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July 29, 2009

Mr. Timothy Larson
New York State Department of Environmental Conservation
Remedial Bureau D
625 Broadway, 12th Floor
Albany, NY 12233-7016

RE: Onondaga Lake Bottom Subsite – Onondaga County, NY
Consent Decree 89-CV-815
Phase IV Pre-Design Investigation
Addendum 7: Additional Scope
Dated: June 30, 2009

Dear Mr. Larson:

Enclosed is the additional scope to the Phase IV PDI Addendum 7. Upon your approval, we will distribute to the public repositories.

Please feel free to contact Caryn Kiehl-Simpson at (315) 451-9560 or me if you have any questions.

Sincerely,

John P. McAuliffe SAW

John P. McAuliffe, P.E.
Program Director, Syracuse

Enclosure

cc: Bob Nunes, USEPA
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M E M O R A N D U M

June 30, 2009

To: Tim Larson, NYSDEC

From: Caryn Kiehl-Simpson, Parsons

Subject: Phase IV PDI Addendum 7 – Additional Scope

Addendum to Phase IV Addendum 7 Work Plan

Additional analyses are proposed to further our understanding of the pH amendment evaluation as described in the original Phase IV Addendum 7 Work Plan. Section I and II below outline the additional proposed scope.

I. ASSESSMENT OF POTENTIAL WATER QUALITY IMPACTS FROM pH-BUFFERING AMENDMENTS

As part of the Phase IV PDI Work Plan Addendum 7 (Parsons, 2008) a number of pH-buffering cap amendments are under evaluation. The original Work Plan did not include an assessment of potential byproducts from these amendments that could have a potential impact on the water column during placement or over time in the in situ porewater. As such, additional evaluations are proposed. These evaluations will be completed by Test America Pittsburg and will be focused on the siderite amendment which has been identified as the most effective amendment in testing to date. If additional promising amendments are identified in future testing or upon review of the ongoing work, evaluations can be extended to those amendments at a later date.

Three forms of the siderite amendment will be tested: (1) a pulverized form commonly used as an animal feed additive, (2) a pellitized form that is made from the powdered siderite by adding a calcium aluminate binder, and (3) granular, mined siderite obtained from a mine in Texas. The pulverized and pelletized siderite is currently under evaluation as part of Phase IV Addendum 7, the mined granular siderite has been obtained from a mine in Texas and is discussed further in Section II below. The three forms of siderite and the necessary volume of ILWD porewater will be shipped to TestAmerica.

Proposed additions to the Phase IV Addendum 7 Work Plan include:

1) **Bulk chemical analysis (major and trace elements) of the three forms of siderite.** The bulk chemical analysis will provide information on the chemical composition and purity of the three forms of siderite and will identify any impurities present at elevated concentrations in the raw materials. This work will

be conducted on the three forms of siderite. Approximately 10 grams of each type will be required. The samples will be submitted to ActLabs in Ancaster, Ontario where they will be analyzed for the elements (inclusive of TAL metals either as a trace element or in oxide form) listed in Table 1 by X-ray fluorescence (XRF) and/or instrumental neutron activation analysis (INAA).

Major Elements		Trace Elements									
Al_2O_3	0.01%	Ag	0.5 ppm	Cu	1 ppm	Rb	2 ppm	V	5 ppm	Gd	0.1 ppm
CaO	0.01%	As	0.5 ppm	Ga	1 ppm	S	100 ppm	W	1 ppm	Tb	0.1 ppm
FeO	0.01%	Au	2 ppb	Ge	1 ppm	Sb	0.2 ppm	Y	1 ppm	Dy	0.1 ppm
K_2O	0.01%	Ba	3 ppm	Hf	0.2 ppm	Sc	0.1 ppm	Zn	1 ppm	Ho	0.1 ppm
MgO	0.001%	Be	1 ppm	Hg	5 ppb	Se	3 ppm	Zr	5 ppm	Er	0.1 ppm
MnO	0.001%	Bi	0.4 ppm	In	0.2 ppm	Sn	1 ppm	La	0.1 ppm	Tm	0.05 ppm
Na_2O	0.01%	Br	0.5 ppm	Ir	5 ppb	Sr	2 ppm	Ce	0.1 ppm	Yb	0.1 ppm
P_2O_5	0.01%	Cd	0.5 ppm	Mo	2 ppm	Ta	0.1 ppm	Pr	0.05 ppm	Lu	0.001 ppm
SiO_2	0.01%	Co	1 ppm	Nb	1 ppm	Th	0.1 ppm	Nd	0.1 ppm		
TiO_2	0.001%	Cr	5 ppm	Ni	1 ppm	Tl	0.1 ppm	Sm	0.1 ppm		
LOI*	0.01%	Cs	0.5 ppm	Pb	5 ppm	U	0.1 ppm	Eu	0.05 ppm		

* loss on ignition

Table 1. Major and trace elements and associated detection limits

2) Modified elutriate test (MET) to evaluate potential water quality impacts from the pH amendment during emplacement through the water column. The objective of the MET is to identify potential water quality impacts from impurities present in the siderite amendment (and calcium aluminate binder used in the case of the pelletized form). The test procedure allows for estimates of dissolved contaminant concentrations (mg/L) and fractions of contaminants in the suspended solids (mg/kg suspended solids) under quiescent settling conditions.

The test will consist of mixing an amendment sample for 1 hr with distilled deionized water to form a slurry, allowing the slurry to settle for 24 hrs under conditions similar to those expected during emplacement of the cap amendments, and extracting an elutriate for chemical analysis (USACE, 2003, Appendix B). The MET elutriate will be analyzed for selected inorganic and organic contaminants for which ambient water quality standards (AWQS) have been established recognizing that siderite is a natural mined material ($FeCO_2$) and it is unlikely that synthetic organics or a majority of parameters for which water quality parameters are available are relevant. Analysis will include TAL metals plus cyanide (USEPA SW-846 6010B, 7470A, 9012A), semi-volatile organic compounds (SVOCs by EPA Method 8270), pH (USEPA SW-846, 9040B), hardness (SM 20 2340B)and total suspended solids (SM20 2540D).

The MET will be carried out in triplicate on each of the three types of siderite and will require approximately 2 liters of material per amendment tested.

3) Sequential batch leach test (SBLT) to evaluate potential leachate quality from porewater discharging through the pH amended cap. The objective of the SBLT

is to identify potential water quality impacts from impurities present in the siderite amendment (and calcium aluminate binder used in the case of the pelletized form).

The SBLT is performed under conditions designed to simulate those within the cap. Because of the elevated pH and ionic strength of the ILWD porewater, the water used for the tests will be filtered ILWD pore water rather than distilled-deionized water as described in the SBLT procedure for freshwater sediments (USEPA, 2003, Appendix D). Amendments will be prepared in a 4:1 water to solids ratio and loaded into centrifuge tubes under anaerobic conditions, samples are tumbled in a tumbler for 24 hrs, centrifuged for 30 minutes, and then sampled. Leachate will be separated from solids by centrifugation and/or filtration, and then chemically analyzed. Fresh leachate will be added to the tubes to replace that removed and the procedure will be repeated for four complete cycles. The ILWD porewater (leaching solution) and the SBLT leachates will be analyzed for the same analytes as the MET elutriate.

The SBLT will be carried out in duplicate for each of the three forms of siderite. This will require approximately 10 liters of porewater (collected from TR-03A) and 2 liters of each of the three forms of siderite tested.

II. PERFORMANCE EVALUATION OF ADDITIONAL SIDERITE SOURCE

The original Work Plan included batch testing of two types of siderite: (1) a pulverized form that is used as an animal feed additive, and (2) a pelletized form that is made from the powdered siderite by adding a calcium aluminate binder. During the course of these evaluations, a third source was identified capable of providing material in multiple grain sizes. Siderite from this source will be evaluated following the same experimental and modeling procedures described in the original Work Plan.

Reference

Parsons. 2008. Onondaga Lake Phase IV Pre-Design Investigation Work Plan; Addendum 7. Prepared for Honeywell, Morristown, New Jersey. Syracuse, NY.

USACE (U.S. Army Corps of Engineers). 2003. Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities — Testing Manual. Engineer Research and Development Center. Environmental Laboratory. ERDC/EL TR-03-1. Vicksburg, Mississippi.