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FACSIMILE COVER SHEET

TO: Malhulla Logan **COMPANY:** _____

FAX #: 337-9335 **COVER PAGE +** 1 **PAGES**

FROM: Misty Kaltheider **SENT BY:** _____

DATE: 1/24/95 **TIME SENT:** _____

RE: Gun Club, Risk Assessment Addendum.

COMMENTS:

Short term exposure (one month) to the concentrations after the hot spots are removed to 1000 mg/kg is shown on the attached table using 500 ug/m³ dust load for construction workers (as in the original report) The 95% UCL calculated for the soil concentration input comes from Table E-2 of Appendix E. Based on these calculations - Blood lead levels are still below the 10 ug/dL level of concern for sensitive receptors. (children).

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Appendix E
Evaluation of Future Risk after the Removal of Lead Hot Spots

The development plan for the site proposes the construction of mini-storage buildings and an RV parking lot on the site. The site will be graded, covered in 6 to 8 inches of baserock, and paved in asphalt. The foundation for the storage buildings, including the small office, will consist of a concrete slab on grade. The storage buildings will be one-story, pre-fabricated structures with a maximum height of approximately 15 feet.

It is anticipated that the surface cover will retain its integrity over time. Cracks in the asphalt paving could occur but would not necessarily result in exposure of soil due to the presence of baserock material between the asphalt pavement and the underlying soil. It is highly unlikely that cracks in the asphalt paving and the building foundation would be of such a size that baserock material could be removed to would allow for the entrainment of near-surface soil particulates into the breathing zone of facility workers. However, in response to the request from the Alameda County Health Department, inhalation of lead in near-surface soil after removal of the lead hot spots is evaluated for this future receptor.

Four lead hot spots were identified at the Former Gun Club site as described in section 2.1.2 of the main text. Hot spot locations are shown on Figure 2-3 of the main text. Table E-1 presents the near surface soil lead data as collected and the anticipated concentrations after remediation of lead to 1000 mg/kg at the hot spots. Table E-2 presents site-wide summary statistics calculated for lead after remediation. Summary statistics were determined using the statistical package MTCAStat (WDOE, 1992). The maximum concentration of lead after remediation will be 1000 mg/kg and the minimum concentration detected remains 9.9 mg/kg. The r^2 value for the log-transformed data was consistent with the assumption of a lognormal distribution (r^2 of 0.972). The upper 95 percent confidence limit (95% UCL) for the lognormal distribution was estimated as 640 mg/kg using the method of Land (1971, 1975) and the H parameter determined from tabled values with degrees of freedom equal to one less than the number of sample values.

Exposure to lead in dust cannot be evaluated by calculating a chemical intake or dermal dose. This evaluation uses the California Department of Toxic Substance Control (DTSC) spreadsheet (blood lead beta test version, CalEPA, 1992a) as described in section 3.5.4 of the main text. A blood lead concentration (ug lead per deciliter blood, ug/dL) resulting

from exposure through various pathways (dietary intake, drinking water intake, soil and dust ingestion, dust inhalation, and dermal contact) is estimated with the spreadsheet. An equation relating incremental blood lead increase to a concentration in a medium, using contact rates and empirically determined ratios is used for each pathway evaluated. The contact rates used in the equations for each pathway assume residential exposure. Therefore, this will over-estimate the amount of media contacted by the potential future storage facility worker.

The contact rate for the soil and dust ingestion pathway has been set to zero for this evaluation, as only inhalation of dust is considered a potential pathway of exposure for this future receptor. Dietary intake and drinking water intake are included in this evaluation as people may ingest lead in media not related to the site that would influence their blood lead concentration. DTSC default concentration for lead in the diet and drinking water are used. The DTSC default concentration for lead in ambient air (background air) is also used (CalEPA, 1992b). These are presented on Table E-3. Dermal contact has also been included in this evaluation since dust may settle on workers skin.

The 95% UCL for lead in near surface soil after remediation is used for the soil input value to the inhalation and soil contact pathway. The equation for the inhalation pathway estimates the lead concentration in dust with the following equation:

$$\text{Pb dust } (ug/m^3) = \text{Pb background air} + (\text{Airborne dust} * \text{Pb soil} * CF)$$

where:

Pb background air	=	0.18 ug/m^3 (DTSC default value)
Airborne dust	=	50 ug/m^3 (DTSC default value)
Pb soil	=	640 mg/kg (95% UCL)
CF	=	10^{-6} kg/mg conversion factor

This is similar to the estimation of dust exposure point concentrations described in section 3.5.1 of the main text except for the inclusion of the contribution of lead in background air. Assuming a constant airborne dust level of 50 ug/m^3, the annual average respirable portion (PM_{10}) of suspended particulate matter, will over-estimate the amount of dust in the air as dust levels do not remain constant over time but vary throughout the day. In addition, use of this method to estimate dust concentrations effectively ignores the presence of

baserock material, asphalt paving and building foundations. The amount of dust in air for this potential future receptor is considerably over-estimated.

The output of the DTSC lead spreadsheet is presented in Table E-3. The 99th percentile blood lead level is 5.0 ug/dL for adults. This value includes background exposure in food, air and water and is less than the recommended upper limit of 30 ug/dL for adults (FDA, 1990) and lower than 10 ug/dL identified for the most sensitive receptors (children) (CalEPA, 1992b). Inhalation of lead in dust arising from near surface soil represents 16% of the total intake. These blood lead values suggest intake of lead through inhalation does not present a health risk to future storage facility workers.

References

California Environmental Protection Agency. 1992a. LeadSpread, beta test version spreadsheet. Department of Toxic Substances Control (DTSC), Sacramento, CA.

California Environmental Protection Agency. 1992b. Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities. Department of Toxic Substances Control (DTSC), Sacramento, CA.

Food and Drug Administration (FDA). 1990. Memorandum to Elizabeth Campbell, Division of Regulatory Guidance, from the Contaminants Team, Division of Toxicological Review and Evaluation. U.S. Department of Health and Human Services.

Land, C.E. 1971. Confidence intervals for linear functions of the normal mean and variance. Ann. Math. Stat. 42:1187-1205.

Land,C.E. 1975. Tables of confidence limits for linear functions of the normal mean and variance. In: Selected tables in mathematical statistics, volume III, American Mathematical Society, Providence, RI. pp. 385-419.

Washington Department of Ecology. 1992. MTCAStat, a statistical software package. Toxics Cleanup Program, Olympia, WA.

Appendix E Table E-1
Near Surface Soil Lead Data Before and After Proposed Removal of Hot Spots

Date of Collection	Sample No.	Depth (ft)	Lead	
			As Detected (mg/kg)	After Remediation (mg/kg)
2/90	S-43181	6"	33	33
2/90	S-43182	6"	15000	1000
2/90	S-43183	6"	88000	1000
2/90	S-43184	6"	150	150
2/90	S-43185	6"	98	98
2/90	S-43186	6"	37	37
9/92	3	0-1'	39	39
9/92	7	0-1'	42	42
9/92	9	0-1'	480	480
9/92	18	0-1'	23	23
9/92	19	0-1'	82	82
9/92	22	0-1'	170	170
9/92	24	0-1'	210	210
9/92	27	0-1'	150	150
9/92	28	0-1'	40000	1000
9/92	34	0-1'	70	70
9/92	38	0-1'	120	120
9/92	43	0-1'	340	340
9/92	48	0-1'	10	10
9/92	54	0-1'	32	32
9/92	61	0-1'	230	230
12/92	1	0-1'	610	610
12/92	2	0-1'	65	65
12/92	3	0-1'	130	130
12/92	4	0-1'	91000	1000
12/92	5	0-1'	NA	NA
12/92	6	0-1'	NA	NA
12/92	7	0-1'	490	490
12/92	8	0-1'	500	500
12/92	9	0-1'	150	150
12/92	10	0-1'	190	190

NA = Not analyzed.

Appendix E Table E-2
Summary Statistics for Near Surface Soil Lead Data After Proposed Removal of Hot Spots

Summary Statistics After Remediation						
Minimum (mg/kg)	**Maximum** (mg/kg)	**Median** (mg/kg)	**Arithmetic Mean** (mg/kg)	**Geometric Mean** (mg/kg)	**Std. dev.**	**Lognormal 95% UCL** [a] (mg/kg)
9.9	1000	150	291.4	329.8	329.5	639.5

a The r-squared value is 0.972 for the lognormal distribution while the r-squared value for the normal distribution is 0.793.

Appendix E Table E-3
Lead Risk Assessment Spreadsheet
California Department of Toxic Substances Control
Long-term Storage Facility Worker After Remediation of Hot Spots to 1000 mg/kg

INPUT		
Medium		**Level**
LEAD IN AIR	ug/m^3	0.18 [a]
LEAD IN SOIL	(ug/g)	640 [b]
LEAD IN WATER	(ug/L)	15 [a]
PLANT UPTAKE? 1=YES 0+NO		0
AIRBORNE DUST	ug/m^3	50 [c]

EQUATIONS, ADULTS						
Pathway	ug/dL	Route-specific Constant	Concen. in Medium	Contact Rate		Percent of Total
SOIL CONTACT:	0.13 =	1.00E-04 (ug/dL/(ug/day) *	640 ug/g *	1.85 [a]	g soil/day (5 g/m^2 * 0.37 m^2)	6%
SOIL INGESTION:	0.00 =	0.018 (ug/dL/(ug/day) *	640 ug/g *	0 [b]	g soil/day	0%
INHALATION:	0.35 =	1.64 [d] (ug/dL/(ug/day) *	0.21 ug/m^3			16%
WATER INGESTION:	0.84 =	0.04 (ug/dL/(ug/day) *	15 ug/L *	1.4 [a]	L water/day	38%
FOOD INGESTION:	0.88 =	0.04 (ug/dL/(ug/day) *	10 ug Pb/kg die	2.2 [a]	kg diet/day	40%

OUTPUT						
		Percentiles				
Age-Group		50th	90th	95th	98th	99th
BLOOD Pb, ADULT	(ug/dL)	2.2	3.4	3.9	4.5	5.0

a Default value
b Concentration is the 95% UCL of the arithmetic mean based on a lognormal distribution assuming hot spots are removed and the concentration remaining is 1000 mg/kg.
c Site-specific assumption.
d Use of this value assumes a 24 hr/day exposure which over-estimates the potential exposure of a storage facility worker.

To

Mystie Kaltreider.
ACC.

From
Madhulla Logan
Alameda County Health.

Mystie,

I reviewed the faxed information & it appears that the contact rate for soil ingestion is not computed (see the marked sheet) It is defined as '0' for both long term & short term exposure scenarios. I would like a valid reason for using 0 instead of DTSC default value of 0.025 gram/day for soil ingestion contact rate.

Also I would like a copy of original DTSC output (like the one I have just faxed) because it gives me also the exposure parameters used. I would like a copy of this printout for both long-term & short-term exposures

Thankyou
Madhulla Logan