DISPOSAL PLAN FOR WATER AND SEDIMENT FROM EMERGENCY HOLDING TANKS MANZANO WEAPONS STORAGE AREA

1.0 INTRODUCTION

Five underground emergency holding tanks, RW-04 (RB-04), RW-05 (RB-05), RW-17 (RB-06), RW-19 (RB-08), and RW-23 (RB-09) in the Manzano Weapons Storage Area (MWSA) at Kirtland Air Force Base (AFB), will be removed as part of the U.S. Air Force Installation Restoration Program (Figures 1 and 2). Collectively, these tanks are identified as SWMU 6A-2. Prior to removal, four of the tanks must be drained. This attachment to the Work Plan has been prepared to outline the procedures to be followed for disposal of the tank contents.

2.0 DISPOSAL OF TANK CONTENTS

Table 1 outlines the radiological constituents in the liquid contained within the tanks. The volatile organic compounds, metals, and radiological constituents found in the water and sediment contained in the tanks are presented in Table 2. This information was developed from the analytical results and physical measurements of tank contents. It is estimated that approximately 20,695 gallons of water is in the tanks. Once the tanks have been removed, they will be decontaminated with a triple-rinse process that will generate an additional 1,400 gallons of water. The 22,095 gallons of water generated from tank evacuation and decontamination will be disposed of by evaporation in a lined evaporation pond as described in the following sections. The New Mexico Environment Department and Kirtland AFB have approved this disposal process.

2.1 Preparation of Evaporation Pond

Approximately 2,940 cubic feet of storage capacity will be required for the evaporation of the 22,095 gallons of water. Two concrete-bermed sludge drying beds are located at the abandoned Manzano Sewage Treatment Plant, a secured, fenced facility that will be used for the evaporation ponds (Figure 1). These drying beds are 40 ft x 20 ft x 3 ft, with a total holding capacity of 4,800 cu ft/35,904 gallons (Figure 2). The drying beds are bermed on all four sides with 6-in. concrete and have a soil bottom; native vegetation is currently present in the bottom of the drying beds. This vegetation and any debris or rubble will be removed prior to preparing the beds for use as evaporation ponds.

The drying beds will be prepared as evaporation ponds and will be lined with a 40-mil, high-density polyethylene liner. The liner will be approximately 60 ft x 65 ft to completely cover the two drying beds and to drape over all four sides so it can be secured with stakes.

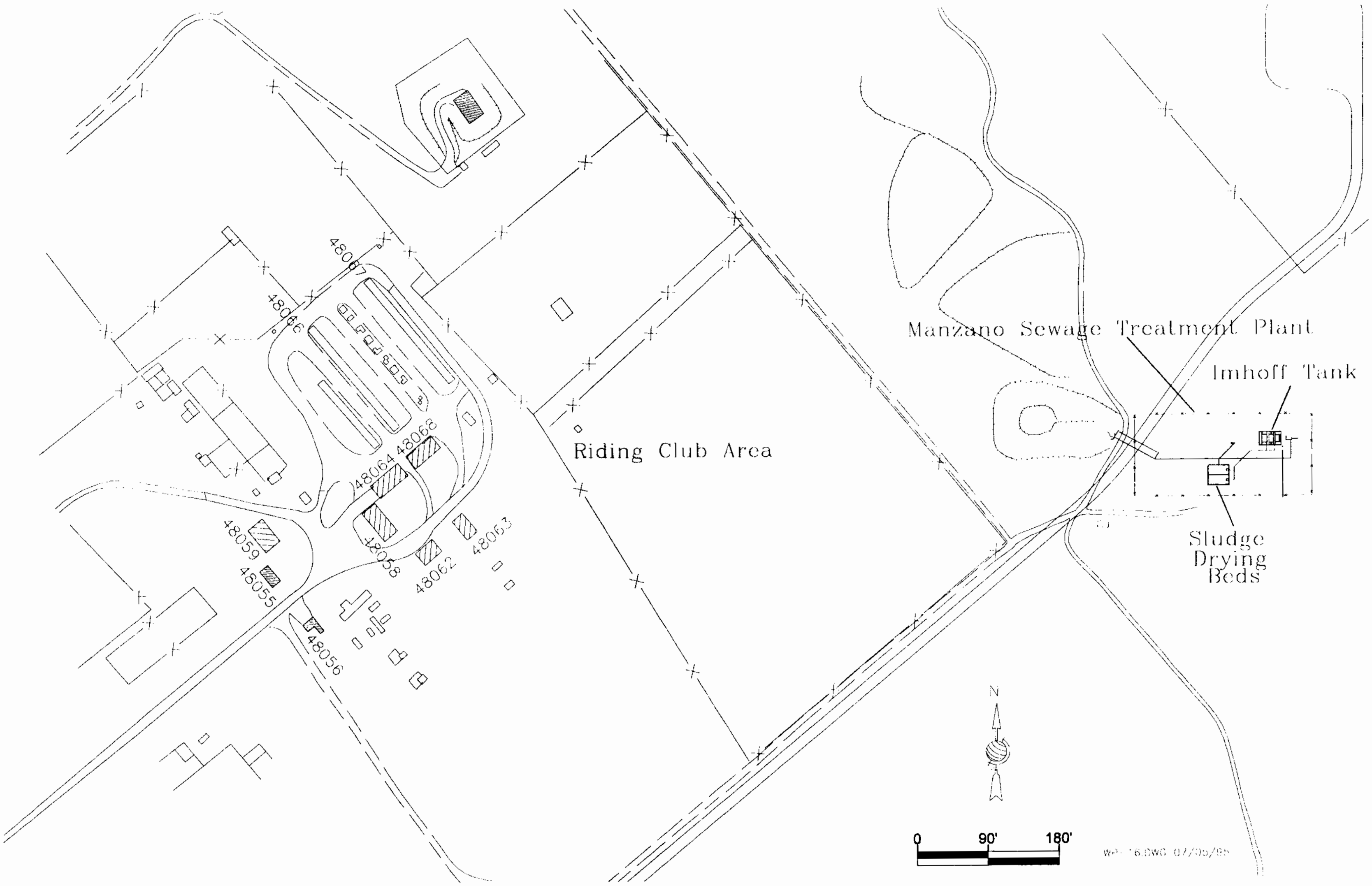

Figure 1. **Manzano Sewage Treatment Plant Location Map Kirtland AFB, Albuquerque, New Mexico**

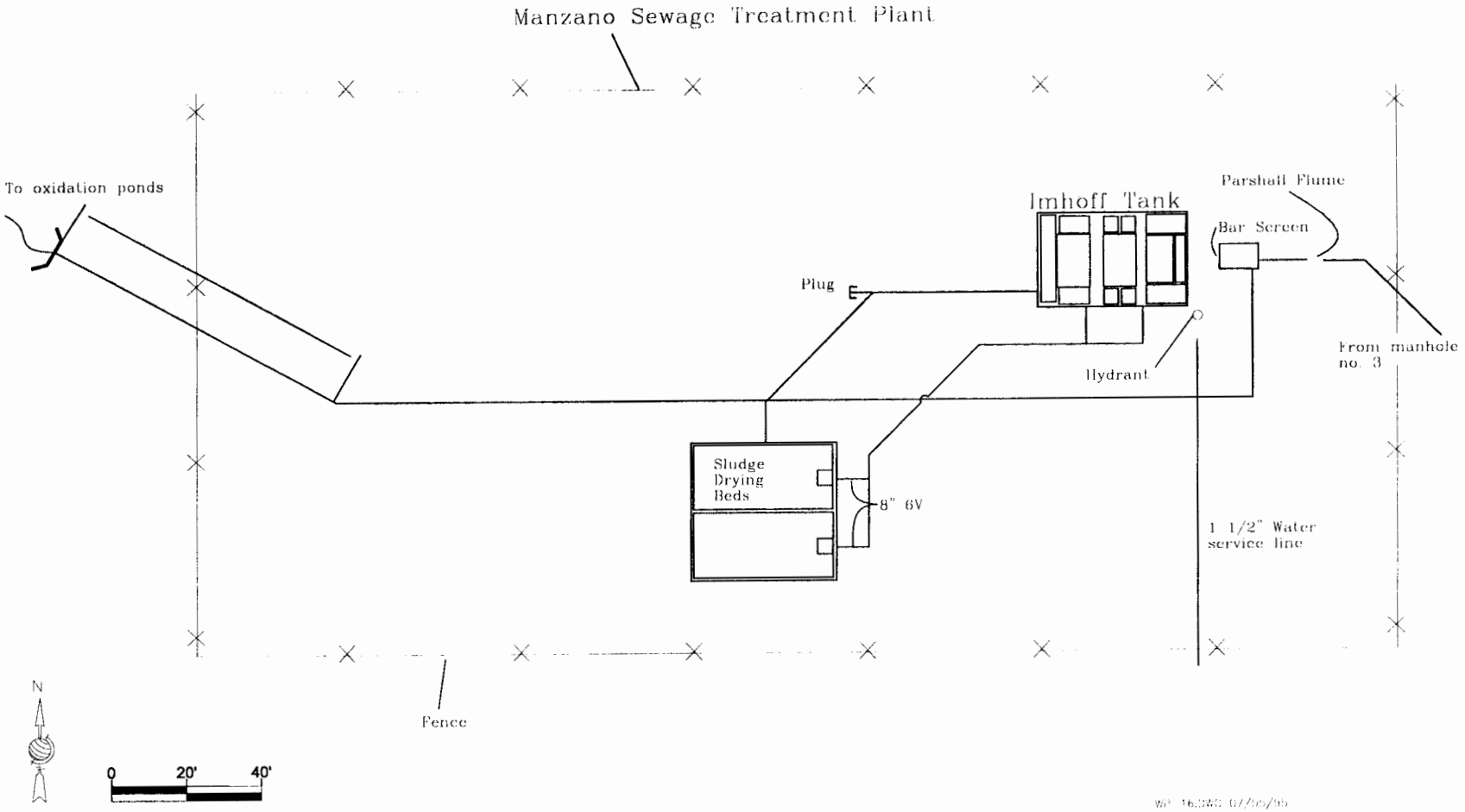

Figure 2. **Manzano Sewage Treatment Plant Site Map, Kirtland AFB, Albuquerque, New Mexico**

Table 1. Radiological Constituents

Location	Gallons	Gross Alpha	Gross Beta	Cesium-137	Cobalt-60	Lead-212	Thorium-227	Tritium
RW-04	10200	29 ± 8	27 ± 6	< 20	< 20	ND	ND	< 700
RW-05	0							
RW-17	80	8.2 ± 4.4	15 ± 4	< 20	< 20	9.4 ± 5.0	28 ± 15	5,500 ± 600
RW-19	10200	2.7 ± 2.3	20 ± 4	< 20	< 20	ND	ND	< 700
RW-23	215	4.5	17 ± 5	< 20	< 20	7.9 ± 4.7	24 ± 14	< 700
Drinking Water Standard		15	*	*	*	*	*	20,000
Accumulated water	20695	15.7 ± 5	23.4 ± 5	< 20	< 20	0.12 ± 0.0	0.36 ± 0.2	370
Accumulated water w/rinsate	22095	14.7 ± 4.8	21.9 ± 4.7	< 20	< 20	0.11 ± 0.0	0.33 ± 0.19	346

* The maximum contaminant level is based on effective dose calculations
Concentrations in pCi/L

Table 2. MWSA Underground Emergency Holding Tank Analytical Results

	Sample Location	RW-04	RW-04	RW-05	RW-17	RW-17	RW-19	RW-23
	Sample ID	RB04-WW	RB04-WW2	RB05-SL	RB06-SL	RB06-WW	RB08-WW	RB09-WW
VOC	Acetone	<0.050	NA	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzene	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	Bromodichloromethane	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	Bromoform	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	Bromomethane	<0.010	NA	<0.010	<0.010	<0.010	<0.010	<0.010
	Carbon disulfide	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	Carbon tetrachloride	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	Chlorobenzene	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	Chloroethane	<0.010	NA	<0.010	<0.010	<0.010	<0.010	<0.010
	2-Chloroethyl vinyl ether	<0.010	NA	<0.010	<0.010	<0.010	<0.010	<0.010
	Chloroform	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	Chloromethane	<0.010	NA	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibromochloromethane	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	1,1-Dichloroethane	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	1,2-Dichloroethane	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	trans-1,2 Dichloroethene	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	1,1-Dichloroethene	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	cis-1,2-Dichloroethene	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	1,2-Dichloropropane	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	cis-1,3-Dichloropropene	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	trans-1,3-Dichloropropene	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	Ethylbenzene	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	2-Hexanone	<0.050	NA	<0.050	<0.050	<0.050	<0.050	<0.050
	Methyl ethyl ketone	<0.050	NA	<0.050	<0.050	<0.050	<0.050	<0.050
	Methyl isobutyl ketone	<0.050	NA	<0.050	<0.050	<0.050	<0.050	<0.050
	Methylene chloride	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	Styrene	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	1,1,2,2-Tetrachloroethane	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	Tetrachloroethylene	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	Toluene	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	1,1,1-Trichloroethane	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	1,1,2-Trichloroethane	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	Trichloroethylene	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	Vinyl acetate	<0.010	NA	<0.010	<0.010	<0.010	<0.010	<0.010
	Vinyl chloride	<0.010	NA	<0.010	<0.010	<0.010	<0.010	<0.010
	m,p-Xylene (sum of isomers)	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005
	o-Xylene	<0.005	NA	<0.005	<0.005	<0.005	<0.005	<0.005

Table 2. MWSA Underground Emergency Holding Tank Analytical Results (Continued)

	Sample Location	RW-04	RW-04	RW-05	RW-17	RW-17	RW-19	RW-23
		RB04-WW	RB04-WW2	RB05-SL	RB06-SL	RB06-WW	RB08-WW	RB09-WW
METALS	Aluminum	***0.075***	NA	***0.296***	<0.050	***0.142***	<0.100	***0.272***
	Antimony	<0.005	NA	<0.010	<0.005	<0.005	<0.010	<0.005
	Arsenic	<0.003	NA	<0.003	<0.003	***0.0031***	<0.003	<0.003
	Barium	***0.037***	NA	***0.058***	<0.005	***0.005***	***0.060***	***0.016***
	Beryllium	<0.003	NA	<0.006	<0.003	<0.003	<0.006	<0.003
	Cadmium	<0.005	NA	<0.010	***0.005***	<0.005	0.012	0.005
	Calcium	***83.6***	NA	***6.04***	***1.62***	***3.55***	***102***	***7.74***
	Chromium, total	***0.0013***	NA	***0.0017***	***0.0020***	***0.0023***	***0.0012***	***0.0035***
	Cobalt	<0.010	NA	<0.020	<0.010	<0.010	<0.020	<0.010
	Copper	<0.010	NA	***0.236***	<0.010	<0.010	<0.020	<0.010
	Iron	***8.23***	NA	***16.1***	***0.469***	***8.56***	***1.20***	***24.3***
	Lead	***0.0223***	NA	***0.0111***	***<0.002***	***0.0052***	***0.0302***	***0.0093***
	Magnesium	***25.3***	NA	***1.90***	***0.430***	***0.924***	***31.1***	***3.16***
	Manganese	***0.018***	NA	***0.126***	***0.006***	***0.147***	***0.144***	***0.83***
	Mercury	<0.0002	NA	<0.0008	<0.0008	<0.0002	<0.0002	<0.0002
	Molybdenum	<0.050	NA	<0.100	<0.050	<0.050	<0.100	<0.050
	Nickel	<0.020	NA	***0.042***	<0.020	<0.020	<0.040	<0.020
	Potassium	***5.73***	NA	***163***	***7.99***	***17.1***	***37.2***	***15.8***
	Selenium	***<0.004***	NA	<0.004	<0.004	<0.004	<0.004	<0.004
	Silver	<0.010	NA	<0.020	<0.010	<0.010	<0.020	<0.010
	Sodium	***28.6***	NA	***1000***	***36.5***	***76.5***	***105***	***45.7***
	Thallium	<0.001	NA	<0.001	<0.001	<0.001	<0.001	<0.001
	Vanadium	<0.010	NA	<0.020	<0.010	<0.010	<0.020	<0.010
	Zinc	***0.010***	NA	***0.118***	***0.011***	***0.046***	***0.036***	***0.046***

Table 2. MWSA Underground Emergency Holding Tank Analytical Results (Concluded)

	Sample Location	RW-04	RW-04	RW-05	RW-17	RW-17	RW-19	RW-23
		RB04-WW	RB04-WW2	RB05-SL	RB06-SL	RB06-WW	RB08-WW	RB09-WW
RADIOLOGICALS	Actinium-228	ND	NA	ND	ND	ND	ND	ND
	Gross Alpha	***29±8***	NA	***92±64***	***23±10***	***8.2±4.4***	***2.7±2.3***	<9
	Gross Beta	***27±6***	NA	***220±50***	***22±5***	***15±4***	***20±4***	***17±5***
	Bismuth-212	ND	NA	ND	ND	ND	ND	ND
	Bismuth-214	ND	NA	ND	ND	ND	ND	ND
	Cesium-137	<20	NA	<20	<10	<20	<20	<20
	Cobalt-60	<20	NA	<20	<20	<20	<20	<20
	Lead-212	ND	NA	ND	***8.2±4.8***	***9.4±5.0***	ND	***7.9±4.7***
	Lead-214	ND	NA	ND	ND	ND	ND	ND
	Potassium-40	ND	NA	ND	ND	ND	ND	ND
	Radium-223	ND	NA	ND	ND	ND	ND	ND
	Radium-224	ND	NA	ND	ND	ND	ND	ND
	Radium-226	ND	0.9	ND	ND	ND	ND	ND
	Radium-228	NA	<0.2	NA	NA	NA	NA	NA
	Thallium-208	ND	NA	ND	ND	ND	ND	ND
	Thorium-227	ND	NA	ND	***25±14***	***28±15***	ND	***24±14***
	Thorium-228	NA	<0.05	NA	NA	NA	NA	NA
	Thorium-230	NA	0.063±.041	NA	NA	NA	NA	NA
	Thorium-232	NA	<0.05	NA	NA	NA	NA	NA
	Thorium-234	ND	NA	ND	ND	ND	ND	ND
	Tritium	<700	NA	<700	***N/A***	***5,500±600***	<700	<700
	Uranium-233/234	NA	17	NA	NA	NA	NA	NA
	Uranium-235	ND	0.84	ND	ND	ND	ND	ND
	Uranium-238	NA	16	NA	NA	NA	NA	NA
	Plutonium-238	NA	<0.1	NA	NA	NA	NA	NA
	Plutonium-239/240	NA	<0.2	NA	NA	NA	NA	NA
	Strontium-89	NA	<0.5	NA	NA	NA	NA	NA
	Strontium-90	NA	<0.6	NA	NA	NA	NA	NA

WW – Water/fluid sample
SL – Sediment/fluid sample
ND – Not detedcted
NA – Not analyzed
VOC and metals concentrations – mg/L (ppm)
Radiological concentrations – pCi/L

2.2 Installation of Wind-Blown Sediment Barrier

To prevent any wind-blown sediment from depositing in the ponds, a vinyl wind barrier will be installed around the perimeter of the evaporation ponds after they are filled with water. The wind barrier will be approximately 4 ft high and will be secured by metal stakes every 5 ft around the perimeter of the pond.

2.3 Transportation and Disposal of Water

Water will be vacuumed from the tanks prior to their removal. The water will be transported directly to the evaporation ponds for disposal. Once the contents of the tanks have been removed, a triple-rinse process will be used for decontamination. The rinse water will be contained in a baker tank and transported to the evaporation ponds for disposal.

2.4 Monitoring

Monthly monitoring of the evaporation rate and condition of the ponds will be conducted.

3.0 DISPOSAL OF SEDIMENT AND LINER

After the water has evaporated, the accumulated sediment, which will primarily be scale from the interior of the tanks, will be collected and containerized for analysis and proper disposal. The liner will then be decontaminated in place by high-pressure washing. The decontamination water will be collected and evaporated in a 55-gallon drum with a perforated lid. Swipes will then be collected from the liner to determine the proper disposal of the liner.