Amendment 3 to The Draft Implementation Work Plan

Centredale Manor Restoration Superfund Site North Providence, Rhode Island

March 8, 2002

PREPARED FOR:

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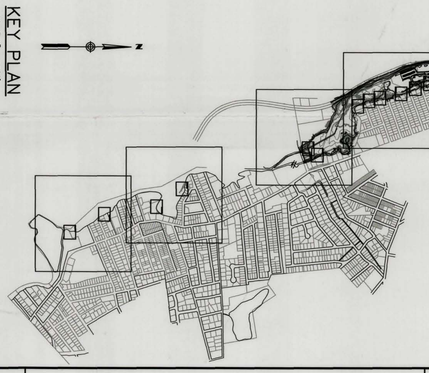
Comm. No. 15RP101.001

DRAFT
PRELIMINARY FOR REVIEW PURPOSES ONLY

LEGEND

- PROPOSED SAMPLE LOCATION BETWEEN ACTION AREAS (APPROXIMATE)
- PROPOSED SAMPLE LOCATION EASTERN BOUNDARY (APPROXIMATE)
- EXCAVATION DELINEATION SAMPLE LOCATION (DIOXIN CONCENTRATION < 1000 ppt FOR ALL SAMPLING INTERVALS)
- EXCAVATION DELINEATION SAMPLE LOCATION (DIOXIN CONCENTRATION > 1000 ppt FOR AT LEAST ONE SAMPLING INTERVAL)
- USEPA SAMPLE LOCATION (DIOXIN CONCENTRATION < 1000 ppt)
- USEPA SAMPLE LOCATION (DIOXIN CONCENTRATION > 1000 ppt)
- PIEZOMETER LOCATION
- AREA PROPOSED IN TTNUS EE/CA FOR EXCAVATION OF RESIDENTIAL USE SOIL
- AREA PROPOSED IN TTNUS EE/CA FOR EXCAVATION OF FLOOD PLAIN SEDIMENT
- ppt PARTS PER TRILLION
- 100 - YEAR FLOOD BOUNDARY (APPROXIMATE)

KEY PLAN
SCALE 1" = 1000'



REV.	DESCRIPTION OF REVISION	DATE	APPR.

CENTREDALE MANOR RESTORATION SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

PROPOSED SAMPLE LOCATIONS

SCALE: 1" = 50'
COMM. NO.: 15RP102
DRAWN BY: A.C.L. DATE: 03/07/02
APP. BY: D.N.S. DATE: 03/07/02

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SHEET NO. 1 OF SHEETS 1
DRAWING 1

15RP101-SITE.dwg

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KEY PLAN
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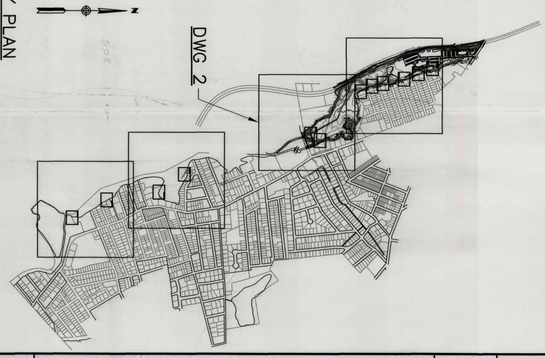

CENTREDALE MANOR RESTORATION SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

PROPOSED SAMPLE LOCATIONS

SCALE	
1" = 50'	
COMM. NO.	
15RP102	
DRAWN BY	DATE
A.C.L.	03/07/02
APP. BY	DATE
D.N.S.	03/07/02

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DRAWING NO. 2 | SHEET NO. 1 | NO. OF SHEETS 1

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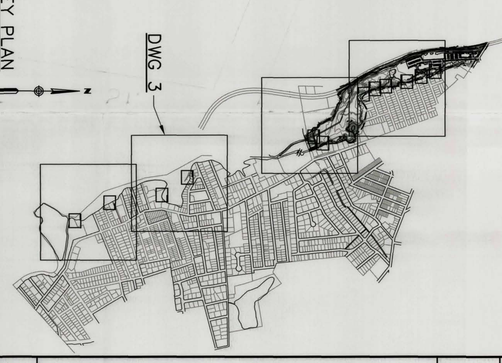
SCALE 1" = 1000'



CENTREDALE MANOR RESTORATION SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

PROPOSED SAMPLING LOCATIONS

SCALE	1" = 50'
COMM. NO.	15RP101
DRAWN BY	A.C.L.
DATE	03/07/02
APP. BY	S.A.M.
DATE	03/07/02

SHEET NO. 1 NO. OF SHEETS 1
DRAWING 3

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Loureiro Engineering Associates, Inc.
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COMM. NO. 15RP101
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APP'D. BY S.A.M. DATE 03/07/02

CENTREDALE MANOR RESTORATION SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

PROPOSED SAMPLE LOCATIONS

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DRAWING 4

SHEET NO. 1 NO. OF SHEETS 1

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IMPLEMENTATION WORK PLAN – AMENDMENT 03
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

1.0 BACKGROUND

As explained by the U.S. Environmental Protection Agency's (EPA's) conceptual site model (CSM), sediment (dioxin) was transported downstream from the source area(s) and was deposited below the 10-year flood elevation through sedimentation processes. The resulting distribution of dioxin was presumed to be limited to the surface soil and sediment along the floodplain. Analytical results reported for samples obtained by the EPA were used to define areas proposed for excavation (Action Areas). To refine the limits of these Action Areas and as required by the Unilateral Administrative Order, Loureiro Engineering Associates, Inc. (LEA) implemented a sampling and analytical (immunoassay screening) program on behalf of the Centredale Manor Performing Parties Group as part of the Non-Time-Critical Removal Action (NTCRA).

Based on initial immunoassay screening results, elevated levels of dioxin appear to extend beyond the limits of the Action Areas defined by EPA. To better understand the possible extent of dioxin-impacted soil and sediment at the site, LEA reviewed the CSM with respect to the existing analytical results. Based on this review, LEA developed a revised CSM to explain that the apparent widespread distribution of dioxin has resulted from areas of deposition having undergone subsequent episodes of filling and excavation as a result of changing land-use practices and changing landforms. The revised CSM is supported by the findings of an evaluation of historic topographic maps, flood inundation maps, and aerial photographs of the site and adjoining area. This evaluation was performed to identify and document the nature and location of any landform changes and to guide future delineation efforts. Based on the revised CSM, a revised sampling approach has been developed to define the distribution of dioxin-impacted soil and sediment. A summary of the approach and the procedures that will be used to implement the sampling approach are discussed in the following sections.

2.0 SAMPLING APPROACH AND PROCEDURES

2.1 Overview

Because the extent of dioxin-impacted soil and sediment in the area adjacent to Allendale Pond is relatively greater than in the area adjacent to Lymansville Pond, the proposed approach differs

somewhat for each area. A discussion of the delineation approach is provided below for each pond.

2.2 Allendale Pond

2.2.1 Overview

To identify the limits of dioxin-impacted soil and sediment adjacent to Allendale Pond, a sampling and analytical program consisting of two components is proposed. The first component is intended to assess whether elevated levels of dioxin are present along the entire eastern reach of the pond by collecting samples between the EPA-identified Action Areas. The second component will involve the collection of samples to define the eastern boundary of dioxin.

2.2.2 Institutional Boundaries

Where identified by EPA, institutional considerations define delineation boundaries. As shown in Drawing 1, institutional considerations identified by EPA define the northern boundary of Action Area 1, as well as the western boundary of Action Areas 1 and 2. The western boundary of Action Areas 3, 4, 5, 6, and 7 are defined by the 92.5 contour elevation. No samples will be collected along these EPA-defined boundaries.

Furthermore, the water table will be used to define the vertical boundary of delineation if elevated levels of dioxin extend to the depth at which the water table is encountered. The use of the water table as the vertical limit of delineation applies only to the residential use soil outside of the pond area (i.e., east of the 93.5 contour). Although further delineation of floodplain sediment in areas that exist between the 92.5 and 93.5 contour is not anticipated at this time, it is recognized that any additional sampling within these areas will extend to a depth of two feet, even if the water table in these areas exists at a depth that is less than two feet.

2.2.3 Assess the Extent of Dioxin Between Action Areas

Sampling Locations

To confirm the existence of dioxin-impacted soil and sediment between the Action Areas adjacent to Allendale Pond, samples will be obtained from approximately 20 boring locations. The proposed boring locations are illustrated in Drawings 1 and 2. The borings will be field located between the Action Areas, based on existing analytical data, information obtained from an evaluation of historic maps and aerial photographs, and local topography. The survey subcontractor will stake the boring locations in the field. Two samples will be obtained from

each staked location. The samples will be obtained from a depth of 0" – 12" and 12" – 24". Thus, approximately 40 samples will be collected.

Soil Sampling Methods

The samples will be obtained using stainless steel bucket-augers, macro-cores, trowels, or similar manual sampling techniques. Each sample will be logged to document a general description of the soil in accordance with LEA's standard operating procedure for soil sampling. During the logging process, each soil sample will be examined with respect to the findings of the historic document review so that any relevant characteristics may be identified and used to guide delineation efforts.

Sample Designation

Each sample that is collected will be assigned a unique sample location tracking number. The sample location identifiers will consist of an alphanumeric code that identifies that the samples were obtained adjacent to Allendale Pond (AP), the type of sample (delineation), and the sequential sample number. According to this sampling nomenclature, the delineation samples to be obtained to assess the extent of dioxin between action areas will be identified as AP-DEL-01 through AP-DEL-20. A suffix (A or B) will be appended to each sample location tracking number to identify the depth at which each sample was obtained (0"-12" = A; 12"-24" = B).

Laboratory Analysis and Evaluation

The samples will be analyzed by Severn Trent Laboratories, Inc. located in Sacramento, California using USEPA Method 8290. The laboratory analytical results will be validated in accordance with the Region I Data Validation Functional Guidelines for Evaluating Environmental Analyses. The validated results will be evaluated relative to the toxicity equivalent (TEQ) of 1.0 part per billion (ppb). If the validated results are reported to be less than the TEQ of 1.0 ppb, then a modified grid-based sampling approach similar to that implemented under the Field Sampling Plan (FSP) incorporated as part of the August 6, 2001 Implementation Work Plan (IWP) will be used to collect additional samples in delineating the limits of dioxin in the area of Allendale Pond.

Although it is possible that dioxin is limited, it is expected that the results will suggest a more extensive distribution of elevated levels of dioxin along the former tailrace and Allendale Pond. This expectation is based on the immunoassay screening results obtained to date; on the occurrence of samples characterized by EPA as exceeding 1.0 ppb; and on the concentrations of dioxin in sediment within the pond and along the pond embankment, as characterized by EPA. If the results support the expectation that dioxin-impacted soil and sediment is present in areas significantly beyond those identified by EPA, then the validated results will be reviewed with

EPA, the State of Rhode Island Department of Environmental Management (RIDEM), and the USACE to formulate a plan on how to proceed with dioxin delineation activities at the site.

2.2.4 Identify the Eastern Boundary of Dioxin

Sampling Locations

To identify the eastern boundary of dioxin adjacent to Allendale Pond, soil samples will be obtained from borings spaced 30-ft on center between the northern and southern boundaries identified by the first component of this investigation. The basis for spacing the borings 30-ft on center is predicated upon the widespread distribution of dioxin along the eastern reach of Allendale Pond (~3,000 feet). The 30-ft spacing along such an extensive boundary (~3,000 feet) is appropriate and consistent with the initial sampling approach in which samples were obtained from locations spaced 10-ft on center in an attempt to refine the boundaries of limited and isolated Action Areas defined by EPA.

The soil borings will be placed along a continuous line that represents the boundary believed to be just east of the elevated levels of dioxin. For illustrative purposes, approximate sample locations along such a line are proposed in Drawings 1 and 2. The identification of this line is based on a review of existing analytical data, immunoassay screening results, flood inundation maps, and historic documents. Soil borings along this line will be advanced to the elevation of the water table identified through measurements recorded from piezometers installed adjacent to Allendale Pond and shown in Drawings 1 and 2. The survey subcontractor will stake the boring locations in the field. At each staked location, samples will be obtained from a depth of 0" to 12", 12" to 36", and for every two feet (or fraction thereof) extending to the water table.

Soil Sampling Methods

The samples will be obtained using GeoProbe® direct-push sampling techniques. Manual sampling techniques using stainless steel bucket-augers, macro-cores, or trowels, may also be used to collect the soil samples. Each sample will be logged to document a general description of the soil in accordance with LEA's standard operating procedure for soil sampling. During the logging process, each soil sample will be examined with respect to the findings of the historic document review so that any relevant characteristics may be identified and used to guide delineation efforts.

Sample Designation

Each sample that is collected will be assigned a unique sample location tracking number. The sample location identifiers will consist of an alphanumeric code that identifies that the samples were obtained along the eastern boundary (EB) of Allendale Pond, the type of sample (delineation), and the sequential sample number. According to this sampling nomenclature, the

delineation samples to be obtained to identify the eastern boundary of dioxin will be identified as EB-DEL-01, EB-DEL-02, EB-DEL-03, etc. A suffix (A, B, C, etc.) will be appended to each sample location tracking number to identify the depth at which the sample was obtained (0"-12" = A; 12"-36" = B; 36"–60" = C; etc.).

Composite Soil Samples

The soil samples will be thoroughly mixed and homogenized and transferred to the appropriate sample containers. Once homogenized, an equal volume of soil will be taken from each sample container to provide composite samples. The location tracking numbers of the samples that comprise each composite sample will be recorded in the field paperwork. The individual soil samples used to prepare the composite samples will be held for possible future analysis.

The composite samples will be prepared from the samples such that each composite will consist of soil obtained from the same horizon from three adjacent borings. For example, if groundwater exists at five feet below grade, then three composite samples will be collected along a 90-foot section of the eastern boundary. One composite sample will consist of soil obtained from the same horizon (0" to 12", 12" to 36", and 36" to 60") from each of three borings spaced every 30 feet. Stratigraphic changes and soil characteristics that may define limits of dioxin will be considered in processing composite samples, such that soil horizons exhibiting different soil characteristics will not be mixed together.

Sample Analysis and Evaluation

Each composite sample will be analyzed using immunoassay-screening techniques. The screening results will be evaluated relative to a 1,000 parts per trillion (ppt) threshold. However, during the course of the sampling and analytical process this threshold will be adjusted if it is evident from corresponding fixed lab results that a different threshold should be used. If the screening results for the composite samples suggest elevated levels of dioxin, then three additional borings will be placed to the east of the borings from which the initial composite sample was obtained. If the screening results for the composite samples suggest that elevated levels of dioxin do not exist, then the samples will be analyzed according to fixed lab methods (USEPA Method 8290).

The results of the samples analyzed according to USEPA Method 8290 will be validated in accordance with the Region I Data Validation Functional Guidelines for Evaluating Environmental Analyses. The validated results will be evaluated with respect to the TEQ of 1.0 ppb. If the validated results are reported to be less than the TEQ of 1.0 ppb, then the eastern boundary will be defined. However, if the results of one or more samples suggest dioxin concentrations above the TEQ of 1.0 ppb, then additional sampling and analysis will be required.

Where required, the additional sampling and analysis may include a screening evaluation of the individual samples that comprise the composite sample reported to contain dioxin in excess of the TEQ of 1.0 ppb. This screening evaluation would be performed to assess which of the three locations are contributing to elevated levels of dioxin. If only one of the locations appears to be contributing to elevated levels of dioxin, then an additional boring will be placed to the east of this location. A sample would be obtained from this boring at the appropriate depth and would be analyzed according to fixed lab methods (USEPA Method 8290). Likewise, if only two of the three locations appear to be contributing to elevated levels of dioxin, then two additional borings will be placed to the east of these locations and samples would be obtained from the appropriate depth, and a composite of the two samples would be analyzed according to fixed lab methods (USEPA Method 8290). If all three locations appear to be contributing to elevated levels of dioxin, based on this screening analysis, then three additional borings will be placed to the east of the borings from which the initial composite sample was obtained. Samples would be obtained from these borings at the appropriate depth and a composite of the three samples would be analyzed according to fixed lab methods (USEPA Method 8290). If it is concluded that a screening evaluation of the individual samples not be performed, then three additional borings will be placed to the east of the borings from which the initial composite sample was obtained. A composite sample would be comprised of samples obtained from these three additional borings at the appropriate depth and would be analyzed according to fixed lab methods (USEPA Method 8290).

The location of the additional borings will be based on analytical data obtained to date, the existing slope of the land, any distinguishing soil characteristics, and any other information that is indicative of the extent of dioxin. Additional borings will be placed in this manner until the eastern boundary of dioxin is defined by fixed laboratory analytical results reported to be below the TEQ of 1.0 ppb, and supported by immuno-assay screening results that suggest that elevated levels of dioxin do not exist. The fixed laboratory analytical results will be used to define the final limits of any excavation prior to the commencement of any removal actions. This approach will avoid open excavations for a prolonged period of time and the risks associated therewith, and will provide the residents with relatively immediate information about and confirmation of the removal of any impacted soils from their properties.

2.3 Lymansville Pond

2.3.1 Institutional Boundaries

Properties adjacent to Lymansville Pond include properties used for commercial and industrial purposes. EPA has defined delineation boundaries based on the property limits of these non-

residential use properties. As shown in Drawings 3 and 4, institutional considerations identified by EPA exclude these properties from the sampling and removal activities to be performed under this NTCRA. Furthermore, the water table will be used to define the vertical boundary of delineation if elevated levels of dioxin extend to the depth at which the water table is encountered.

As shown in Drawing 4, institutional considerations defined by EPA will be used to establish the lateral limits of Action Area 12. Action Area 12 exists entirely on an industrial property and is defined by the limits of two small areas ("recreational areas") that provide access to Lymansville Pond for recreational purposes. The institutional considerations defined by EPA, and thus the limits to Action Areas 12, are represented by the limits of these recreational access areas. These limits, and thus the limits of Action Area 12, will be confirmed in the field and agreed upon by the EPA. After the limits are confirmed by EPA, it is proposed that very limited or no further delineation sampling be performed.

2.3.2 Sampling Locations

The approach to establishing the limits of dioxin in Action Areas 9, 10, and 11 is similar to that being used for defining the eastern boundary of dioxin in the area of Allendale Pond. This approach would establish the boundaries of each Action Area with the results of samples obtained from borings spaced 20-ft on center, along a specified boundary. The proposed sampling locations are illustrated in Drawings 3 and 4. The basis for spacing the borings 20-ft on center is supported by the limited distribution of dioxin relative to Allendale Pond. Greater spacing between samples would not provide the data needed to adequately characterize the relatively small Action Areas. In accordance with this approach, soil borings will be advanced to the water table. At each boring location, samples will be obtained from a depth of 0" to 12", 12" to 36", and for every two feet (or fraction thereof) extending to the water table.

2.3.3 Soil Sampling Methods

The samples will be obtained using either GeoProbe® direct-push sampling techniques or manual sampling techniques using stainless steel bucket-augers, macro-cores, or trowels. Each sample will be logged to document a general description of the soil in accordance with LEA's standard operating procedure for soil sampling. During the logging process, each soil sample will be examined with respect to the findings of the historic document review so that any relevant characteristics may be identified and used to guide delineation efforts.

2.3.4 Sample Designation

Each sample that is collected will be assigned a unique sample location tracking number. The sample location identifiers will consist of an alphanumeric code that identifies the action area, the type of sample (delineation), and the sequential sample number. As provided by this sampling nomenclature, the delineation samples to be obtained to assess the extent of dioxin in Action Area 9 will be identified as locations 09-DEL-35 through 09-DEL-46. Using this same sampling nomenclature, delineation samples to be obtained to assess the extent of dioxin in action areas 10 and 11 will be similarly identified.

2.3.5 Composite Soil Samples

Based on elevation, horizon-specific samples obtained from these borings would be used to provide a composite sample over 60 linear feet of investigation. In preparing the composite samples, the individual soil samples will be thoroughly mixed and homogenized and transferred to the appropriate sample containers. Once homogenized, an equal volume of soil will be taken from each sample container to provide composite samples. The location tracking numbers of the samples that comprise each composite sample will be recorded in the field paperwork. The individual soil samples used to prepare the composite samples will be held for possible future analysis.

2.3.6 Sample Analysis and Evaluation

The composite samples will be screened using immunoassay analytical techniques. The screening results will be evaluated relative to the appropriate threshold. If the screening results for the composite samples suggest elevated levels of dioxin, then three additional borings will be placed to the east of the borings from which the initial composite sample was obtained. If the screening results for the composite samples suggest that elevated levels of dioxin do not exist, then the samples will be analyzed according to fixed lab methods (USEPA Method 8290).

The laboratory analytical results will be validated in accordance with the Region I Data Validation Functional Guidelines for Evaluating Environmental Analyses. The validated results will be evaluated relative to the TEQ of 1.0 ppb. If the validated results are reported to be less than the TEQ of 1.0 ppb, then the boundary will be defined. However, if the results for one or more samples suggest dioxin concentrations above the TEQ of 1.0 ppb, then additional sampling and analysis will be required.

Where required, the additional sampling and analysis may include a screening evaluation of the individual samples that comprise the composite sample reported to contain dioxin in excess of

the TEQ of 1.0 ppb. This screening evaluation would be performed to assess which of the three locations are contributing to elevated levels of dioxin. As appropriate, additional borings will be placed to the "east" of the borings from which the initial composite sample was obtained. Samples would be obtained from these borings at the appropriate depth and the corresponding composite samples would be analyzed according to fixed lab methods (USEPA Method 8290). If a screening evaluation of the individual samples is not performed, then three additional borings will be placed to the "east" of the borings from which the initial composite sample was obtained. A composite sample would be comprised of samples obtained from these three additional borings at the appropriate depth and would be analyzed according to fixed lab methods (USEPA Method 8290).

The location of the additional borings will be based on a review of existing analytical data, immunoassay screening results, flood inundation maps, historic documents, the existing slope of the land, any distinguishing soil characteristics, and any other information that is indicative of the extent of dioxin. The additional samples will be obtained from three additional borings placed away from the borings from which the initial sample was obtained. Additional borings will be placed in this manner until the limits of dioxin are defined by fixed laboratory analytical results (USEPA 8290) reported to be below the TEQ of 1.0 ppb, and supported by immuno-assay screening results that suggest that elevated levels of dioxin do not exist. The approach to delineate Action Areas 9, 10, and 11 is similar to the approach to delineate the eastern boundary of Allendale Pond, in that the analytical results of the composite samples will be used to define the final limits of any excavation prior to any removal activities, thereby eliminating the need for post-excavation samples.