ABB

May 30, 1997
Docket No. 70-36
License No. SNM-33

Mr. Michael Weber, Chief
Licensing Branch
Division of Fuel Cycle Safety and Safeguards, NMSS
Office of Nuclear Materials Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: **Decommissioning of Former Evaporation Ponds**

References: (A) CE (R. Sharkey) letter to NRC (R. Pierson), dated October 26,1994
(B) CE (M. Michelsen) letter to NRC (R. Pierson), dated March 10, 1995
(C) NRC (R. Pierson) License SNM-33 Amendment 4 to CE (R. Sharkey), dated May 4, 1995

Dear Mr. Weber:

Enclosure 1 provides for your approval an updated Decommissioning Plan for the two former Evaporation Ponds.

In accordance with the Decommissioning Plan by submitted by Combustion Engineering (CE) [Ref. A as amended Ref. (B)] and approved by the NRC [Ref. (C)], CE has completed preremediation characterization and has updated the decommissioning plan. The characterization indicated that remediation beyond that limited to hot spots is required. Therefore, the solubility study was postponed because the removal of a significant portion of surface material will impact the results of a solubility study in a non-conservative manner.

As part of the update a new schedule has been proposed. The schedule originally proposed was developed under the assumption that little remediation would be necessary. With the additional remediation, work was delayed while staff efforts focused on Safety Condition S-2, beta activity in burial well #4, and investigation into former 20.304 burial pits.

If there are questions regarding this matter, please feel free to contact Dr. Earl Saito of my staff at (314) 937-4691 Ext. 461 or myself at (314)937-4691 Ext. 399.

Cordially,

COMBUSTION ENGINEERING, INC.

Robert W. Sharkey
Director, Regulatory Affairs

cc:Tim Ridinger Region III
RA97/583
Enclosures: As stated

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This document provides supplemental information to the "Hematite Evaporation Ponds Decommissioning Plan" submitted to the NRC on October 26, 1994. In particular, this document supersedes Section 2.1 and Chapter 4 of the original submittal. In addition, Chapter 7 provides characterization details of the retention ponds, and Chapter 8 provides details of decommissioning activities.

2.1 Decommissioning Objectives, Activities, Tasks and Schedules

2.1.1 Objective

The purpose of the decommissioning effort for the former evaporation ponds is to characterize residual uranium from previous decontamination efforts, remediate by removing the contamination to an acceptable level, and then demonstrate through the final status survey that the radiological conditions of the ponds satisfy NRC approved guidelines. The acceptable level will be based on the solubility of the residual uranium. Near surface material that will be removed as part of this effort is most likely insoluble uranium while material at depth is most likely soluble. Therefore, solubility measurements will not be made until remediation is performed to determine the actual condition of the soil that will be left. Analysis indicate that Resource Conservation and Recovery Act (RCRA) contaminants are not above regulatory limits. The specific objectives of the final status survey are to show that:

1) Average radionuclide concentrations are within the authorized values, i.e., 250 pCi/g for insoluble uranium and 100 pCi/g for soluble uranium using sum of the fractions when both soluble and insoluble uranium are present.

2) Reasonable efforts have been made to identify and remove hotspots that may exceed the average guideline by greater than a factor of $(100/A)^{1/2}$, where A is the area of the hot spot.

3) Exposure rates do not exceed 5 μR/h above background at 1 m above the surface. Exposure rates may be averaged over 100 m^2 grid areas. Maximum exposure rates over any discrete area of <100 m^2 may not exceed 10 μR/h above background.

2.1.2 Decommissioning Activities and Schedules

Table 2.1 provides an overview of the major activities and tasks associated with this decommissioning project. Table 2.2 provides the proposed schedule for the project, including major milestones.

Depending on uranium concentration, water pumped from the pond will be discharged to the site creek, evaporated, or used for dust suppression in the controlled area of the plant. The limit on the concentration of uranium discharged will be 3×10^{-7} μCi/ml as measured at the confluence of the site creek and Joachim Creek (site boundary) or upon application when used for dust suppression. Measurements taken at closer locations may also be used to demonstrate compliance with this limit when discharging to the site creek.

2.1.3 Safety Evaluation

The activities and tasks of this limited scope decommissioning project of the former evaporation ponds are simple and not hazardous to the workers, environment or public. There have been no operational occurrences that could adversely affect decommissioning safety. The current assessment of residual radioactive contamination of the ponds is such the workers will not be exposed to significant radioactivity or radiation from the project. Other than common industrial safety concerns, there is no foreseen potential for accidents that could have a significant impact on decommissioning safety. The decommissioning project can therefore be conducted in a safe manner.

2.1.4 Procedures

As stated in Section 3.,3, decommissioning activities and tasks will be performed in accordance with approved written procedures. The control system concerning procedures is described in Section 2.6 of SNM-33.

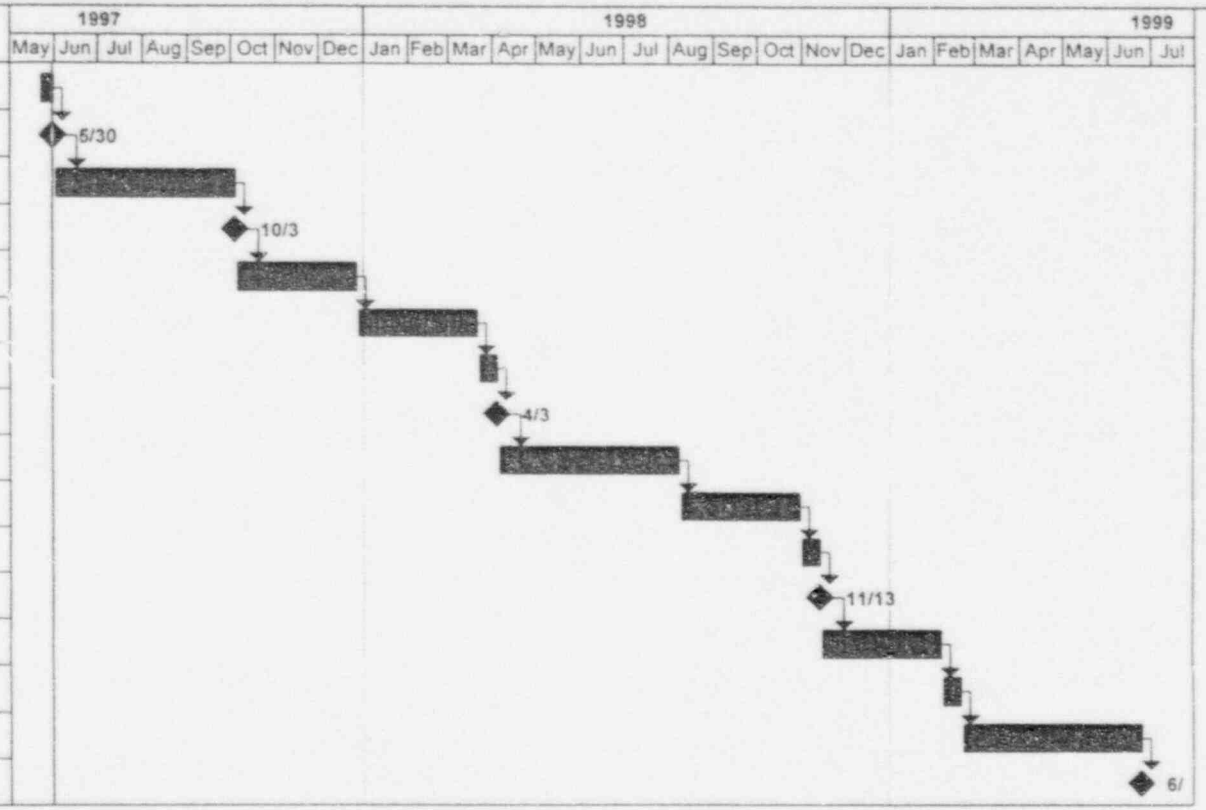
Table 2.1

Overview of Major Activities and Tasks

Activities	Tasks
Evaluate Contamination Potential	1. Review history -done 2. Prepare decommission work plan- done 3. Collect random soil and water sample for RCRA analysis -done 4. Radiological Characterize -done
Characterize Background Levels	1. Measure outdoor background exposure rates 2. Collect background soil sample -done
Perform Remediation	1. Secondary Pond a. Drain pond b. Remove berm c. Scan and remediate hot spots d. Establish solubility and perform additional remediation if necessary 2. Primary Pond a. Drain pond b. Remove berm c. Scan and remediate hot spots d. Establish solubility and perform additional remediation if necessary
Establish Grid Reference System	1. Install grids 2. Prepare survey maps
Collect Samples	1. Collect samples
Analyze Samples	1. Analyze samples
Interpret Data	1. Convert data to standard units 2. Calculate average levels 3. Compare data with criteria 4. Compute total residual activity inventory
Prepare Final Status Survey Report	1. Construct data tables 2. Develop graphics 3. Prepare text 4. Submit report to NRC

Decommissioning Schedule

ID	Task Name
1	Update Decommissioning Plan
2	Submit Updated Decommissioning Plan to NRC
3	NRC Review Updated Plan
4	NRC Concur with Updated Plan
5	Remediate Secondary Pond
6	Final Status Survey Secondary Pond
7	Back fill Secondary Pond
8	Complete Secondary Pond Remediation
9	Remediate Primary Pond
10	Final Status Survey Primary Pond
11	Back fill Primary Pond
12	Complete Primary Pond Remediation
13	Final Status Survey of Area With in Pond Fence
14	Apply Cover Material
15	Prepare Final Status Survey Report
16	Submit Final Status Survey Report to NRC



Project:
Date: Fri 5/30/97

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress

4.0 Planned Final Radiation Survey

Upon completion of the decontamination activities described in this plan, areas within the scope of the project will be surveyed to determine if they meet the objectives as specified in Section 2.1.1.

4.1 Final Status Survey Instrumentation

Due to the short range of alpha and beta particles, which comprise the majority of radiation emitted by low enriched uranium, scanning for uranium contamination has limited value. However, the area will be scanned using Geiger-Muelier, Scintillation and/or gas proportional detectors. Instructions regarding instrument selection, calibration, use, and control will be included in final status survey procedures.

4.2 Methodology for Ensuring Adequate Survey Coverage

The Final Status Survey will be designed to ensure that data generated are statistically meaningful. The methodology will follow the guidelines set out in NUREG/CR-5849. In particular, surface samples, first six inches, will be collected within the pond areas following the triangular sampling pattern specified in Figure 4-5 of NUREG/CR-5849. Surface samples will be collected following the "standard sample pattern" specified in Figure 4-4 of NUREG/CR-5849 for areas outside the ponds but inside the pond fence. Preliminary characterization indicated increased activity at shallow depths. Therefore, within the pond area samples will be collected at depths of 6-12" and 12-18" following the "standard sampling pattern" specified in Figure 4-4 of NUREG/CR-5849.

4.3 Analysis of Soil Samples

Soil samples will be analyzed for uranium by any (or combination) of the following methodologies.

4.3.1 Kinetic Phosphorescence Analysis

4.3.2 Gross Alpha Analysis

4.3.3 Gamma Spectroscopy

4.3.4 Alpha Spectroscopy

4.3.5 Direct soil counting by using a gas flow proportional counter or an alpha scintillator coupled to a photomultiplier.

4.3.6 In-situ gamma spectroscopy

4.4 Background Radiation and Radioactivity

Previous analyses have shown soil in the general vicinity of the Hematite plant to have approximately 2-3 pCi/g total uranium background activity. The background exposure rate is approximately 5 μR/h. Background will be checked at a neutral site prior to and after direct dose measurements.

7.0 Site Characterization

The ponds have been characterized using a combination of historical data, current sampling and knowledge of historic utilization. Previous efforts to decontaminate the ponds removed uranium from the pond but left the berms in place. As a consequence of these actions, rain events would wash contamination from the berms back into the ponds. The ponds berms were made of contaminated scrubber rock from the UF_6 conversion process. Therefore, areas above the remediation goal exist at the bottom of the primary pond, the west side of the secondary pond and along the berms. Contamination also exists at depth along the pipe line from the plant to the ponds. This contamination at depth is most likely to be a soluble form of uranium.

7.1 Primary Pond

The primary pond is roughly elliptical in shape with a major axis of 50 feet and a minor axis of approximately 30 feet. The sides slopes smoothly to a depth of approximately 10 feet at the center. Historic data indicate that contamination washed to the bottom of the pond with contamination levels of approximately 1,000 pCi/g, Figure 7-1. Recent characterization also indicates that the berm surrounding the pond is contaminated in excess of the remediation goals. In addition, contamination has been found at depth in the area where the pipe from the plant entered the pond, Figure 7-2.

7.2 Secondary Pond

The secondary pond is roughly rectangular with a length of approximately 100 feet and a width of approximately 30 feet. The majority of the pond is less than 200 pCi/g with the exception of the west side of the pond, Figure 7-3. As with the primary pond, the berms are also contaminated above the remediation goals, Figure 7-4.

7.3 Areas Outside the ponds and inside the pond fence

Only low levels of contamination were found in the area outside of the pond and inside the pond fence.

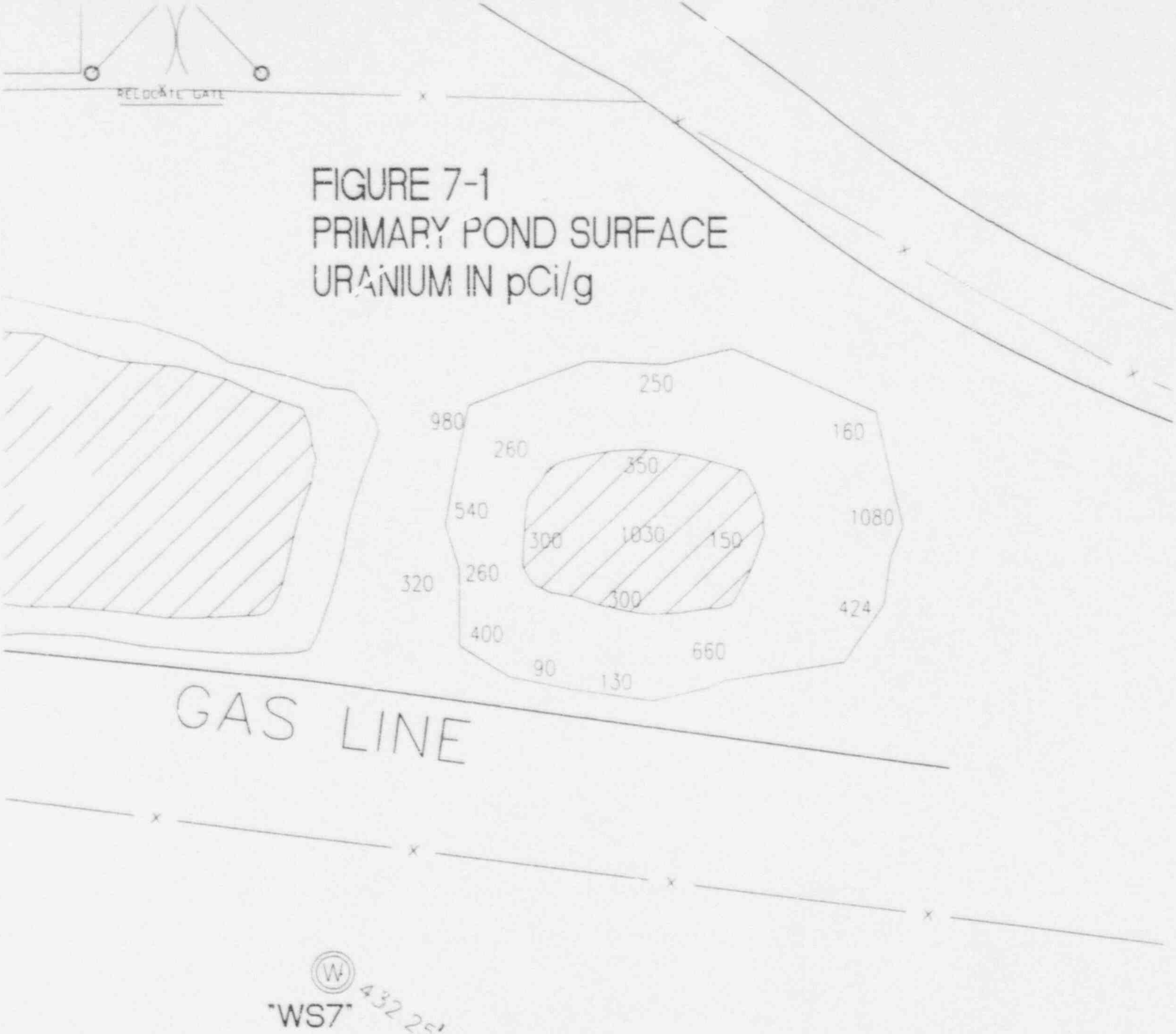


FIGURE 7-1
PRIMARY POND SURFACE
URANIUM IN pCi/g

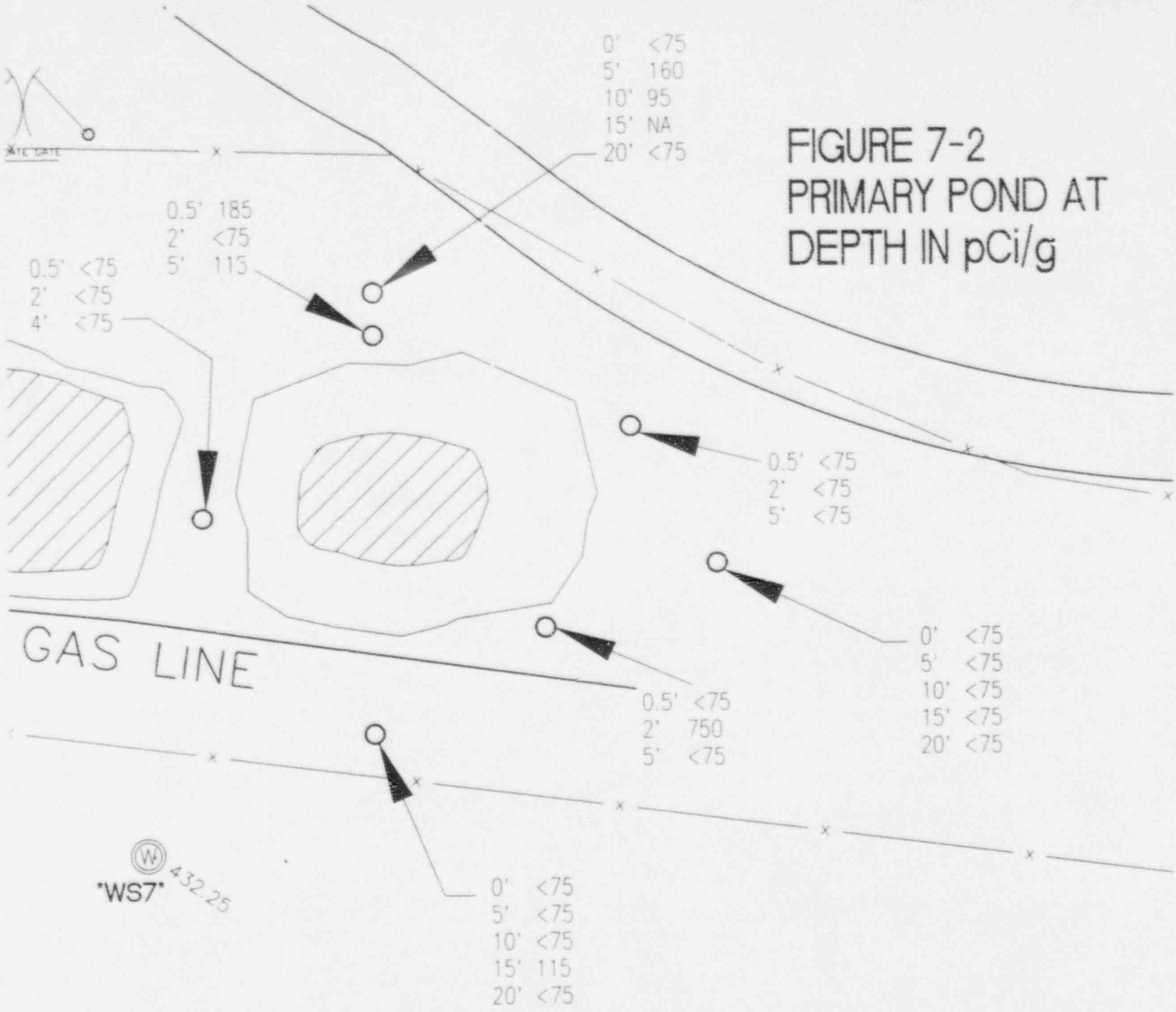


FIGURE 7-2
PRIMARY POND AT
DEPTH IN pCi/g
0' <75
5' 160
10' 95
15' NA
20' <75
0.5' 185
2' <75
5' 115
0.5' <75
2' <75
4' <75
0.5' <75
2' <75
5' <75
0' <75
5' <75
10' <75
15' <75
20' <75
GAS LINE
0.5' <75
2' 750
5' <75
0' <75
5' <75
10' <75
15' 115
20' <75
"WS7"
432.25

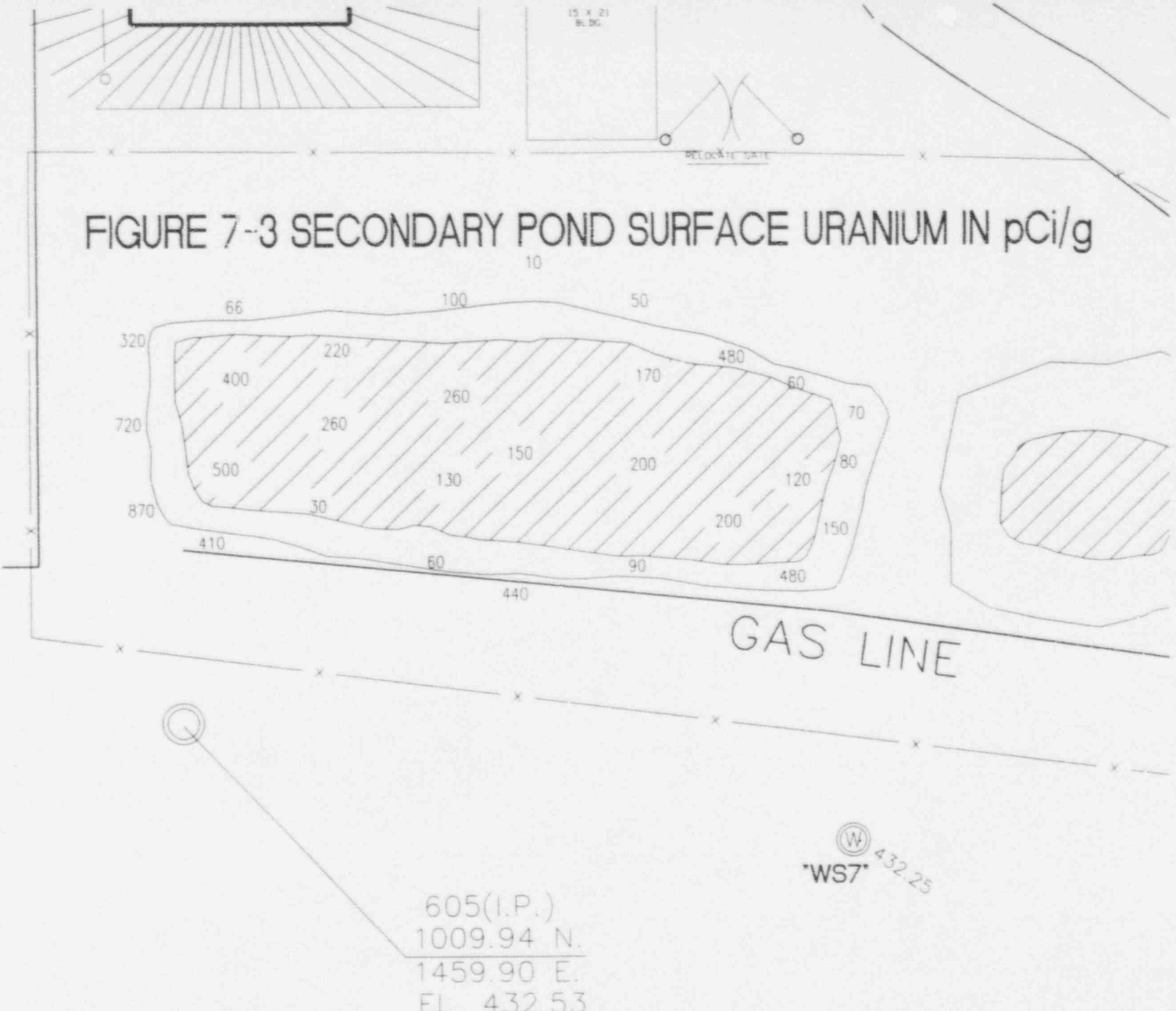


FIGURE 7-3 SECONDARY POND SURFACE URANIUM IN pCi/g

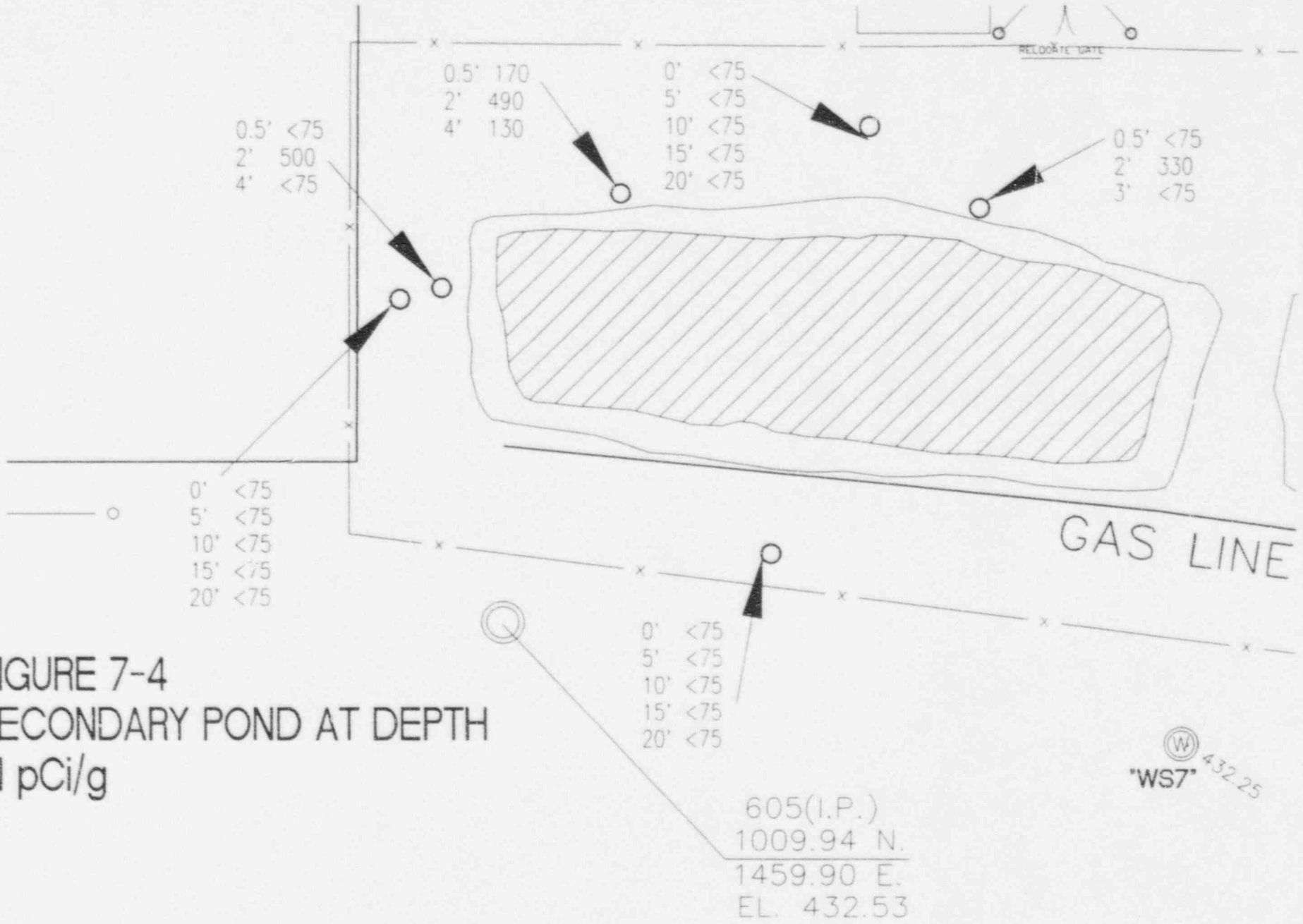


FIGURE 7-4
SECONDARY POND AT DEPTH
IN pCi/g

8.0 Remediation Plan

The secondary pond will be the first to be remediated and surveyed. After the secondary pond is completed, the primary pond will be remediated and surveyed.

8.1 Secondary Pond

To dry the secondary pond, water from the secondary pond will be pumped to the site creek, the primary pond, evaporated, or a hold tank to be used for dust suppression. The berm will be removed, and to the extent practicable the scrubber rock will be separated. The scrubber rock will be disposed as low level waste and the soil will be sampled. If the soil is above 200 pCi/g it will be disposed of as low level radioactive waste. Soil under 200 pCi/g will be returned to the berm area. A "walk over" survey will be performed to identify areas of increased beta/gamma activity. These areas will be evaluated to determine if remediation is needed. Areas found to have contamination above 250 pCI/g will be remediated.

Once all remediation activities are complete, a triangular grid as specified in Section 4.3 will be set up and samples collected. The results will be compared to the remediation levels specified in Section 2.1. If additional remediation is necessary it will be performed. When the remediation levels have been achieved, the pond will be back filled.

8.2 Primary Pond

To dry the primary pond, water from the primary pond will be pumped to the site creek, evaporated, or a hold tank to be used for dust suppression. The berm will be removed and to the extent practicable the scrubber rock will be separated. The scrubber rock will be disposed of as low level waste and the soil will be sampled. If the soil is above 200 pCi/g it will be disposed of as low level radioactive waste. Soil under 200 pCi/g will be returned to the berm area. The pipe which fed the pond will be removed back to the pond fence and capped. Soil in the near vicinity of the pipe will be remediated to a level of 100 pCi/g. A "walk over" survey will be performed to identify areas of increased beta/gamma activity. These areas will be evaluated to determine if remediation is needed. Areas found to have contamination above the 250 pCi/g will be remediated.

Once all remediation activities are complete, a triangular grid as specified in Section 4.3 will be set up and samples collected. The results will be compared to the remediation levels specified in Section 2.1. If additional remediation is necessary it will be performed. When the remediation levels have been achieved, the pond will be back filled.

8.3 Areas Outside of the pond and inside the pond fence

A "walk over" survey will be performed to identify areas of increased beta/gamma activity. These areas will be evaluated to determine if remediation is needed. A grid as specified in section 4.3 will be set up and samples collected. The results will be compared to the remediation levels specified in Section 2.1. If additional remediation is necessary it will be performed. When the remediation levels have been achieved, the area will be covered such that any area with average uranium levels above 30 pCi/g is covered by at least 4 feet of fill.