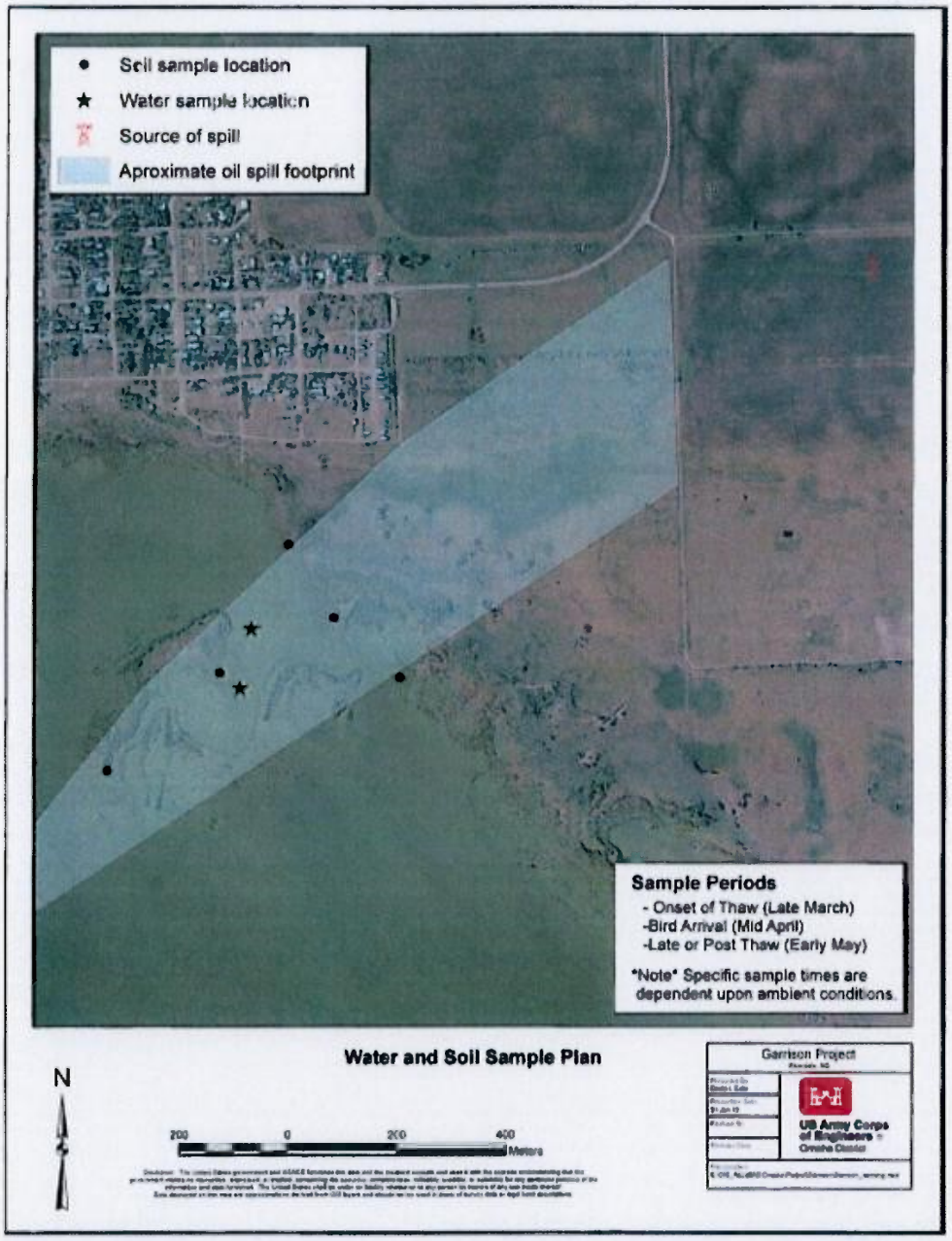
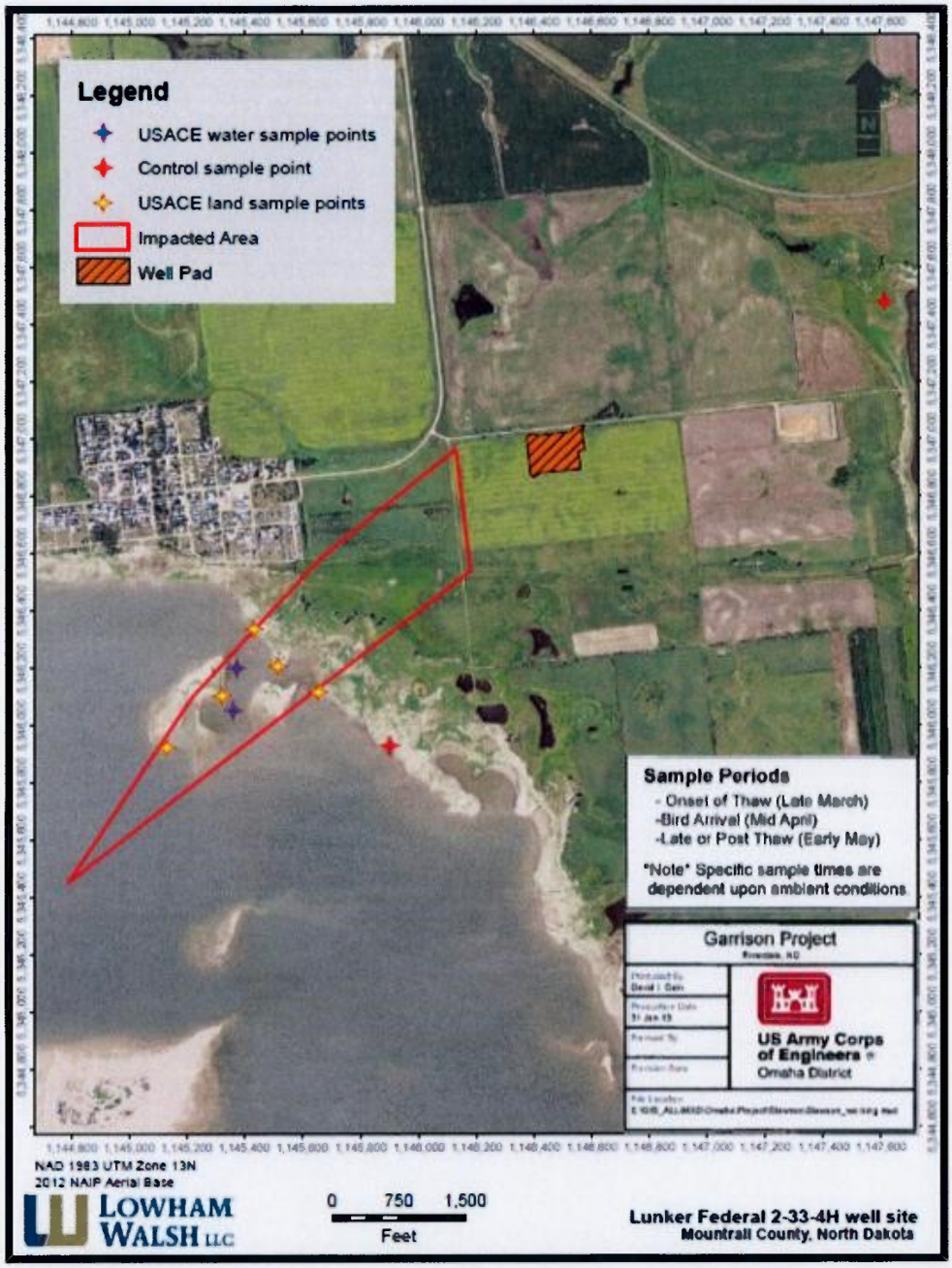
Figure 2. Sampling Points Proposed by U.S. Army Corps of Engineers.



The sampling plan diagram provided by U.S. Army Corps of Engineers includes five (5) land locations and two (2) water locations. Lowham Walsh proposes to include two (2) additional sample locations outside the impact zone, which will serve as control samples, as shown in Figure 3. The first control sample location will be to the south and east of the impacted zone along the shore of Lake Sakakawea. The second control sample location will be within a drainage to the north and east of the impacted zone, where the drainage enters Lake Sakakawea.

Figure 3. Sampling Program Proposed by U.S. Army Corps of Engineers with Two Additional Sample Points.



Lowham Walsh will notify U.S. Army Corps of Engineers at least 24 hours prior to commencing sampling campaigns in order to allow for an agency representative to be present. Persons to be contacted are: 1) William Harlon (701) 654-7746 (office), or (701) 220-2867 (mobile), and 2.) Ryan Newman (701) 654-7756 (office). Notification will be provided to Mr. Harlon and Mr. Newman during normal business hours, excluding holidays.

The impact investigation can be driven by analytical results obtained from the three (3) planned sampling campaigns. Additional ecological/biological impact analysis may be required as a result of analytical results obtained from the sampling campaigns.

It is the recommendation of Lowham Walsh that a total of seven land-based samples and two water-based points be sampled, in keeping with the direction expressed by U.S. Army Corps of Engineers. A control water sample was collected through the ice on Jan. 13, 2013.

2. Sampling Methodology

Lowham Walsh proposes to sample soil and water from locations depicted in Figures 2 and 3. Soil samples will be collected with hand tools in keeping with both U.S. EPA Standard Operating Procedures and North Dakota Department of Health soil sampling procedures (Appendix C). The sampling technique will involve scrapping an area with hand tools. The area to be scrapped will be approximately a circle with a 12-inch diameter. Scrapping will be from the outer edge of the circle toward the center. A maximum depth below ground surface (bgs) of 1 inch will be scrapped. . Samples collected in this manner will be homogenized, jarred, and appropriately labeled. Sample locations will be logged as the samples are collected. Soil samples will be predominately surface soil.Additionally, Lowham Walsh proposes collecting two soil control samples during each of the three sampling campaigns from areas that were not impacted by the event (control sample points shown in Figure 3). These samples will be collected from WMA lands immediate to the south and east of the impacted zone. A minimum distance of ¼ mile from the impacted zone will be traveled prior to collecting background samples.

Finally, at the request of U.S. Fish and Wildlife Service, a replicate soil sample will be collected. The replicate sample location will be selected by the agency representative in the field from one of the sample locations depicted in Figure 3.

Lowham Walsh proposes to utilize ESC Lab Sciences (ESC) for analytical services. ESC has recommended the collection of four 4-ounces jars of homogenized soil sample at each of the land-based locations. Total sample volume required for each land-based location is 16 ounces. ESC has recommended the collection of a total slightly more than 1700 milliliters (mL) of water divided between seven sample bottles.Water samples will be collected via dipping of a vessel into the water. The contents of the vessel will be returned to the body of water three times before transferring of the vessel contents to a sample container. Care will be taken to not disturb the lake bottom during vessel rinsing and emptying so as to not add solids to the water sample. The water collected in the vessel on the fourth dip will be transferred to sample containers have been provided by ESC with appropriate labeling for the analytes to be determined. Additionally, certain of the sample containers are charged with an appropriate preservative (Appendix C).

Samples will be labeled in a manner such that they are identified with the Lunker Federal project, but that the exact sample location cannot be determined from the label. Additionally, the replicate sample will bear no markings indicating it is a replicate of one of the other submitted samples. Exact sample locations will be recording on a map marked with the locations (GPS coordinates) and sample identification code at the time of sampling. Samples will be marked at the time of collection. Sample

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marking will utilize a code unintelligible to the analysis laboratory. The code will be decipherable only via the use of the map generated in the field on the day of sampling. A hand copy of the map will be provided to the agency representative at the completion of the field sampling campaign.

Lowham Walsh proposes to utilize a GPS device identify and re-locate sampling points in the field.

Samples will be shipped to ESC utilizing standard chain of custody forms and protocols. Samples will be shipped via FedEx in large insulated chests. The chain of custody form will be signed and placed inside the chest, and the chest sealed with adhesive tape. Each ice chest will be signed, dated and following sealing. Custody of the chest will be transferred to FedEx. The agency representative is welcome to travel with the samples from the field to the FedEx office/drop point.

ESC will receive the samples, sign the chain of custody document, and note and record the condition of the samples upon receipt. Sample preparation and analysis will follow methods for which ESC is certified by North Dakota Department of Health. Analytical methods are presented in Appendix B.

It is expected that Lowham Walsh will provide analytical results to U.S. Army Corps of Engineers within 14 days of submitting samples to ESC. Results will be submitted in electronic format. An electronic copy of the chain of custody form(s) will also be supplied with the sample results.

3. Data Reduction & Report Generation

Lowham Walsh proposes to consolidate and organize the analytical data produced by ESC. The data will be grouped by location, and transferred to a database identifying the sample location as depicted in Figure 3. Additionally, Lowham Walsh proposes to prepare a report detailing the three sampling events, compiling data from each event, and comparing and contrasting the results; we will also provide a summary of impact and outcome of remediation efforts.

4. Deliverables

Lowham Walsh proposes to deliver to Slawson the following items:

1. Copies of field notes.
2. Copies of ESC laboratory reports.
3. A draft report for review by Slawson
4. A final report for distribution to:
    a. William Harlon: U.S. Army Corp of Engineers
    b. Ryan Newman: U.S. Army Corp of Engineers
    c. Kent Luttschwager: North Dakota Game & Fish Department
    d. Kris Roberts: North Dakota Department of Health
    e. Cody Vanderbusch: North Dakota Department of Mineral Resources

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APPENDIX A
RESUMES

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APPENDIX B

ANALYTICAL METHODS

APPENDIX C

FIELD SAMPLING METHODS