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MEMORANDUM

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Date: April 15, 2010

To: Shannon Harbour, P.E.
Nevada Division of Environmental Protection (NDEP)

RE: Technical Memorandum: COPC Selection for RZ-A

We have prepared the attached table to facilitate an upcoming discussion on Chemical of Potential Concern (COPC) selection with regard to RZ-A to evaluate the direct contact with soil pathway.[1] No remediation of soil is planned in RZ-A. The aim of the discussion is to ensure that the approach summarized in the table meets the intent of the COPC selection process outlined in the approved HRA Work Plan and to obtain concurrence that going forward in a similar approach can be used for the remaining areas (post remediation).

As outlined in the approved HRA Work Plan and in accordance with USEPA guidance, the COPC selection process is intended to ensure that the risk assessment focuses on those chemicals that contribute the greatest to the overall health risk. The attached table provides an analysis of the COPC selection process for RZ-A using the approved methods outlined in the HRA. The general approach is outlined below:

- The table contains a list of all chemicals (47 potential COPCs) that were either positively identified in at least one soil sample or, for metals, were determined to be above background based on a statistical analysis (background comparison analysis presented in the April 8, 2010 memorandum and discussed during the April 14, 2010 call).
- Based on the approved methods in the HRA, a combination of frequency of detection (chemical is detected in less than 5% of the samples) and a toxicity screen were used to further reduce the initial list of potential COPCs. No chemical was eliminated based solely on frequency of detection.
- The chemical toxicity screen used was based on comparison of the maximum detected concentration to a percentage of the BCL. As stated in the HRA Work Plan, “A concentration-toxicity screen may also be employed to support COPC selection. NDEP’s BCL may be used in this regard (i.e., when the maximum

[1] As indicated in the HRA Work Plan, vapor intrusion and groundwater issues will be evaluated on a site-wide basis.

concentration with a decision unit does not exceed one-tenth of NDEP BCL, the chemical is a candidate for COPC elimination.)“ To illustrate this BCL comparison, the table presents the ratio of the BCL divided by the maximum detected soil concentration. A ratio >10 indicates that the maximum detected concentration is less than 10% of the BCL. A ratio of > 100 indicates that the maximum detected concentration is less than 1% of the BCL.

- All chemicals with the exception of hexachlorobenzene, iron and lead have maximum detected concentrations less than 10% of the BCL (or ratios above 10). In fact, the majority of detected chemicals have very large ratios indicating that they would not contribute substantially to overall health risk estimates.
- All persistent, bioaccumulative, and toxic chemicals and Class A carcinogens were retained as COPCS with the exception of DDT, DDE, and beta BHC. These three chemicals were eliminated as COPCs as their ratio of BCL to maximum detected concentration was greater than 100 (maximum detected concentration is less than 1% BCL) indicating they would not significantly contribute to overall health risk estimates.
- Chemicals such as boron and perchlorate that would normally be eliminated based on the chemical toxicity criteria screen, but are associated with historic site activities (LOUs), were retained.
- There is no NDEP BCL for octachlorstyrene, nor does it appear that a toxicity criterion has previously been developed. Consistent with the approved HRA Work Plan, we would like to discuss with NDEP if (1) this chemical should be evaluated qualitatively in the uncertainty analysis, (2) a toxicity criterion can be developed based on toxicity data published in the peer-reviewed literature, or (3) a surrogate RfD or RfC should be applied.

Chemical	Result Unit	Total Count	Detect Count	Detect Frequency	Min. Detect	Max. Detect	PBT or Class A Carcinogen	Ratio: BCL/max detect	COPC	Basis
4,4'-DDE	mg/kg	27	7	26%	0.0029	0.014	yes	557	no	1
4,4'-DDT	mg/kg	27	6	22%	0.0022	0.013	yes	600	no	1
Beta-BHC	mg/kg	27	10	37%	0.001	0.013	yes	108	no	1
1,4-Dioxane	mg/kg	44	1	2%	0.01	0.01	no	17,400	no	3,5
Acenaphthylene	mg/kg	44	4	9%	0.0011	0.003	no	49000	no	3
Anthracene	mg/kg	44	1	2%	0.0067	0.0067	no	14925373	no	3,5
Benz(a)anthracene	mg/kg	44	12	27%	0.00071	0.0097	no	241	no	3
Benzo(a)pyrene	mg/kg	44	5	11%	0.0035	0.012	yes	20	yes	2
Benzo(b)fluoranthene	mg/kg	44	6	14%	0.0039	0.014	no	167	no	3
Benzo(g,h,i)perylene	mg/kg	44	9	20%	0.0021	0.02	no	1705000	no	3
Benzo(k)fluoranthene	mg/kg	44	6	14%	0.0032	0.012	no	1950	no	3
bis(2-Ethylhexyl)phthalate	mg/kg	44	3	7%	0.15	0.37	no	370	no	3
Chrysene	mg/kg	44	13	30%	0.0014	0.014	no	16714	no	3
Dimethyl phthalate	mg/kg	44	1	2%	0.0044	0.0044	no	22727273	no	3,5
Di-N-Butyl phthalate	mg/kg	44	10	23%	0.039	0.084	no	814286	no	3
Fluoranthene	mg/kg	44	13	30%	0.0018	0.016	no	1525000	no	3
Hexachlorobenzene[d]	mg/kg	44	8	18%	0.0043	0.23	yes	5	yes	4
Indeno(1,2,3-cd)pyrene	mg/kg	44	7	16%	0.0021	0.014	no	167	no	3
Naphthalene	mg/kg	44	2	5%	0.0014	0.0014	no	3721	no	3
Octachlorostyrene	mg/kg	44	3	7%	0.016	0.025	yes	na[a]		
Phenanthrene	mg/kg	44	12	27%	0.0021	0.0052	no	4712	no	3
Pyrene	mg/kg	44	11	25%	0.0021	0.015	no	2273333	no	3
1,1-Dichloroethene	mg/kg	44	1	2%	0.00053	0.00053	no	807547	no	3,5
1,2-Dichlorobenzene	mg/kg	44	2	5%	0.00031	0.00038	no	981579	no	3
2-Butanone	mg/kg	44	28	64%	0.00075	0.0041	no	8317073	no	3
Acetone	mg/kg	44	35	80%	0.0043	0.075	no	1333333	no	3
Chloromethane	mg/kg	44	1	2%	0.00062	0.00062	no	4323	no	3,5
Methylene chloride	mg/kg	44	8	18%	0.00054	0.00097	no	21237	no	3
Tetrachloroethene	mg/kg	44	1	2%	0.00086	0.00086	no	2023	no	3,5
Toluene	mg/kg	44	19	43%	0.00055	0.002	no	260500	no	3
Total PCBs	mg/kg	2	2	100%	0.0041	0.0088	yes	94	yes	2
Perchlorate	mg/kg	44	37	84%	0.0357	17	no	47	yes	6
TCDD TEQ[g]	pg/g	21	21	100%	0.0053	64.6	yes	15	yes	2
Antimony	mg/kg	44	5	11%	0.14	3.4	no	134	no	3
Boron	mg/kg	44	17	39%	3.6	112	yes	893	yes	6
Cadmium	mg/kg	44	36	82%	0.04	0.57	no	970	no	3
Copper	mg/kg	44	44	100%	12.6	140	no	301	no	3
Iron	mg/kg	44	44	100%	10700	45600	yes	2	yes	4
Lead	mg/kg	44	44	100%	7	112	yes	7	yes	4
Molybdenum	mg/kg	44	43	98%	0.31	32.7	no	174	no	3
Selenium	mg/kg	44	4	9%	0.8	0.9	no	6311	no	3
Silver	mg/kg	44	5	11%	0.092	1.7	no	3341	no	3
Tin	mg/kg	44	2	5%	0.41	0.47	no	212766	no	3
Titanium	mg/kg	44	44	100%	380	1080	no	93	no	3
Tungsten	mg/kg	44	43	98%	0.12	0.62	no	13742	no	3
Uranium	mg/kg	44	44	100%	26.6	54.9	no	1413	no	3
Vanadium	mg/kg	44	44	100%	26.6	54.9	no	103	no	3
Asbestos - Long Chrysotile	fibers	18	3	17%	1	3	yes	na	yes	7

(1) chemical is a PBT or Class A carcinogen but BCL/maximum detect ratio is greater than 100
(2) chemical is a PBT or Class A carcinogen and BCL/maximum detect ratio is less than 100
(3) chemical is not a PBT or Class A carcinogen and BCL/maximum detect ratio is greater than 10
(4) chemical is not a PBT or Class A carcinogen but BCL/maximum detect ratio is less than 10
(5) chemical is detected in less than 5% of samples
(6) chemical would otherwise be eliminated but is retained as it may be associated with historic site activities (LOUs)
(7) asbestos does not have a BCL; therefore, it is identified as a COPC if detected in one or more samples

[a] pending develoment of toxicity comparison criteria
PBT: persistent bioaccumulative and toxic