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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

JUN 06 2000

FILE COPY

Reply To
Attn Of: WCM-126

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. George Sylvester
Van Waters & Rogers Inc.
32131 Steven Way
Conifer, Co 80433

Re: Cleanup Level Determination Approach
Van Waters & Rogers Inc., Portland, Oregon
EPA ID No. ORD. 00922 73998
RCRA Docket No. 1087-10-18-3008

Dear Mr. Sylvester:

This letter documents agreements reached in the meeting on May 10, 2000 between Van Waters & Rogers Inc. (VW&R) representatives and the United States Environmental Protection Agency (EPA). As was agreed in the meeting, EPA reviewed the Technical Memorandum Re: *Proposed Cleanup Level Determination Approach* (EMCON 1998) in the context of current understanding of site specific conditions and the cleanup strategy for this site. Our comments are provided in the enclosure to this letter.

Pursuant to the June 1988 Administrative Order on Consent, please refer to the enclosed comments and revise the Technical Memorandum so all of EPA's concerns are adequately addressed. The revised document must include a thorough conceptual site model which identifies <u>all potential current and future exposure pathways</u>. All exposure assumptions and toxicological values must be proposed to EPA for use in developing final cleanup levels.

The revised Technical Memorandum must be submitted to EPA within 60 (sixty) days of receipt of this letter.

Additionally, please note that EPA's specific comment **3.g** summarizes the second agreement reached in the May 10th meeting. It states that VW&R will use the EPA model to predict indoor air concentrations to predict protective groundwater cleanup levels.

We hope our comments answer all your questions on the approach to cleanup level determination. Should you have questions related to this correspondence, please don't hesitate to call me at 206/553-5122.

Sincerely,

Anna I. Filutowski
Project Manager

Enclosure

cc: Jim Hooper, VW&R
Dan Balbiani, IT Corporation

bcc: Rene Fuentes, EPA-OEA
Bob Hartman, EPA-ORC
Anna Filutowski, EPA-RCU (3 copies)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

Reply To
Attn Of: OEA-095

MEMORANDUM

May 18, 2000

To: Anna Filutowski,
Office of Waste and Chemicals Management (HW-104)

From: Marcia Bailey, Marcia Bailey
Office of Environmental Assessment

Re: Review of Van Waters & Rogers Technical Memorandum
Proposed Cleanup Level Determination Approach

Per your request at our meeting with VW&R representatives on May 10, I reviewed the above-named document. Below are my comments.

Major Issues

1. There is no discussion (or even recognition) in the memo of the discharge of ground water beneath the facility. My understanding is that the ground water beneath the facility discharges to the Willamette River less than a half-mile away. It is reasonable to assume that facility-sourced ground water contamination will impact the river and its sediments, unless the ground water contamination is addressed promptly and aggressively to reduce that likelihood. If timely and effective corrective measures are not undertaken at the facility, ground water cleanup levels will have to incorporate potential human and ecological receptors to facility-related surface water and sediments.

2. The memo includes incorrect statements or assumptions concerning the appropriate assessment of exposure to contaminated soil, despite the fact that the document references the EPA Region 10 1998 "Interim Final Guidance: Developing Risk-Based Cleanup Levels at Resource Conservation and Recovery Act Sites in Region 10." This guidance makes clear that soil cleanup levels for direct contact with soil must consider ingestion, inhalation, and dermal pathways concomitantly. The VW&R memorandum states that "[i]nhalation of dust will not be evaluated quantitatively, because CULs for soil ingestion are more protective that those for dust inhalation for the soil COPCs identified at the site." This does not reflect the fact that the direct contact exposures with soil are concomitant and therefore the risks must be added together, since a given person would be expected to be exposed via all methods of direct exposure, i.e., incidental ingestion, inhalation of volatiles and particulates, and dermal

exposure.
This is a risk assessment issue that Region 10 risk assessors consistently emphasize, for risk assessments in both RCRA and Superfund.

3. There are incorrect statements made concerning the protectiveness of the evaluation of indoor air v. ambient air. The memo dismisses all evaluation of ambient air, stating that "CULS for an enclosed space are more protective (i.e., lower) than those for an outdoor setting." It is appropriate to assume that the evaluation of indoor air is more protective than ambient air; however, in the VW&R memo, it is not ambient air per se which is anticipated as an exposure pathway; rather, exposure to air during trenching operations is anticipated. A trenching scenario could easily be more hazardous to a worker via inhalation than would inhalation of indoor air. Both acute and chronic inhalation scenarios must be considered for a trenching scenario. Acute exposures have apparently not been considered in the VW&R memo. In addition, there is no justification of the assumption that the trenching scenario will be limited to 30 days. [Note: Expeditious and effective remediation of the ground water and soil vapor contamination should significantly reduce the concerns regarding exposures to future trenching scenarios.]

4. Exposure scenarios for off-site workers and residents (current and future) who may be exposed chronically or acutely to indoor or outdoor air contaminated with vapors from facility-sourced ground water contamination must be developed, along with the appropriate ground water cleanup levels.

5. The memo is written in such a manner as to suggest that all future percolation via soil to ground water has been obviated by the presence of a cap, and that, therefore, the leaching of chemicals to ground water is limited to volatiles which may exist in soil in exceedance of soil saturation levels. There are multiple issues associated with this suggestion:

a) The pavement material over the site apparently does not constitute a RCRA-engineered cap. Therefore, it cannot be assumed to be a permanent remedy. The degree to which it acts as an efficient barrier to rain or other water infiltration is not known.

b) The facility is not entirely paved. I understand that roughly 10-15% of the facility surface area is not covered with structures or pavement. Therefore, percolation occurs via unpaved surface areas. Terrestrial ecological and human exposures to unpaved soils must be considered.

c) It is not clear why, as suggested in the memo, organic chemicals which exceed soil saturation levels should be allowed to be left in place, whether or not they exist under a RCRA cap. Chemicals in soil which are predicted to have the potential to move into ground water at levels of concern must be removed and/or treated. Again, an aggressive soil vapor and ground water extraction and treatment system should alleviated the need to <u>directly</u> remediate organic chemicals in soil under the paved area of the facility.

6. There does not appear to be any federal or state authority or policy which would cause EPA to not consider the underlying aquifer as a potential future drinking water resource. Therefore, appropriate MCLs and risk-based concentrations should be considered when developing ground water cleanup levels.

Specific comments not covered by the above

1. Summary of HEA:

Future scenarios for on-site workers would include the following in addition to what is listed:
1) Inhalation of surface level particulates (dust):
2) Ingestion of surface soil;
3) Dermal contact with surface soil;
4) Inhalation of VOCs from surface soil.

2. Exposure Pathways to be Evaluated in CMS:

Soil:

a. It does not appear that horizontal migration of soil contamination (especially in vapor form) has been considered, but should be.

b. It is not explained how soil to ground water migration via NAPL will be evaluated.

3. Development of Cleanup Levels:

Step 1, Screening Levels and Identification of COCs:

a. There is no discussion of cleanup levels for soil to protect migration to ground water.

b. The occupational soil ingestion rate of 50 mg/day for occupational trenching scenarios is inadequate. See the attached Region 10 policy memo on soil ingestion rates. If the Oregon DEQ has default scenarios for this exposure, they should be presented and evaluated for pertinence to this facility.

c. It is not clear what "subchronic" reference doses will be used for noncarcinogens. There are few subchronic RfDs available. There is no presentation of what the "subchronic" scenario consists of; and all toxicity values proposed for use, whether subchronic or chronic, must be presented for EPA evaluation prior to their incorporation into a cleanup level equation.

d. Dermal exposure factors must be altered to reflect current EPA Region 10 guidance, attached (and as mentioned in Marc Stifelman's November 24, 1998 memo).

e. All chronic, subchronic, acute and cancer potency factors must be proposed so that EPA

can evaluate their accuracy according to current criteria, and can provide additional values as appropriate.

f. Insufficient explanation and justification are given for the soil-specific parameter used for soil saturation limits. Documentation and justification must be provided for soil type, soil porosity, volumetric water content in the vadose zone, etc. At a minimum, a reference to another document submitted to EPA which describes these parameters and their justifications must be provided in this context.

g. It was agreed at the meeting on May 9, 2000 between EPA and VWR representatives that the EPA spreadsheet to predict indoor air concentrations would be used to predict protective groundwater cleanup levels. All site-specific parameters used as inputs to the J-E model must be proposed and justified to EPA prior to their incorporation into the ground water-to indoor air model exercise.

Step 2: Calculation of Preliminary Cleanup Levels:

This states that a "preliminary CUL" based on 1E-5 and HQ=1 will be calculated for each COC. This is a risk management decision that does not appear to have been made by EPA at this time. The default cleanup levels should reflect the Oregon limits of 1E-6 for a single carcinogen and HQ=1 for an individual noncarcinogen. The second paragraph discusses how certain COCs may be eliminated based on relative risk; this is inappropriate. A chemical-specific justification to EPA must be made for the proposal to eliminate any COC. In common practice, COCs which are retained via screening are not eliminated until the risk management stage, in order to preserve the goal of transparency in the characterization of risk. However, EPA may consider a request to eliminate COCs prior to that stage, based on site-specific circumstances, e.g., the presence of various other chemicals which render a given COC less important.

Step 3: Calculation of Final Cleanup Levels:
This step is inappropriately included in this memo, because it presumes how acceptable risk and hazard levels will be established. There is no discussion of ODEQ statutory and regulatory provisions regarding acceptable risks and hazards, and this must be included, whether or not EPA decides to make cleanup level decisions which comport with ODEQ standards. In addition, this step presumes that an excess cancer risk of "10-4" is acceptable "because the site is an operating industrial facility." Such a justification is not reflected in EPA risk assessment practices. Occupational risks and hazards are estimated based on <u>exposure assumptions</u> that are different from those of residential receptors. In contrast, the justification put forth in this memo would require one to assume that a <u>higher overall excess cancer risk is acceptable for occupational workers</u>. This is not appropriate. All human receptors should be protected using the same risk and hazard target levels.

The options given for distributing the total target cancer risk are reasonable, given the uncertainties inherent in variable remediation rates of various chemicals in a given medium.

However, it is m y understanding that Oregon DEQ statutory requirements specify that cleanup levels for multiple carcinogens not exceed 1E-6 for any single chemical and a total of 1E-5 for the mixture. The Oregon requirements should be outlined here.

Summary

There are many deficiencies in this technical memorandum. The facility should include a thorough conceptual site model which identifies all potential current and future complete exposure pathways. All exposure assumptions and toxicological values must be proposed to EPA for use in developing cleanup levels. The assumption that final cleanup levels representing "total site cancer risk" of 1E-4 is inappropriate, since 1) it is inconsistent with Oregon statutory requirements for acceptable excess cancer risk levels at hazardous waste cleanup sites; and 2) it is ultimately an EPA risk management decision as to what the acceptable level will be. VW&R can readily provide a table which provides cleanup levels at various excess cancer risk levels. No potential exposure pathways should be eliminated without the approval of EPA.

Thank you for the opportunity to review this technical memorandum.

Attachments

TABLE 4-6 (amended 01/26/00)

RECOMMENDED DEFAULTS FOR DERMAL EXPOSURE FACTORS[a]
REGION 10 RCRA RISK-BASED CLEANUP LEVEL GUIDELINES

	Water Contact				Soil Contact	
	Bathing		Swimming			
	Central	Upper	Central	Upper	Central	Upper
Event time and frequency	10 minutes event 1 event/day 350 days/year	15 minutes/event 1 event/day 350 days/year	Site-specific 60 minutes 1 event/month	site-specific	site-specific	350 events/year - residential 250 events/year - occupational
Exposure duration	9 years - adult	30 years - adult 6 years - child	9 years - adult	30 years - adult 6 years - child	9 years - adult	30 years - adult 6 years - child
Skin surface area	18,000 cm^2 - adult[b] 6,500 cm^2 - child[b]	none[e]	18,000 cm^2 - adult[b] 6,500 cm^2 - child[b]	none[e]	2,500 cm^2 - adult[c] 2,200 cm^2 - child[d] 2,500 cm^2- occupational[c]	none[e]
Soil-to-skin adherence rate[f]	–	–	–	–	0.1 mg/cm^2 - event - adult 0.2 mg/cm^2 - event - child 0.1 mg/cm^2 - event - occ.[g]	child and adult – none[h] 0.2 mg/cm^2 - event - occ.[i]

Notes:

a Recommended defaults compiled by EPA (1997b), with background data and rationales for the defaults derived from EPA information (1992d) and the 1996 Science Advisory Board review draft of the *Exposure Factors Handbook* (1996e draft update of EPA 1989d)

b Assumes total body surface area for adult and child.

c For adult wearing short-sleeved shirt, shorts, and shoes, with exposed skin surface limited to face, hands, and forearms.

d For children wearing short-sleeved shirt and shorts, but no shoes, with exposed face, hands, forearms, lower legs, and feet.

e Skin surface area has no upper value since only one body weight per category is available.

f From Kissel (1996 and unpublished); values for adherence rates are under development and are subject to change. Consult a Region 10 Risk Assessor for currently recommended values.

g Value as established for a gardener.

h Only central values are recommended, as they are based on high-end activities and are therefore sufficiently conservative.

i Value as established for a utility worker.

– Not applicable.

TABLE 4-5

RECOMMENDED DERMAL ABSORPTION FACTORS FOR SOIL REGION 10 RCRA RISK-BASED CLEANUP LEVEL GUIDELINES

Compound	Dermal Absorption Factor	Reference
Arsenic	0.03	Wester et al. (1993a)
Cadmium	0.001	Wester et al. (1992a) EPA (1992d)
Chlordane	0.04	Wester et al. (1992b)
2,4-D	0.05	Wester et al. (1996)
DDT	0.03	Wester et al. (1990)
TCDD Low Organic Soil (<10%) High Organic Soil (>10%)	 0.03 0.001	 EPA (1992d) EPA (1992d)
Other Dioxins and Dibenzofurans	0.03	EPA (1992d)
PAHs	0.13	Wester et al. (1990)
PCBs	0.14	Wester et al. (1993b) EPA (1992d)
Pentachlorophenol	0.25	Wester et al. (1993c)
Generic Defaults		
Volatile organic compounds with vapor pressure ≥ benzene	0.0005	EPA 1995f, Skowronski et al. 1988
Volatile organic compounds with vapor pressure < benzene	0.03	EPA 1995f
Semivolatile organic compounds	0.1	Ryan et al. (1987)
Inorganic Compounds	0.01	Ryan et al. (1987)

Sources: EPA 1997b, EPA 1992d

Notes:

EPA	U.S. Environmental Protection Agency
2,4-D	2,4-dichlorophenoxy acetic acid
DDT	Dichlorodiphenyltrichloroethane
TCDD	Tetrachlorodibenzo-p-dioxin
PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyl

This table was amended on 01/26/00.

REGION 10 SUPPLEMENTAL HUMAN HEALTH RISK ASSESSMENT GUIDANCE
OFFICE OF ENVIRONMENTAL ASSESSMENT
SOIL INGESTION RATES

50 milligrams per day RME Adult, commercial, primarily indoor activity

100 milligrams per day RME adult residential and also central tendency child, annual average, not to be used for duration shorter than one year.

200 milligrams per day RME child, residential and commercial/industrial. Also, RME Adult occupational in a soil contact exposure scenario. An important aspect of this contact rate is that it represents an annual average with exposure duration occurring during a span of at least 50 weeks per year.

300 milligrams per day 90th percentile for child (age 12 months to 72 months) and also soil contact intense adult exposure scenario. An important aspect of this contact rate is that it represents a short exposure duration, e.g. camping or working for 3-5 days per week for a few weeks out of the year.

Citations

EFH, 1997 (EPA/600/P-95/002Fa, pp. 4-7 thru 4-8) and OSWER directive 9285.6-03, 1991.

Kissel, J.C., J.H. Shirai, K.Y. Richter and R.A. Fenske. 1998. "Empirical investigation of hand-to-mouth transfer of soil." Bull. Environ. Contam. Toxicol. 60(3): 379-86.

Notes

The acronym, RME, refers to the "reasonable maximum exposure" as described in RAGS, Part A, section 6.1.2. The recommendations provided in this regional guidance are used in lieu of those provided in OSWER Directive 9285.6-03, "Standard Default Exposure Factors", dated March 25, 1991. The soil ingestion rate recommendations presented here are used in combination with other exposure parameters to develop an estimate of the RME.

Additional Discussion

Subject: 300 mg/day RME adult soil IR

There are no citations for adult soil ingestion rates for contact intensive activities except for Hawley (1985, see EFH, pp 4-16 through 4-17). The Hawley citation provides a rate of 480 mg/day and is a modeled (not measured) rate. The consensus rationale of the R10 risk assessors is that this soil ingestion rate should not be used.

The primary reference upon which the 300 mg/day recommendation is based (for RME adult soil

contact intense activity) is the Van Wijnen et al work which is summarized in the 1997 EFH (see Vol 1, page 4-7). However, this is a 3-5 day exposure study of children staying at campgrounds with the study objective that this physical setting maximizes the possibility of direct contact with soil. The consensus rationale of the R10 risk assessors is that adults in activities in direct contact with soil would be unlikely to have soil ingestion rates greater that those shown for children in this short duration study.

A recent work by Stanek et al (Ecotoxicology and Environmental Safety, Soil ingestion in adults-results of a second pilot study, 36:249-257) provides a upper-percentile rate of ~300 mg/day for adults over a 4 week period engaged in routine day-to-day activities. This estimate, as stated by the authors, is highly uncertain due to the small size of the study. Although the estimate is uncertain, the Stanek report provides evidence that adults can have soil ingestion rates in the magnitude of 300 mg/day. The consensus rationale of the R10 risk assessors is that adults in activities in direct contact with soil would be unlikely to have soil ingestion rates lower that than upper percentile shown in this long term study of adults in day-to-day activities which may have include occasional direct soil contact activities.

The recommendation regarding whether a proposed exposure scenario is "soil contact intensive" is based on knowledge of site conditions, consistency with EPA-recommended exposure assessment and risk assessment practices and best professional judgement.

G:/sfguidance/soilingest.wpd January 25, 2000