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**POST REMOVAL SITE CONTROL PLAN
Centredale Manor Restoration Project Superfund Site
North Providence, Rhode Island**

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Prepared for

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1. INTRODUCTION

1.1 Terms of Reference

This document is the Post-Removal Site Control Plan (Plan) for the Centredale Manor Restoration Project Superfund Site located in North Providence, Rhode Island (Site). This document was prepared in accordance with the Non-Time Critical Removal Action (NTCRA) Statement of Work (SOW) provided as Appendix A to, and incorporated in, the Second Administrative Order for Removal Action (U.S. EPA New England Docket No. CERCLA-1-2001-0032) issued by the United States Environmental Protection Agency (EPA). This Plan was prepared by Loureiro Engineering Associates, Inc. as part of its scope of work for the Implementation Phase of the NTCRA.

1.2 Background

Elevated levels of dioxin exist in the residential use soil and sediment in and around Allendale Pond, Lymanville Pond, and the reach of the Woonasquatucket River that flows between the two ponds. The contaminant-of-concern is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) as identified in the Action Memorandum for the NTCRA dated 18 January 2001. The objectives of the NTCRA as identified in the Action Memorandum are to prevent the migration of TCDD contaminated sediment to downstream areas, and to eliminate or reduce the risk of human exposure to residential-use soil and flood plain sediment containing concentrations of TCDD in excess of 1.0 part per billion (ppb). According to the Implementation Work Plan for the Site, these objectives are to be achieved through the reconstruction of the failed Allendale Dam, and through the removal of residential-use soil and flood plain sediment containing greater than 1 ppb, except for sediment that will be covered with a minimum of one foot of water at the completion of the reconstructed Allendale Dam.

1.3 Plan Objectives

Paragraph A.5 of the Implementation Phase of the NTCRA SOW stipulates that a plan shall be submitted to address specific post-removal site control provisions. In general, these provisions include provisions for inspection, continued maintenance, and repair of Allendale Dam. These provisions also include provisions for submitting necessary status reports. The objectives presented in this Plan address these provisions. Specifically, the objectives of this document are to provide an inspection and maintenance plan for the proper function of Allendale Dam, as well as a plan for fulfilling documentation and reporting requirements.



1.4 **Related Institutional Controls**

A negative easement and covenants restricting alteration of the dam in any way, until such time as the dam is no longer considered by EPA to be necessary for meeting the response action objectives at the Site, will be placed on the dam property to ensure the functional integrity of the restored Allendale Dam and to ensure the protectiveness of all of the response measures performed pursuant to the NTCRA SOW.



2. ROUTINE MAINTENANCE AND INSPECTION

2.1 Overview

Allendale Dam, State of Rhode Island Dam ID Number 133, has been assigned a “Low Hazard Dam” classification by the State of Rhode Island. To ensure the proper operation of Allendale Dam, a program involving periodic inspections and routine maintenance has been developed that complies with the State of Rhode Island’s current dam law (Title 46-19 “Inspection of Dams and Reservoirs”) and the proposed changes and amendments to this law provided in the January 2001 Final Report of the Governor’s Task Force on Dam Safety and Maintenance. As presented in this Plan, periodic inspections will be performed to ensure proper and safe operation of Allendale Dam. A registered professional civil engineer with a dam safety inspection background shall conduct all periodic inspections of Allendale Dam. Routine maintenance shall be performed to ensure that the functioning part of Allendale Dam, the sluice gate, is properly maintained. The maintenance and inspection program is described in more detail in the following sections.

2.2 Quarterly Maintenance

At least once every three months, the sluice gate should be exercised. Exercising the gate consists of opening the gate completely and then closing the gate completely. Due to the duration required to manually open and close the gate, the stop logs must remain in place prior to exercising the gate. As may be necessary, the stop logs may be removed from the gate structure once the gate is opened to inspect and address conditions of the dam or other conditions at the Site.

2.3 Semi-Annual Inspection and Maintenance

For the first year following post-removal activities, a qualified engineer shall inspect the general condition of the dam at a frequency of once every six months. After the first year following the completion of removal activities, this frequency may be reduced to once per year or less (but no less frequent than once per every five years) based on observations made during the initial inspections. The general condition of the dam shall also be inspected subsequent to significant flood events. For the purpose of this Plan, a significant flood event shall mean the discharge through the gauging station located immediately upstream of the site that corresponds to a flood that occurs every five years or more. Upon such an event, an inspection of the dam will be performed. Based on the findings of the inspection, a significant flood event (for the purpose of this Plan) may be re-defined to mean a flood that occurs more or less frequently than every five years, as is appropriate to ensure the safe and proper operation of the dam.



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The inspections shall consist of observing the flow of water over the dam and documenting conditions that may affect the proper operation and safety of Allendale Dam. To ensure that every part of the Dam will be observed, the following sequence of steps shall be performed:

- Abutments -- Traverse abutments in a practical manner so as to gain a general feel for the conditions that exist along the embankments. Walk the entire length of the embankment-abutment contacts.
- Outlet Conduit -- Observe all accessible features of the outlet conduit (gate structure and sluice gate).
- Spillway -- Observe all accessible features of the spillway, including areas that are typically under water (including the spillway and upstream face of the embankment and gate structure once the gate has been raised completely allowing all of the water between the gate and the stop logs to drain).
- Downstream Channel -- Observe the downstream channel between the toe of the dam and the bridge immediately downstream of the dam.
- Reservoir Slopes -- Observe the abutments and reservoir slopes immediately adjacent thereto to assess any changes that have occurred that may affect the safety of the dam.

The Dam shall be inspected for conditions that may affect the integrity of the Dam. Such conditions may include, but are not limited to, the following:

- Settlement
- Structural Cracking
- Erosion
- Sinkholes
- Animal Burrows
- Depressions
- Seeps
- Excessive Vegetation



- Turbid Discharge
- Foundation Movement
- Vandalism

The Dam shall also be inspected for any other items that the engineer determines are necessary to document the condition of Allendale Dam, including an inspection to identify the accumulation of any debris, or the presence of any obstructions, or other deleterious conditions along the upstream face of the dam.

In addition, the gate shall be inspected for signs of corrosion or damage. This inspection should be performed once the gate has been raised completely allowing all of the water between the gate and the stop logs to drain. Visual inspection of both sides of the gate shall be performed. In addition to the visual inspection, the operating stem shall be cleaned and greased.

2.4 Annual Inspection and Maintenance

At least once every 12 months, the floor stand operator shall be inspected and greased. The grease should consist of heavy-duty grease that will not harden in cold weather nor become liquid in warm weather. The manufacturer recommends the product "Mobilgrease Special" for this application.



3. POTENTIAL OPERATIONAL PROBLEMS

Potential operational problems associated with Allendale Dam are primarily limited to the potential problems arising from the function of the sluice gate. Specifically, components of the sluice gate may become damaged during the course of routine operation and maintenance. At the time that the sluice gate is inspected and exercised, care shall be taken to prevent damage to the gate, including distortion of the frame. In the event that excessive leakage is observed, inspection of the bottom, side, and top seals of the gate disk shall be performed to free any debris or to realign the seals. Seal alignment may require assistance from a representative or service technician of the Rodney Hunt Company. The Rodney Hunt Company may be contacted at (978) 544-2511. In the event that exercising the gate requires excessive effort, the grease on the operating stem may have dried or been removed, or excessive dirt and grit may exist on the threads. The operating stem shall be cleaned and greased immediately upon the identification that operation of the gate becomes difficult.



4. REPAIR

4.1 General Maintenance and Ordinary Repairs to the Dam

General maintenance and ordinary repairs that are required to ensure the safe and proper operation of Allendale Dam may include, but are not limited to, the following:

- re-establish a grass cover on all bare earthen areas that were seeded as part of the dam restoration activities;
- mow the grass at least twice per year or as may be necessary to ensure the safe and proper operation of the dam;
- removal of brush or weeds, or cutting of trees, from the embankment, including the removal of small stumps, provided that no deep excavation into the embankment occurs;
- removal of debris, obstructions, or other deleterious materials that may have accumulated along the upstream face of the dam or upstream of the stop logs and sluice gate structure;
- placement of additional riprap and bedding along the embankment, in areas that have sustained minor damage. This would involve restoring the original riprap protection where the damage has not yet resulted in weakening of the dam; and
- repair of erosion gullies or minor rodent damage along the embankment, and surface grading of the embankment to ensure proper drainage.

4.2 Repairs to the Sluice Gate

A representative or service technician approved by the Rodney Hunt Company shall perform all repairs to the sluice gate. Repair services can be requested by calling the Rodney Hunt Company at (978) 544-2511. The Field Service Department should be requested to arrange any repair work.



5. OPERATION AND INSPECTION SAFETY

A hazards assessment of the gate structure surrounding the manual operator and the stop logs shall be performed prior to exercising the sluice gate. This assessment shall include an assessment of the physical hazards that may be encountered during the inspection and maintenance of the sluice gate. In particular, the inspector should be cognizant of the potential slip hazards associated with the presence of water, snow, or ice. The inspector shall take all necessary precautions while working on the gate structure and while inspecting the gate within the structure. The inspector shall also ensure that all of the stop logs are securely in place prior to exercising the sluice gate. The inspection and maintenance of the sluice gate should be performed as expeditiously as possible.



6. FIELD DOCUMENTATION, REPORTING, AND RECORD KEEPING

6.1 Field Documentation

Each inspection shall be documented using an inspection report form. An example of inspection and maintenance report forms are provided in Appendix A. Digital photographs shall also be used to document each inspection. Inspection photographs may be vitally important. Over time, photographs may serve to provide a pictorial history of the evolving characteristics of Allendale Dam. Photographs may be used to demonstrate that some observed conditions have existed for some time and may have reached a state of equilibrium. With this knowledge, quick and economical remedies can be developed and implemented.

6.2 Reporting

An annual report shall be prepared and submitted to the USEPA and the Rhode Island Department of Environmental Management. The report shall document the inspections, maintenance, and any repairs performed on Allendale Dam. The report should contain an assessment of the conditions of the dam and Allendale Pond based on the visual observations. The report should also include a description of any deficient or unsafe conditions that have been identified. Recommendations, including schedules, for additional studies, investigation, or analyses should be included in the report. Recommendations for corrective measures relating to design, construction, operation, observed conditions, maintenance, or inspection of the Dam should also be included in the annual report. The report shall include a copy of all inspection forms, as well as data and information on the operation and maintenance of the sluice gate structure. A record of the photodocumentation of Allendale Dam should also be submitted with the annual report.

6.3 Record Keeping

The owner shall maintain the records of all inspections, including the records of any actions taken to correct conditions found during periodic inspections. All records shall be maintained for a period of time defined by the requirements of the NTCRA.



7. SCHEDULE

Section VI.A.5 of the NTCRA SOW attached as Appendix A to, and incorporated in, the Second Administrative Order for Removal Action (U.S. EPA New England Docket No. CERCLA-1-2001-0032) provides for implementation of all post-removal site controls in accordance with the terms and schedules set forth in this Plan, as approved by EPA commencing within ten days of receipt of EPA's approval of the respondents' Completion of Work Report.



8. ANNUAL OPERATION AND MAINTENANCE BUDGET

Because Allendale Dam is primarily constructed of concrete and steel, and because vegetation along the embankments is already well established, annual operation and maintenance costs should not include significant costs for materials to repair the Dam. However, it is expected that some funds may be required for materials so that minor repairs to the Dam such as repairs to embankment erosion can be made. Annual operating costs will also include material costs for materials and supplies to maintain the proper operation of the sluice gate. The greater part of the annual operating costs will include the costs associated with the periodic inspection and maintenance of Allendale Dam. The annual operation and maintenance budget for the post-removal site controls implemented in accordance with this Plan is estimated to be \$18,000.



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**APPENDIX A
INSPECTION AND MAINTENANCE REPORT FORMS**

INSPECTION REPORT ALLENDALE DAM
North Providence, Rhode Island

GENERAL INFORMATION			
Inspection Date:			
Inspection Engineer:			
Weather:			
INSPECTION	Inspected (Yes/No)	Maintenance Required (Yes/No)	Comments
A. Allendale Dam Components			
Erosion/Rills/Gullies			
Sinkholes/Depressions			
Slope Protection/Riprap Failure			
Animal Burrows			
Unauthorized Plantings			
Vegetation/Ground Cover Adequate			
Seeps/Seepage			
Spillway/Stop Logs/Sluice Gate Clear of Debris			
Spillway/Sluice Gate Discharge Turbid			
Cracking/Bulging/Sliding of Dam			
Settlement			
Vandalism			
Other (specify):			
B. Allendale Pond Components			
Shoreline Erosion			
Changes in Land-Use Practices*			
New Construction Downstream*			
<p><small>*Review hazard classification every five years. Reconnoiter the perimeter of Allendale Pond in an effort to maintain an overall familiarity with its conditions as well as the land-use practices on adjoining properties that may affect these conditions; walk the entire length of the downstream toe and channel and follow the route of the Woonasquatucket River below the Dam to maintain familiarity with property that may be affected by dam failure.</small></p>			

**MAINTENANCE REPORT ALLENDALE DAM
North Providence, Rhode Island**

GENERAL INFORMATION			
Inspection/Maintenance Date:			
Inspection Engineer:			
Weather:			
Maintenance	Frequency Required	Maintenance Performed (Yes/No)	Comments
Sluice Gate			
Exercise (Open/Close) Gate	Quarterly		
Corrosion Control	Semi-Annually		
Clean & Grease Operating Stem	Semi-Annually		
Inspect/Grease Floor Stand Operator	Annually		
Inspect Gate Disk Seals*	As is Needed		
<p>* In the event that excessive leakage is observed, inspection of the bottom, side, and top seals of the gate disk shall be performed to free any debris or to realign the seals. Seal alignment may require assistance from a representative or service technician of the Rodney Hunt Company. The Rodney Hunt Company may be contacted at (978) 544-2511. A representative or service technician approved by the Rodney Hunt Company shall perform all repairs to the sluice gate.</p>			