Appendix A3

Detailed Calculations

SCENARIO 1: IMPLEMENTATION, ENFORCEMENT AND MONITORING OF WORKERS HEALTH AND SAFETY AND SPILL PREVENTION MEASURES

Item	Description	Quantification	Value	Timing	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
1	**Raise awareness**																							
1.1	Organize workshops with local population	· # and frequency of workshops	3 during year 1 / year in the next 5 years	Reccurring	3,000	1,000	1,000	1,000	1,000	1,000														
1.2	Produce and diffuse awareness raising material	· # of risk awareness kits produced	500	Initial	5,000																			
2	**Develop a Health and Safety / Spill Prevention Plan**																							
2.1	Consultation and working session	· Duration of consultation · # of people consulted	0.5 20	Initial	1,600																			
2.2	Development of initial plan	· # of international consultants days · # of national consultants days	10 40	Initial	16,000																			
2.3	Plan revisions	` · # of national consultants days	1 5	Recurring		750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750
3	**Train the personnel**																							
3.1	Initial training	· # of employees to be trained · Employee turnover · Duration of initial training (days)	25 2% 2	Recurring	800	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310
3.2	Training updates	· # of employees to be trained · Frequency of training updates (/year) · Duration of training updates (days)	25 1 0.5	Recurring		200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
4	**Implement the Health and Safety Plan**																							
4.1	Provide personal protection equipment	· # of kits · Percentage of kits to be replaced (yearly)	25 5%	Initial + reccuring	2,500	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125
4.2	Label hazardous materials and contaminated areas	· # of items to be labeled · Additional items to be labeled yearly	200 20	Initial Reccuring	1,000	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
4.3	Test transformers before handling	· # of tests (CLOR N OIL)	10	Reccuring	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Item	Description	Quantification	Value	Timing	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
4.4	Implement Health and Safety procedures	· # of employees at the warehouse · average time dedicated to procedures by employees at the workshop (% of workday) · # of other employees on site · average time dedicated to procedures by other employees on the site (% of workday)	22 5% 60 1%	Recurring	4,080	4,080	4,080	4,080	4,080	4,080	4,080	4,080	4,080	4,080	4,080	4,080	4,080	4,080	4,080	4,080	4,080	4,080	4,080	4,080
4.7	Implement spill response procedures	· # of spills / months · Average time dedicated to clean up (days)	1 1	Recurring	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
5	**Ensure integrity of workplace structure**																							
5.1	Provide facilities for showering and changing into and out of street and work clothes; and clean eating areas where workers are not exposed to hazardous or noxious substances	· Unit	-	Initial	2,500																			
5.2	Define “restricted entry” into contaminated area without proper protection and authorization	· Unit	-	Initial	500																			
6	**Monitoring**																							
6.1	Monitoring of the health and safety plan implementation	· Average time (in days) dedicated each month to monitoring by the Health and safety specialist	1	Recurring		1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
6.2	Environmental monitoring - Soil testing	· # of tests	10	Recurring		150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
6.3	Blood testing	· # of sampling	20	Recurring					20,000					20,000										20,000
7	**Contingency, Technical Support, F**	· % of overhead	**10%**	Recurring	3,720	874	874	874	2,874	874	774	774	774	2,774	774	774	774	774	774	774	774	774	774	2,774
			TOTAL		**40,920**	**9,609**	**9,609**	**9,609**	**31,609**	**9,609**	**8,509**	**8,509**	**8,509**	**30,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**30,509**

PV (Costs)	$180,474

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
	Benefit stream	0	15,680	15,680	15,680	15,680	15,680	15,680	15,680	15,680	15,680	15,680	15,680	15,680	15,680	15,680	15,680	15,680	15,680	15,680	15,680
PV (Benefits)	$180,474																				
Stream of benefits - costs		-40,920	6,071	6,071	6,071	-15,929	6,071	7,171	7,171	7,171	-14,829	7,171	7,171	7,171	7,171	7,171	7,171	7,171	7,171	7,171	-14,829

NPV	**0**
DALYs needed/an	**3.6**
IRR (test)	*5%*

Number of DALY /100000hab total	38,451
Population on site	1,438
Total number of DALYs on site	553
Minimum required effect of site reclamation on total health	**0.6%**

SCENARIO 2 : CONTAINMENT OF EXISTING CONTAMINATION

Item	Description	Quantification	Value	Timing	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
1	**Implementation, enforcement and monitoring of workers health and safety and spill prevention measures**	**Measures described in Scenario 1**	**TOTAL**		**40,920**	**9,609**	**9,609**	**9,609**	**31,609**	**9,609**	**8,509**	**8,509**	**8,509**	**30,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**30,509**
2	**Design of containment plan**																							
2.1	Develop a detailed containment plan	· # of international consultant days	30	Initial	30,000																			
2.2	Conduct test based inventory of PCBs contaminated transformers and oil	· # of tests (CLOR N OIL)	235	Initial	2,350																			
2.3	Conduct detailed soil analysis	· # of tests (CALUX)	30	Initial	12,000																			
3	**Provide secured containment infrastructure and equipment**																							
3.1	Provide secured drums	· # of drums required initially	210	Initial	21,049	1,376	1,376	1,376	1,376	1,376	1,376	1,376	1,376	1,376	1,376	1,376	1,376	1,376	1,376	1,376	1,376	1,376	1,376	1,376
		· # of additional drums required yearly	14	Reccurring																				
3.2	Build a secured containment facility	· Unit		Initial	150,000																			
3.3	Move and store PCB contaminated equipment and oil in containment facility	`		Initial	12,000																			
3.4	Cap and pave the most contaminated areas that are not paved yet (storage area)	· Extent of the area requiring capping (m2)	15000	Initial	750,000																			
3.5	Improve drainage and sediment control system on the site	· Unit		Initial	10,000																			

Item	Description	Quantification	Value	Timing	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
4	**Monitor and maintain containment infrastructure**																							
4.1	Monitoring and maintenance of contaminated transformers and oil containement measures	· % of capital costs	5%	Recurring		9,152	9,152	9,152	9,152	9,152	9,152	9,152	9,152	9,152	9,152	9,152	9,152	9,152	9,152	9,152	9,152	9,152	9,152	9,152
4.2	Conduct soil/sediment analysis	· Number of analysis	3	Recurring		1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
4.3	Pavements and drainage system maintenance	· % of capital costs	1%	Recurring		7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600
4	**Contingency, Technical Support, Project management**	· % of overhead	**10%**	Recurring	98,740	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933	1,933
			TOTAL		**1,127,059**	**30,870**	**30,870**	**30,870**	**52,870**	**30,870**	**29,770**	**29,770**	**29,770**	**51,770**	**29,770**	**29,770**	**29,770**	**29,770**	**29,770**	**29,770**	**29,770**	**29,770**	**29,770**	**51,770**

PV (Costs)	$1,459,604

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
	Benefit stream	0	126,814	126,814	126,814	126,814	126,814	126,814	126,814	126,814	126,814	126,814	126,814	126,814	126,814	126,814	126,814	126,814	126,814	126,814	126,814
PV (Benefits)	$1,459,604																				
	Stream of benefits - costs	-1,127,059	95,944	95,944	95,944	73,944	95,944	97,044	97,044	97,044	75,044	97,044	97,044	97,044	97,044	97,044	97,044	97,044	97,044	97,044	75,044
NPV	**0**																				
DALYs needed/an	**28.8**																				
IRR (test)	*5%*																				

Number of DALY /100000hab total	38,451
Population on site	1,438
Total number of DALYs on site	553
Minimum required effect of site reclamation on total health	**5.2%**

SCENARIO 3: DISPOSAL OF EXISTING CONTAMINATION

Item	Description	Quantification	Value	Timing	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
1	**Implementation, enforcement and monitoring of workers health and safety and spill prevention measures**	**Measures described in Scenario 1**	**TOTAL**		**40,920**	**9,609**	**9,609**	**9,609**	**31,609**	**9,609**	**8,509**	**8,509**	**8,509**	**30,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**30,509**
2	**Design of disposal plan**																							
2.1	Develop a disposal plan	· # of international consultant days	30	Initial	30,000																			
2.2	Conduct test based inventory of PCBs contaminated transformers/ oil	· # of tests (CLOR N OIL)	235	Initial	2,350																			
2.3	Conduct detailed soil analysis	· # of detailed tests (CALUX)	30	Initial	12,000																			
3	**Implementation of disposal**																							
3.1	Disposal of contaminated transformers	· Quantity of transformer (tons)	52.2	Initial	125,215																			
3.2	Disposal of contaminated oil	· Quantity of oil (tons)	60.0	Initial	177,568																			
3.3	Disposal of contaminated soil from the open-air storage area	· Quantity of contaminated soil (tons)	600	Initial	888,000																			
3.4	Disposal of contaminated soil from the road	· Quantity of contaminated soil (tons)	6	Initial	9,472																			
3.5	Packaging and shipping	· % of overhead	0	Initial	300,064																			
4	**Contingency, Technical Support, F**	· % of overhead	**0**	Initial	154,467	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			TOTAL		**1,740,056**	**9,609**	**9,609**	**9,609**	**31,609**	**9,609**	**8,509**	**8,509**	**8,509**	**30,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**8,509**	**30,509**

PV (Costs)	$1,798,699

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
	Benefit stream	0	156,275	156,275	156,275	156,275	156,275	156,275	156,275	156,275	156,275	156,275	156,275	156,275	156,275	156,275	156,275	156,275	156,275	156,275	156,275
PV (Benefits)	$1,798,699																				
	Stream of benefits - costs	-1,740,056	146,667	146,667	146,667	124,667	146,667	147,767	147,767	147,767	125,767	147,767	147,767	147,767	147,767	147,767	147,767	147,767	147,767	147,767	125,767

NPV	**0**
DALYs needed/an	**35.5**
IRR (test)	*5%*

Number of DALY /100000hab total	38,451
Population on site	1,438
Total number of DALYs on site	553
Minimum required effect of site reclamation on total health	**6.4%**