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LETTER AND COMMENTS FROM U S EPA REGION IV REGARDING ECOLOGICAL RISK ASSESSMENT CONSIDERATIONS AND TIMING OF ACTIVITIES AND INCLUSION OF STAKEHOLDERS NAS WHITING FIELD FL
12/22/1998
U S EPA REGION IV

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4

61 Forsyth Street
Atlanta, Georgia 30303-3104

December 22, 1998

4WD-OTS

MEMORANDUM

SUBJECT: Ecological Risk Assessment at Military Bases: Process Considerations, Timing of Activities, and Inclusion of Stakeholders

FROM: Ted W. Simon, PhD, DABT
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CC: Elmer W. Akin,
Chief, OTS

The purpose of this memorandum is to provide information regarding the implementation of EPA's program guidance, *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* at Department of Defense facilities in Region 4. The program guidance will henceforth be referred to as the "Process Document." The Process Document is complementary to the Deparment of Defense guidance , *Tri-Services Procedural Guidelines for Ecological Risk Assessment.*

The Process Document outlines the eight steps that make up the Ecological Risk Assessment (ERA) process. This memorandum presents the timing and requirements for each step in the process, including submission of interim deliverables. Appropriate stakeholders should be included at all stages of the process, and a list of stakeholders is included. Finally, a description of the ERA process is included, and the requirements for each step are discussed.

Communication among all stakeholders is a necessary and integral part of a successful ecological risk assessment effort. Questions regarding the process and timing of ERA or about technical issues in ERA should be directed to Sharon Thoms at thoms.sharon@epa.gov or Lynn Wellman at wellman.lynn@epa.gov.

Stages of the Ecological Risk Assessment Process

Ecological risk assessment consists of an eight step process with five Scientific/Management Decision Points. The process is described in detail in the Agency's program guidance, the Process Document. Exhibit 1-2 from the Process Document provides a flow chart for the process and is attached to this memorandum. The Process Document supersedes previous program guidance, *Risk Assessment Guidance for Superfund, Volume 2: Environmental Evaluation Manual.*

The Risk Assessment Forum's *Guidelines for Ecological Risk Assessment* provides broad guidelines for all Agency programs but is not specific to any program. In contrast, the Process Document is specific to the Office of Solid Waste and Emergency Response (OSWER) program. The Process Document has been determined to be consistent with the Risk Assessment Forum's Guidelines.

☞ *The Process Document is the appropriate guidance for Superfund risk assessments and supersedes previous guidance.*

The Process Document may be downloaded from the Environmental Response Team Center Homepage at http://204.46.140.12/media_resrcs/media_resrcs.asp.

Steps one through five of the process occur prior to the performance of the Remedial Investigation (RI) or RCRA Facility Investigation (RFI). Because the first five steps precede the RI/RFI data collection, there is a chance that sufficient resources will not be devoted to these initial steps. Successful completion of steps one through five is needed to minimize problems in steps six through eight.

☞ *Waiting until RI or RFI data is available will result in additional data collection. This additional data collection may be costly and potentially redundant.*

Communication among stakeholders early in the process is important. The five Scientific/Management Decision Points provide an opportunity to reach agreement between the risk manager for the site (e.g. the remedial project manager), the risk assessment review team and any other stakeholders in the process.

Timing of Ecological Risk Assessment Activities

A major portion of the thought process in designing and conducting a technically defensible ERA occurs in the early steps of the process, particularly steps three and four. ERA activities should commence as soon as environmental samples are available for a given site. Often, environmental samples are available prior to the development of a formal sampliing and analysis plan (SAP). Samples will be available during the Preliminary Assessment/Site

Investigation (PA/SI) in the CERCLA process, a RCRA Facility Assessment (RFA) or Confirmation Sampling (CS) in the RCRA process or the Environmental Baseline Survey (EBS), which may be the earliest available information. Of course, at this early stage, only a limited number of environmental samples are available.

☞ *The first four steps of the ERA process are performed prior to the development of the work plan for the RFI or RI.*

The albeit limited sampling can be used to conduct a first iteration of steps one through four of the ERA process. This information should be used in the work plan for the next investigative phase.

Coordination with Stakeholders

Stakeholders in the ERA process include state and Federal regulatory and scientific personnel, their DOD counterparts, and natural resource trustees. Trustees may include federal agencies such as the Department of Interior (DOI), the National Oceanic and Atmospheric Administration (NOAA), state and/or tribal officials designated by the governor of the state, as well as private and non-profit conservation organizations. The public is also a stakeholder, and members of the public should also be included in the decision process.

Notification of the trustees is required early in the ERA process. Natural resource trustees and their representatives may supply technical expertise and support during the ERA process in addition to their specific roles as trustees. Federal and state trustees are listed in *Supplemental Guidance to RAGS: Region 4 Bulletins. Ecological Risk Assessment, Bulletin No. 4 - Natural Resource Trustees*. This guidance is available at http://www.epa.gov/region4/wastepgs/oftecser/otsguid.htm.

It is suggested that all stakeholders be provided with copies of the interim deliverables at each of the SMDPs. Stakeholders should be invited to participate in the planning of activities for each step of the process.

The Ecological Risk Assessment Process

Step 1: Screening Level Problem Formulation and Ecological Effects Evaluation

Step one activities can commence once this preliminary data is in hand. Documentation of the activities in the steps one and two should be provided to all stakeholders prior to discussions associated with the step two Scientific/Management Decision Point.

☞ *Risk management considerations are considered only minimally, if at all, in the screening level ERA.*

The screening level problem formulation considers aspects such as:

- ecological setting
- chemicals or classes of chemicals
- contaminant fate and transport processes
- mechanisms of ecotoxicity of the contaminants for the probable categories of receptors
- potentially complete exposure pathways
- preliminary endpoints

The screening level problem formulation should contain maps, figures and color photographs of the site and surrounding area. Site visits by review personnel are necessary, and the risk manager should budget and plan for the required travel.

Step 2: Screening-Level Preliminary Exposure Estimate and Risk Calculation

The screening-level exposure estimate and risk calculation is conducted with assumptions that maximize risk to ensure that sites with unacceptable risk will not be dropped at this screening step. The maximum concentrations of chemicals in each medium are compared to ecological screening values to determine chemicals of potential concern (COPCs). Screening levels for sediment and surface water, both freshwater and saltwater, can be found in Region 4 guidance bulletins available at http://www.epa.gov/region4/wastepgs/oftecser/otsguid.htm. Copies of these values are attached. Draft screening levels for soil have recently been compiled by Region 4 and are attached.

To perform the screening level risk calculation, the maximum detected concentration of a given chemical is divided by the ecological screening value. The result is the Screening Hazard Quotient. Contaminants with a Screening Hazard Quotient of one or greater are carried through to step three, Problem Formulation. Chemicals without screening values are also carried through to Problem Formulation.

The first Scientific/Management Decision Point occurs after step two. The Screening-Level ERA should be submitted to Region 4 for approval. Review personnel include both EPA staff and EPA contractors. The purpose of this SMDP is to determine whether a site will continue into step three. Generally, sites with Screening-Level Hazard Quotients greater than one or with chemicals present that have no screening values are carried into step three.

Step 3: Problem Formulation

Problem formulation begins with the refinement of the COPCs. This step is an opportunity for facilities to present a reasoned toxicological approach for the elimination of one or more COPCs from future consideration. At this step, negotiations are undertaken to alter assumptions associated with the Screening Level ERA. These assumptions include but are not

limited to area use factors, incidental soil/sediment intakes, background/reference location comparisons and the nature of the contaminants.

Contaminants generally fall into two classes: 1) chemicals for which the exposure route of concern is direct contact; and 2) chemicals for which the exposure route of concern is the food chain. Most non-bioaccumulative chemicals occur in the first class. Chromium is an example. Bioaccumulative and biomagnifiable chemicals comprise the second class. DDT and polychlorinated biphenyls (PCBs) are examples. Some chemicals possess characteristics of both classes. Toxaphene is an example.

For chemicals in class one, for which the major concern is direct toxicity, the assessment endpoint will generally be developed based on a common habitat among potentially affected species. Terrestrial invertebrates are an example. For chemicals in class two, for which the major concern is food chain exposure, the assessment endpoint will generally be developed based on a common feeding strategy among potentially affected species. Avian piscivores or fish-eating birds are an example.

Problem formulation is a refinement of the issues addressed in the Screening-Level ERA. Problem formulation includes the designation of assessment endpoints and the development of the ERA conceptual model.

☞ *The ERA conceptual site model supplies working hypotheses or scientific questions that site investigation and sampling will address.*

Risk management issues such as background comparison, are introduced for discussion among stakeholders. The Problem Formulation document is an interim deliverable that should be submitted to Region 4 for review. Following the review of this document, the second Scientific/Management Decision Point occurs. This SMDP is an opportunity for stakeholders to provide input to the process prior to data collection.

Step 4: Study Design and Data Quality Objectives Process

The Study Design seeks to prove or refute the hypotheses in the ERA conceptual site model developed in step three. The study design should provide all procedures used for sampling and all methods, models or techniques used for data analysis.

Generally, ERA data collection involves sampling along a chemical concentration gradient. Biotic and abiotic samples should be collected at a common location. Data of this nature enables the risk assessment team to understand the relationship between concentrations in abiotic media and biological effects measured either by tissue residues or toxicity. Failure to collect colocated biotic and abiotic samples will defeat the purpose of gradient sampling.

The Data Quality Objectives Process should be followed to set limits on decision errors and to obtain samples most likely to provide answers to the questions posed in Problem Formulation. The Guidance for Data Quality Objective QA/G-4 should be consulted. This guidance is available at http://es.epa.gov/ncerqa/qa/qa_docs.html.

The DQO process is applicable for obtaining samples from both biotic and abiotic sources. The study design should discuss methods of data analysis and identify criteria for acceptable risks.

A Scientific/Management Decision Point occurs at this stage for stakeholders to provide input to and approve the Study Design.

Step 5: Verification of Field Sampling Design

Step five confirms that the proposed data collection is possible and feasible in the field. Step five ensures that the work plan and the various Sampling and Analysis Plans (SAPs) will meet the needs of the assessment outlined in Problem Formulation.

Involvement of review personnel is critical. Field screening methods or rapid analytical are techniques to establish a concentration gradient and guide further sampling efforts.

An SMDP occurs at this stage to permit stakeholder input on any changes to the Study Design.

Step 6: Site Investigation

Step six is the performance of the RI/RFI data collection. Any deviation from the Study Design and associated SAP for the ERA requires agreement among the stakeholders. Hence, the process flow chart shows a possible SMDP at this stage.

Step 7: Risk Characterization

The data collected in step six is analyzed using the methods developed in step four.

Step 8: Risk Management

Step eight is risk management and includes the selection of a remedial alternative. The selection procedure evaluates the ecological impacts of the various remedial alternatives. These alternatives are presented in the Feasibility Study (FS) under CERCLA or the Corrective Measures Study (CMS) under RCRA. The preferred remedial alternative is selected in the Proposed Plan and documented in the Record of Decision or Statement of Basis.

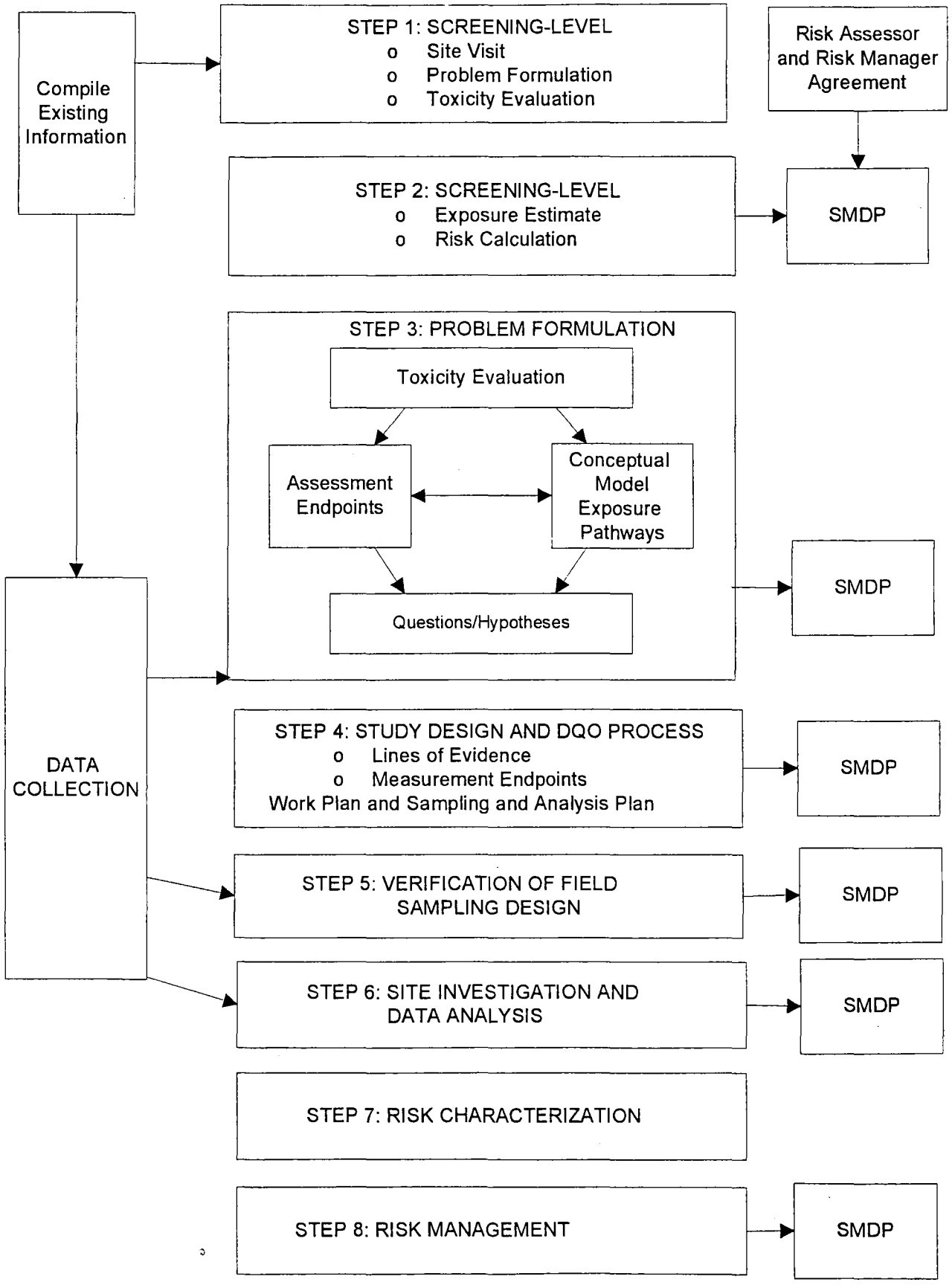
Selection of a remedial alternative is the quintessence of the risk management decision and will necessarily involve discussions with all stakeholders. An SMDP occurs at this last step.

Attachments

1) Exhibit 1-2 from Ecological Risk Assessment Guidance for Superfund. Process for Designing and Conducting Ecological risk Assessments
2) Ecological Screening Levels for Sediment and Surface Water
3) Draft Ecological Screening Levels for Soil

T.W. Simon/tws:4WD-OTS:28642/12/22/98/A:\DISK5\DEC98\ECOPROC.MEM

EXHIBIT 1-2
Eight-step Ecological Risk Assessment Process for Superfund



Recommended Ecological Screening Values (mg/kg) for Soil

Chemical	Screening Value	Source
Inorganics		
Aluminum	50	2
Antimony	3.5	5
Arsenic	10	2
Barium	165	5
Beryllium	1.1	5
Boron	0.5	2
Cadmium	1.6	5
Chromium	0.4	2, 3
Cobalt	20	1, 2, 4
Copper	40	5
Iron	200	2
Lanthanum	50	2
Lead	50	1, 2
Lithium	2.0	2
Manganese	100	2
Mercury (Inorganic)	0.1	2
Methylmercury	0.67	5
Molybdenum	2.0	2
Nickel	30	2
Selenium	0.81	5
Silver	2.0	2
Technetium	0.2	2
Thallium	1.0	2
Tin	53	5
Titanium	1000	2
Tungsten	400	2
Uranium	5.0	2
Vanadium	2.0	2
Zinc	50	2

Recommended Ecological Screening Values (mg/kg) for Soil (Continued)

Chemical	Screening Value	Source
Mineral Pollutants		
Bromine	10	2
Cyanide, free (total)	0.9	3
Cyanide, complex (total)	5.0	1
Thiocyanates	20	4
Fluorine	30	2
Iodine	4.0	2
Sulfur	2.0	1
Monocyclic Aromatic Hydrocarbons		
Benzene	0.05	4
Biphenyl	60	2
Ethylbenzene	0.05	1, 4
Toluene	0.05	1, 4
Trichloroethylene	0.001	4
Xylene	0.05	1, 4
Total MAHs	0.1	1
Phenolic Compounds		
Phenol	0.05	4
3-Chlorophenol	7.0	2
Chlorophenols (each)	0.01	1
Chlorophenols (total)	0.01	1
3,4-Dichlorophenol	20	2
Dichlorophenols (total)	0.003	4
2,4-Dinitrophenol	20	2
Monochlorophenols (total)	0.0025	4
4-Nitrophenol	7.0	2
Pentachlorophenol	0.002	4
2,3,4,5-Tetrachlorophenol	20	2
Tetrachlorophenols (total)	0.001	4
2,4,5-Trichlorophenol	4.0	2

Recommended Ecological Screening Values (mg/kg) for Soil (Continued)
4

Chemical	Screening Value	Source
Phenolic Compounds (continued)		
2,4,6-Trichlorophenol	10	2
Trichlorophenols (total)	0.001	4
Polycyclic Aromatic Hydrocarbons		
Acenaphthene	20	2
Anthracene	0.1	1
Benzo(a)Pyrene	0.1	1
Chloronaphthalene	1.0	4
Fluoranthene	0.1	1
Naphthalene	0.1	1
Phenanthrene	0.1	1
Pyrene	0.1	1
Total PAHs	1.0	1, 4
Chlorinated Hydrocarbons		
Aliphatic chlorinated hydrocarbons (each)	0.1	1
Aliphatic chlorinated hydrocarbons (total)	0.1	1
Carbon tetrachloride	1000	2
Chlorinated hydrocarbons (total)	0.1	1
Chloroacetamide	2.0	2
3-Chloroaniline	20	2
Chlorobenzene (each)	0.05	1
Chlorobenzene (total)	0.05	1
Cis-1,4-dichloro-2-butene	1000	2
2,4-Dichloroaniline	100	2
3,4-Dichloroaniline	20	2
Dichlorobenzene	0.01	4
1,2-Dichloroethane	0.4	4
Dichloromethane	2.0	4
1,2-Dichloropropane	700	2
Hexachlorobenzene	0.0025	4

Recommended Ecological Screening Values (mg/kg) for Soil (Continued)
2

Chemical	Screening Value	Source
Chlorinated Hydrocarbons (cont.)		
Hexachlorocyclopentadiene	10	2
Nitrobenzene	40	2
N-Nitrosodiphenylamine	20	2
Pentachloroaniline	100	2
Pentachlorobenzene	0.0025	4
PCBs (total)	0.02	4
Polycyclic chlorinated hydrocarbons (total)	0.1	1
2,3,5,6-Tetrachloroaniline	20	2
Tetrachlorobenzene	0.01	4
Tetrachloroethylene	0.01	4
Carbon tetrachloride	0.001	4
Trans-1,4–dichloro-2-butene	1000	2
2,4,5-Trichloroaniline	20	2
Trichlorobenzene	0.01	4
Chloroform	0.001	4
Vinyl chloride	0.01	4
Pesticides		
Aldrin	0.0025	4
Atrazine	0.00005	4
DDT/DDE/DDD	0.0025	4
Dieldrin	0.0005	4
Endrin	0.001	4
Carbaryl	0.5	4
Carbofuran	0.2	4
HCH-α	0.0025	4
HCH-β	0.001	4
HCH-γ (Lindane)	0.00005	4
Maneb	3.5	4
Organochlorinated (each)	0.1	1

Recommended Ecological Screening Values (mg/kg) for Soil (Continued)

Chemical	Screening Value	Source
Pesticides (cont.)		
Organochlorinated (total)	0.1	1
Total Pesticides	0.1	1
Other Pollutants		
Acrylonitrile	1000	2
Catechol	20	4
Cresols	5.0	4
Cyclohexane	0.1	1
Cyclohexanone	0.1	4
Diethylphthalate	100	2
Dimethylphthalate	200	2
Di-n-butylphthalate	200	2
Ethylene glycol	97	3
Furan	600	2
Gasoline	20	1
Hydrochinon	1.0	4
Mineral oils	50	4
Phthalates (total)	0.1	4
Pyridine	0.1	1, 4
Resorcinol	1.0	4
Styrene	0.1	1, 4
Tetrahydrofuran	0.1	1, 4
Tetrahydrothiophene	0.1	1, 4

Source:

1: Beyer,WN. 1990 Evaluating Soil Contamination. United States Fish and Wildlife Service. Biological Report 90(2).

2: Efroymson, R.A., M.E. Will, G.W. Suter. 1997a Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision. Oak Ridge National Laboratory, Oak Ridge, TN ES/ER/TM-126/R2 (http://www.hsrd.ornl.gov/ecorisk/reports.html.
Efroymson, R.A., M.E. Will, G.W. Suter. 1997b Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. Oak Ridge National Laboratory, Oak Ridge, TN ES/ER/TM-85/R3 (http://www.hsrd.ornl.gov/ecorisk/reports.html.

3. Canadian Council of Ministers of the Environment (CCME). March 1997. Recommended Canadian Soil Quality Guidelines. Canadian Council of Ministers of the Environment (CCME), Winnipeg, Manitoba.

4. Ministry of Housing, Spatial Planning and Environment (MHSPE) 9 May 1994 Intervention Values and Target Values - Soil Quality Standards. Directorate-General for Environmental Protection, Department of Soil Protection, The Hague, The Netherlands.

5. Crommenttuijn, T., D.F. Kalf, M.D. Polder, R. Posthumus and E.J. van de Plassche. 1997. Maximum Permissible Concentrations and Negligible Concentrations for Pesticides. RIVM Report No. 601501002.

Region 4 Waste Management Division
Freshwater Surface Water Screening Values
for
Hazardous Waste Sites[1]

Compound	Acute Screening Values (ug/L)	Chronic Screening Values (ug/L)
Priority Pollutants		
Antimony	1300 (2s)	160 (2s)
Arsenic III	360*	190*
Beryllium	16 (6s)	0.53 (1s)
Cadmium[2]	1.79*	0.66*
Chromium (III)[2]	984.32*	117.32*
Chromium (VI)	16*	11*
Copper[2]	9.22*	6.54*
Lead[2]	33.78*	1.32*
Mercury	2.40*	0.012*[3]
Nickel[2]	789.00*	87.71*
Selenium	20.00*	5.00*
Silver[2]	1.23*	0.012(1s)
Thallium	140.00(3s)	4.00 (2s)
Zinc[2]	65.04*	58.91*
Cyanide	22*	5.2*
2,3,7,8-TCDD-Dioxin	0.1	0.00001[3]
Acrolein	6.8(3s)	2.1 (1s)
Acrylonitrile	755 (4s)	75.5
Benzene	530 (7s)	53
Bromoform	2930 (2s)	293
Carbon Tetrachloride	3520 (3s)	352
Chlorobenzene	1950 (5s)	195

Compound	Acute Screening Value (ug/L)	Chronic Screening Values (ug/L)
2-Chloroethylvinyl Ether	35400 (1s)	3540
Chloroform	2890 (3s)	289
1,2-Dichloroethane	11800 (3s)	2000 (1s)
1,1-Dichloroethylene	3030 (3s)	303
1,2-Dichloropropane	5250 (3s)	525
1,3-Dichloropropylene (cis and trans)	606 (2s)	24.4 (1s)
Ethylbenzene	4530 (5s)	453
Methyl Bromide	1100 (1s)	110
Methyl Chloride	55000 (1s)	5500
Methylene Chloride	19300 (3s)	1930
1,1,2,2-Tetrachloroethane	932 (3s)	240 (1s)
Tetrachloroethylene	528 (5s)	84 (1s)
Toluene	1750 (5s)	175
1,2-Trans-Dichloroethylene	13500 (1s)	1350
1,1,1-Trichloroethane	5280 (2s)	528
1,1,2-Trichloroethane	3600 (3s)	940 (1s)
2-Chlorophenol	438 (5s)	43.8
2,4-Dichlorophenol	202 (3s)	36.5 (1s)
2,4-Dimethylphenol	212 (3s)	21.2
2-Methyl-4,6-Dinitrophenol (4,6-Dinitro-O-Cresol)	23 (4s)	2.3
2,4-Dinitrophenol	62 (3s)	6.2
2-Nitrophenol	-	3500
4-Nitrophenol	828 (3s)	82.8
3-Methyl-4-Chlorophenol (P-Chloro-M-Cersol)	3 (1s)	0.3

Compound	Acute Screening Value (ug/L)	Chronic Screening Values (ug/L)
Pentachlorophenol[4] (pH 7.8)	20 *	13 *
Phenol	1020(16s)	256 (1s)
2,4,6-Trichlorophenol	32 (3s)	3.2
Acenaphthene	170 (2s)	17
Benzidine	250 (4s)	25
Bis(2-Chloroethyl) Ether	23800 (1s)	2380
Bis(2-Ethylhexyl) Phthalate	1110 (2s)	<0.3 (2s)
4-BromophenylPhenyl Phthalate	36(2s)	12.2 (1s)
Butylbenzyl Phthalate	330(4s)	22 (2s)
1,2-Dichlorobenzene	158(4s)	15.8 (3s)
1,3-Dichlorobenzene	502(3s)	50.2
1,4-Dichlorobenzene	112(5s)	11.2
Diethyl Phthalate	5210(2s)	521
Dimethyl Phthalate	3300(2s)	330
Di-n-Butyl Phthalate	94(6s)	9.4
2,4-Dinitrotoluene	3100(2s)	310
1,2-Diphenylhydrazine	27(2s)	2.7
Fluoranthene	398(2s)	39.8
Hexachlorobutadiene	9(5s)	0.93(1s)
Hexachlorocyclopentadiene	0.7(4s)	0.07
Hexachloroethane	98(5s)	9.8
Isophorone	11700(2s)	1170
Naphthalene	230(4s)	62(1s)
Nitrobenzene	2700(2s)	270

Compound	Acute Screening Value (ug/L)	Chronic Screening Values (ug/L)
N-Nitrosodiphenylamine	585(2s)	58.5
1,2,4-Trichlorobenzene	150(4s)	44.9 (1s)
Aldrin	3*	0.3
a-BHC	-	500[5]
b-BHC	-	5000[5]
g-BHC (Lindane)	2*	0.08*
Chlordane	2.4*	0.0043*[3]
4,4'-DDT	1.1*	0.001*
4,4'-DDE	105(1s)	10.5
4,4'-DDD	0.064(8s)	0.0064
Dieldrin	2.5*	0.0019*[3]
a-Endosulfan	0.22*	0.056*
b-Endosulfan	0.22*	0.056*
Endrin	0.18*	0.0023*[3]
Heptachlor	0.52*	0.0038*[3]
Heptachlor Epoxide	0.52*	0.0038*[3]
PCB-1242	0.2(7s)	0.014*
PCB-1254	0.2(7s)	0.014*
PCB-1221	0.2(7s)	0.014*
PCB-1232	0.2(7s)	0.014*
PCB-1248	0.2(7s)	0.014*
PCB-1260	0.2(7s)	0.014*
PCB-1016	0.2(7s)	0.014*
Toxaphene	0.73*	0.0002*[3]

Compound	Acute Screening Value (ug/L)	Chronic Screening Values (ug/L)
Non-priority Pollutants		
Aluminum (pH 6.5 - 9.0)	750*	87*
Boron	-	750*6
Chloride	860,000*	230,000*
Chlorine (TRC)	19*	11*
Chloropyrifos	0.083*	0.041*
Demeton	-	0.1*
Guthion	-	0.01*
Iron	-	1000*
Malathion	-	0.1*
Methoxychlor	-	0.03*
Mirex	-	0.001*
Oil and Grease	-	0.01* Low LC_{50}
Parathion	0.065*	0.013*
Pentachlorobenzene	250	50
pH	-	6.5 - 9.0*
Sulfide (S_2-, HS-)	-	2*
1,2,4,5-Tetrachlorobenzene	250	50
Tributyltin	-	0.026

[1] Based on Region IV Water Management Division, Water Quality Standards Unit's Screening List.
Hardness (mg/L as $CaCO_3$): 50.0
pH: 6
*: Criteria
s: Number of Species

[2] Hardness Dependent
Based on the following equations:

Compound	Acute Screening Value	Chronic Screening Value
Cadmium	$e^{(1.128(\ln H)-3.828)}$	$e^{(0.7852(\ln H)-3.49)}$
Chromium III	$e^{(0.819(\ln H)+3.688)}$	$e^{(0.819(\ln H)+1.561)}$
Copper	$e^{(0.9422(\ln H)-1.464)}$	$e^{(0.8545(\ln H)-1.465)}$
Lead	$e^{(1.273(\ln H)-1.46)}$	$e^{(1.273(\ln H)-4.705)}$
Nickel	$e^{(0.846(\ln H)+3.3612}$	$e^{(0.846(\ln H)+1.1645)}$
Silver	$e^{(1.72(\ln H)-6.52)}$	
Zinc	$e^{(0.8473(\ln H)+0.8604)}$	$e^{(0.8473(\ln H)+0.7614)}$

[3] Based on the marketability of fish. The use of other values which may have greater ecological significance may be considered.

[4] pH Dependent.
Based on the following equation:

Compound	Acute Screening Value	Chronic Screening Value
Pentachlorophenol	$e^{(1.005pH-4.83)}$	$e^{(1.005pH-5.29)}$

[5] Lowest plant value reported

[6] For long term irrigation of sensitive crops (minimum standard)

Region 4 Saltwater Water Quality Screening Values
for
Hazardous Waste Sites[1]

Compound	Acute Screening Value (ug/L)	Chronic Screening Values (ug/L)
Priority Pollutants		
Antimony	-	-
Arsenic III	69*	36*
Beryllium	-	-
Cadmium	43*	9.3*
Chromium (III)	1030 (2s)	103
Chromium (VI)	1100*	50*
Copper	2.9*	2.9*
Lead	220*	8.5*
Mercury	2.1*	0.025*[2]
Nickel	75*	8.3*
Selenium	300*	71*
Silver	2.3*	0.23 (1s)
Thallium	213 (3s)	21.3
Zinc	95*	86*
Cyanide	1*	1*
2,3,7,8-TCDD-Dioxin	-	0.00001[2]
Acrolein	5.5(1s)	0.55
Acrylonitrile	-	-
Benzene	1090 (6s)	109
Bromoform	1790 (2s)	640 (1s)
Carbon Tetrachloride	15000 (1s)	1500

Compound	Acute Screening Value (ug/L)	Chronic Screening Values (ug/L)
Chlorobenzene	1050 (2s)	105
2-Chloroethylvinyl Ether	-	-
Chloroform	8150 (1s)	815
1,2-Dichloroethane	11300 (1s)	1130
1,1-Dichloroethylene	22400 (3s)	2240
1,2-Dichloropropane	24000 (1s)	2400
1,3-Dichloropropylene (cis and trans)	79 (2s)	7.9
Ethylbenzene	43 (5s)	4.3
Methyl Bromide	1200 (1s)	120
Methyl Chloride	27000 (1s)	2700
Methylene Chloride	25600 (2s)	2560
1,1,2,2-Tetrachloroethane	902 (2s)	90.2
Tetrachloroethylene	1020 (1s)	45 (1s)
Toluene	370 (5s)	37
1,2-Trans-Dichloroethylene	-	-
1,1,1-Trichloroethane	3120 (2s)	312
1,1,2-Trichloroethane	-	-
2-Chlorophenol	-	-
2,4-Dichlorophenol	-	-
2,4-Dimethylphenol	-	-
2-Methyl-4,6-Dinitrophenol (4,6-Dinitro-O-Cresol)	-	-
2,4-Dinitrophenol	485 (3s)	48.5
2-Nitrophenol	-	-
4-Nitrophenol	717 (2s)	71.7

Compound	Acute Screening Value (ug/L)	Chronic Screening Values (ug/L)
3-Methyl-4-Chlorophenol (P-Chloro-M-Cresol)	-	-
Pentachlorophenol[3]	13*	7.9*
Phenol	580 (4s)	58
2,4,6-Trichlorophenol	-	-
Acenaphthene	97 (2s)	9.7
Benzidine	-	-
Bis(2-Chloroethyl) Ether	-	-
Bis(2-Ethylhexyl) Phthalate	-	-
4-BromophenylPhenyl Ether	-	-
Butylbenzyl Phthalate	294.4(2s)	29.4
1,2-Dichlorobenzene	197(3s)	19.7
1,3-Dichlorobenzene	285(2s)	28.5
1,4-Dichlorobenzene	199(2s)	19.9
Diethyl Phthalate	759(2s)	75.9
Dimethyl Phthalate	5800(2s)	580
Di-n-Butyl Phthalate	-	3.4[4]
2,4-Dinitrotoluene	-	-
1,2-Diphenylhydrazine	-	-
Fluoranthene	4(2s)	1.6 (1s)
Hexachlorobutadiene	3.2(4s)	0.32
Hexachlorocyclopentadiene	0.7(6s)	0.07
Hexachloroethane	94(2s)	9.4
Isophorone	1290(1s)	129

Compound	Acute Screening Value (ug/L)	Chronic Screening Values (ug/L)
Naphthalene	235(3s)	23.5
Nitrobenzene	668(2s)	66.8
N-Nitrosodiphenylamine	330000(1s)	33000
1,2,4-Trichlorobenzene	45(2s)	4.5
Aldrin	1.3*	0.13
a-BHC	-	1400[4]
b-BHC	-	-
g-BHC (Lindane)	0.16*	0.016
Chlordane	0.09*	0.004*2
4,4'-DDT	0.13*	0.001*
4,4'-DDE	1.4(1s)	0.14
4,4'-DDD	0.25(3s)	0.025
Dieldrin	0.71*	0.0019*2
a-Endosulfan	0.034*	0.0087*
b-Endosulfan	0.034*	0.0087*
Endrin	0.037*	0.0023*2
Heptachlor	0.053*	0.0036*2
Heptachlor Epoxide	0.053*	0.0036*2
PCB-1242	1.05(3s)	0.03*
PCB-1254	1.05(3s)	0.03*
PCB-1221	1.05(3s)	0.03*
PCB-1232	1.05(3s)	0.03*
PCB-1248	1.05(3s)	0.03*
PCB-1260	1.05(3s)	0.03*
PCB-1016	1.05(3s)	0.03*

Compound	Acute Screening Value (ug/L)	Chronic Screening Values (ug/L)
Toxaphene	0.21*	0.0002*2
Non-priority Pollutants		
Aluminum (pH 6.5 - 9.0)	-	-
Ammonia	5	5
Boron	-	-
Chloride	-	-
Chlorine (TRC)	13*	7.5*
Chloropyrifos	0.011*	0.0056*
Demeton	-	0.1*
Guthion	-	0.01*
Iron	-	-
Malathion	-	0.1*
Methoxychlor	-	0.03*
Mirex	-	0.001*
N-nitrosopyrrolidene	3300000	-
Oil and Grease	-	0.1* Low LC_{50}
Parathion	1.78(2s)	0.178
Pentachlorobenzene	160	129
Phosphorus (elemental)	-	0.1*
pH	-	6.5 - 8.5
Sulfide (S_2-, HS-)	-	2
1,2,4,5-Tetrachlorobenzene	160	129
Tributyltin (Advisory)	-	0.01

1 Based on Region IV Water Management Division, Water Quality Standards Unit's Screening List.

* : Criteria

s : Number of Species

[2] Based on the marketability of fish. The use of other values which may have greater ecological significance may be considered.

[3] pH Dependent.
Based on the following equation:

Compound	Acute Screening Value	Chronic Screening Value
Pentachlorophenol	$e^{(1.005pH-4.83)}$	$e^{(1.005pH-5.29)}$

[4] Lowest Plant Value Reported

[5] See table/Ambient WQCrit./Ammonia (Salt H_2O) 440/5-88-004

Region 4 Waste Management Division
Sediment Screening Values

Chemical Analyte	Effects Value	CLP PQL[1]	Screening Value
Metals (ppm)			
Antimony	2[2]	12	12
Arsenic	7.24[3]	2	7.24
Cadmium	0.676[3]	1	1
Chromium	52.3[3]	2	52.3
Copper	18.7[3]	5	18.7
Lead	30.2[3]	0.6	30.2
Mercury	0.13[3]	0.02	0.13
Nickel	15.9[4]	8	15.9
Silver	0.733[3]	2	2
Zinc	124[3]	4	124
Organics (ppb)			
p,p'-DDD	1.22[3]	3.3	3.3
DDD	2[2]	3.3	3.3
p,p'-DDE	2.07[3]	3.3	3.3
DDE	2[2]	3.3	3.3
p,p'-DDT	1.19[3]	3.3	3.3
DDT	1[2]	3.3	3.3
Total DDT	1.58[4]	3.3	3.3
Chlordane	0.5[2]	1.7	1.7
Dieldrin	0.02[2]	3.3	3.3
Endrin	0.02[2]	3.3	3.3
Lindane (gamma-BHC)	0.32[3]	3.3	3.3
Total PCBs	21.6[3]	33 (67 for Aroclor 1221)	33 (67 for Aroclor 1221)

Industrial Area: 62-777 FAC Leachability Values for Contaminants of Concern

Site No.	Contaminant of Concern	Frequency of Detection	Range of Detected Analyte Concentrations	Location of max. Concentration	Background Screening Value (mg/kg)	FAC 62-777 Leachability (mg/kg)	FAC 62-777 DE Residential (mg/kg)	FAC 62-777 DE Industrial (mg/kg)
3	dieldrin	2/30	0.001/ 0.026	3SB1-5-7(93)	NA	0.004	0.07	0.3
	aluminum	29/30	214/59600	3SB6-5-7(93)	13917	XX	72000	1000000
	cobalt	6/30	0.87/3.2	3SB1-5-7(93)	0.74	XX	4700	110000
	copper	25/30	0.36/11.1	3SB5-10-12(93)	4.4	XX	110	78000
	iron	30/30	86.1/32600	3SB2-5-7(93)	9055	XX	23000	480000
	lead	28/30	0.6/8.3	W03SB01201	4.2	XX	400	920
	manganese	30/30	0.88/39.4	3SB5-5-7(93)	21.3	XX	1600	22000
	selenium?	16/30	0.13/4.9			5		
	chromium?	28/30	0.9/37.9			38		
4	benzene	1/24	0.77	W04SB00103	NA	0.007	1.1	1.6
	chloromethane	1/24	0.017	W04SB00602	NA	0.01	1.7	2.3
	ethlybenzene	8/24	0.002/13	W04SB00602	NA	0.6	400	400
	methylene chloride	1/24	0.069	W04SB00104	NA	0.02	16	23
	toluene	5/24	0.001/20	W04SB00602	NA	0.5	380	650
	xylenes (total)	11/24	0.002/46	W04SB00602	NA	0.2	140	140
	2-methylphenol	3/24	0.047/0.31	W04SB00602	NA	0.2	1800	18000
	4-methylphenol	3/24	0.072/0.5	W04SB00602	NA	0.2	210	2200
	N-nitroso-di-n-propylamine	6/24	0.014/0.061	W04SB00302-D	NA	0.04	0.09	0.2
	aluminum	24/24	366/29600	W04SB00702	13917	XX	72000	1000000
	copper	8/24	0.55/9	W04SB00902-D	4.4	XX	110	78000
	iron	24/24	57.3/22400	W04SB00902	9055	XX	23000	480000
	lead	24/24	0.51/15.3	W04SB00702-D	4.2	XX	400	920
	manganese	21/24	0.67/116	W04SB00902	21.3	XX	1600	22000

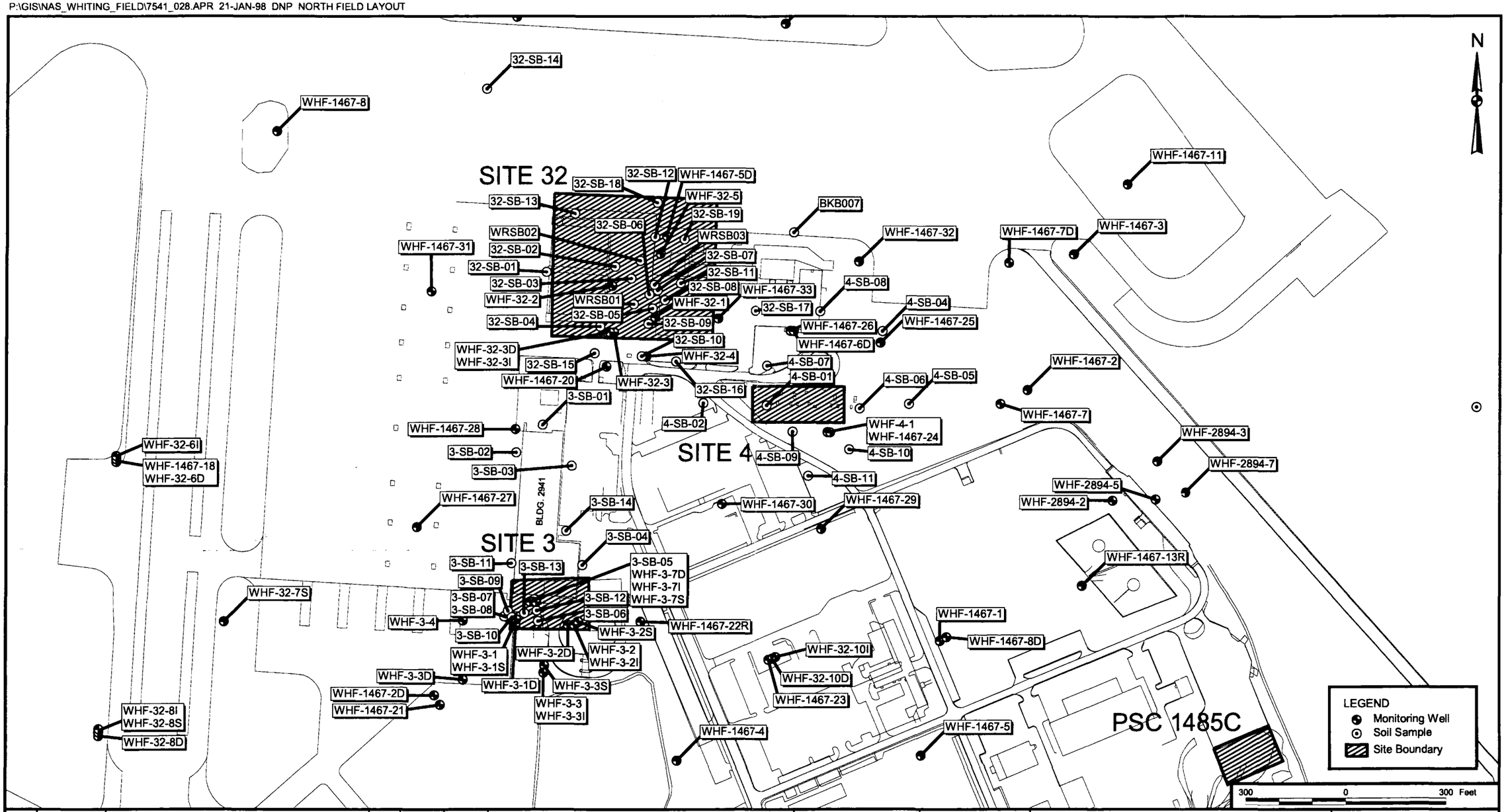
Industrial Area: 62-777 FAC Leachability Values for Contaminants of Concern

Site No.	Contaminant of Concern	Frequency of Detection	Range of Detected Analyte Concentrations	Location of max. Concentration	Background Screening Value (mg/kg)	FAC 62-777 Leachability (mg/kg)	FAC 62-777 DE Residential (mg/kg)	FAC 62-777 DE Industrial (mg/kg)
6	trichloroethene	1/14	0.073	6SB3-117-119(92)	NA	0.03	6	8.5
	dieldrin	1/14	0.013	6SB1-5-7(92)	NA	0.004	0.07	0.3
	aluminum	14/14	175/39800	6SB2-15-17(92)	13917	XX	72000	1000000
	chromium	13/14	1.1/39.4	6SB2-15-17(92)	11.4	38	210	420
	copper	14/14	0.44/10.3	6SB2-15-17(92)	4.4	XX	110	78000
	iron	14/14	237/18900	6SB1-15-17(92)	9055	XX	23000	480000
	lead	14/14	0.19/21.1	6SB1-5-7(92)	4.2	XX	400	920
	manganese	14/14	0.77/73.7	6SB1-5-7(92)	21.3	XX	1600	22000
30	trichloroethene	4/36	0.001/0.16	30SB1-5-7(92)	NA	0.03	6	8.5
	N-nitroso-diphenylamine	1/36	0.71	30SB00303	NA	0.4	170	440
	naphthalene	4/36	0.046/20	30SB04-5-7(93)	NA	1.7	40	270
	aluminum	23/23	105/41800	W30SB01201	13917	XX	72000	1000000
	cobalt	5/23	1/2.3	30SB6-10-12(93)	0.74	XX	4700	110000
	copper	18/23	0.48/9.1	W30SB01201	4.4	XX	110	78000
	iron	23/23	67/24500	W30SB01201	9055	XX	23000	480000
	lead	21/23	0.23/22	30SB04-5-7(93)	4.2	XX	400	920
	manganese	22/23	0.29/177	30SB1-5-7(92)	21.3	XX	1600	22000
	TPH	23/33	2.7/21200	30SB04-5-7(93)	NA	340	0	0

Industrial Area: 62-777 FAC Leachability Values for Contaminants of Concern

Site No.	Contaminant of Concern	Frequency of Detection	Range of Detected Analyte Concentrations	Location of max. Concentration	Background Screening Value (mg/kg)	FAC 62-777 Leachability (mg/kg)	FAC 62-777 DE Residential (mg/kg)	FAC 62-777 DE Industrial (mg/kg)
32	1,2-DCE (total)	3/74	0.002/0.43	WRSB01(5-7)	NA	.4/.7	19/31	130/210
	benzene	4/74	0.017/1.4	WR-SB03(15-17)	NA	0.007	1.1	1.6
	chloromethane	2/74	0.002	W32SB01603	NA	0.01	1.7	2.3
	ethlybenzene	9/74	0.001/5.1	WR-SB01(5-7)-D	NA	0.6	400	400
	methylene chloride	8/74	0.004/0.61	WR-SB01(5-7)-D	NA	0.02	16	23
	tetrachloroethene	3/74	0.39/1.7	WR-SB01(5-7)-D	NA	0.03	8.9	17
	toluene	9/74	0.002/13	WR-SB01(5-7)	NA	0.5	380	650
	trichloroethene	3/74	0.005/1.3	WR-SB01(15-17)	NA	0.03	6	8.5
	xylenes (total)	13/74	0.008/32	WR-SB01(5-7)	NA	0.2	140	140
	naphthalene	14/74	1.1/26	WR-SB01(5-7)	NA	1.7	40	270
	aluminum	62/62	6.9/33200	32SB5-5-7(93)	13917	XX	72000	1000000
	cobalt	11/62	0.51/2.5	32SB7-5-7(93)	0.74	XX	4700	110000
	copper	45/62	0.49/8.4	32SB6-10-12(93)	4.4	XX	110	78000
	iron	62/62	29.8/16000	32SB5-5-7(93)	9055	XX	23000	480000
	lead	60/62	0.13/6.4	W32SB01604	4.2	XX	400	920
	manganese	53/62	0.21/53.5	32SB5-5-7(93)	21.3	XX	1600	22000
	TPH	9/42	2.0/2650	32SB7-30-32(93)	NA	340	0	0
33	ethylbenzene	1/36	1.5	33SB2-5-7(92)	NA	0.6	400	400
	xlyenes (total)	3/36	0.002/4.8	33SB2-5-7(92)	NA	0.2	140	140
	dieldrin	1/28	0.013	33SB2-2-4(92)	NA	0.004	0.07	0.3
	aluminum	28/28	36.8/47800	33SB5-5-7(92)	13917	XX	72000	1000000
	chromium	27/28	0.85/70	W33SB01201	11.4	38	210	420
	cobalt	6/28	1.3/1.8	33SB4-3-5(92)	0.74	XX	4700	110000
	copper	27/28	0.54/11.1	33SB5-5-7(92)	4.4	XX	110	78000
	iron	28/28	67.4/22300	33SB5-5-7(92)	9055	XX	23000	480000
	lead	37/38	0.26/24.3	33SB2-5-7(92)	4.2	XX	400	920
	manganese	28/28	0.32/169	33SB4-3-5(92)	21.3	XX	1600	22000
	TPH	20/32	2.1/7790	33SB2-5-7(92)	NA	340	0	0

P:\GIS\NAS_WHITING_FIELD\7541_028.APR 21-JAN-98 DNP NORTH FIELD LAYOUT



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY D. PERRY — DATE 21-JAN-99
CHECKED BY — DATE
COST/SCHED-AREA
SCALE AS NOTED

NORTH FIELD
NAS WHITING FIELD
MILTON, FLORIDA

CONTRACT NO.
APPROVED BY — DATE
APPROVED BY — DATE
DRAWING NO. FIGURE 3-5
REV. 0

ERC Adoption Hearing Schedule Changed (Chapters 62-713, 770, 777,782, and 785)

APRIL 29

The ERC Adoption Hearing for the referenced rules has changed from March 25 to **April 29.** The meeting will be held in Room 609 in Twin Towers in Tallahassee. The change was necessary to accommodate the Joint Administrative Procedures Committee's review of the five rules before the rules are published in the Florida Administrative Weekly.

The **February 1** date for submittal of written comments from the January 14 workshop has not changed. Written comments are due to the appropriate rule coordinator by February 1.

The Methodology Focus Group (MFG) plans to meet in Gainesville on **February 5** to review the cleanup target levels and any changes made to the cleanup target levels since the January workshop. The meeting is scheduled for 10:00 A.M. Contact Bob DeMott, Legia or myself for additional information.

The website for 62-777 was last updated at the end of the day on January 21. The site now contains tables and figures dated January 21, 1999. Any additional changes or postings to this website will not occur until all written comments from the workshop and any recommendations from the MFG are reviewed by department staff.

The department appreciates your past efforts at the workshop and future efforts you will make during the coming months. It is hoped that this change in the ERC Adoption Hearing date will not result in an inconvenience in your April schedule.

Your assistance is requested in distributing this information to others who may have an interest in the development of these rules. Please contact any of the rule coordinators or myself if you have any questions or require additional information.

See you on April 29.

Sincerely,

Roger Register

FDEP 62-777 -WORKSHOP

On 14JAN99 FDEP held a workshop on proposed Rule 62-777 FAC and subsequent proposed changes to the following existing rules:
62-770 UST, 62-785 Brownfields 62- 782 Dry Cleaning 62-713 Soil treatment facilities.

In general the goal of 62-777 is to provide consistency between the above existing rules by providing SCTLs and GWCTLs in one set of tables for environmental work (to be contained in 62-777).
The existing rules are proposed to be changed to reflect the use of 62-777 tables and other mostly administrative changes in an attempt to achieve consistency throughout similar environmental rules.

62-777 and the revised rule(s) are proposed for adoption on 25MAR99. Public written comments are due by 01FEB99 to the appropriate sections.
The web site for viewing all this is: ww2.dep.state.fl.us/waste/programs & then /brwnfld/index.htm or /pcp/index/htm.

The following is an overview of rule specific comments that were made.

FAC 62-777:
Questions were asked on the following subjects/items:

-Clarifying issues,
-Wanting comparison of new to old changed values,
-Including statements in the rule that the values given were applicable to the specific rules only, NOT all inclusive *(OPINION: FDEP does apply them as all inclusive).*
-No clear guidance is provided for how/when a risk assmt. is done
-Lack of text to describe that these values are not the only ones. These values need to be given as default values

In general comments dealt with wanting to be certain that a number wasn't being "etched in stone" but that alternative methodologies would be usable. As always FDEP says they are always willing to consider different methodologies provided adequate documentation is provided.

A discussion on Csat and how it applies was held. The following is a very rough explanation of Csat:

> Csat is a measure of the ability of the soil pore space to volatilize to the atmosphere. For certain soils, the point where no more pore space may be filled with the gaseous state of a chemical is below the health based risk assumption. This can result in a different risk based number for certain chemicals.

The end result is FDEP is using the health-based numbers for the SCTLs and will utilize Csat numbers in the leachability SCTLs for some chemicals. The chemicals these conditions apply to are fairly uncommon in most environmental investigations.

FAC 62-770:
No major comments were made on the edited rule provided. The most significant issue is that the Massachusetts Method (a lab process to determine hydrocarbon chain length) has been lab validated and is now applicable to TPH contamination at sites that may not pass the leachability test.

FAC 62-785 & FAC 62-782
Work in cross consistency editing still needs to be done and is proposed to be completed before the rule(s) are presented for adoption.

SUMMARY
Overall, 62-777 will provide a consistent set of numbers to follow throughout the state programs. For the Navy CERCLA/RCRA sites FDEP project managers have been directed to use these numbers as "guidelines" or for consideration.

This means that FDEP believes that 62-777 needs to be used as SCTLs and GWCTLs and therefore TtNUS should utilize the values in that manner.

Change every 3 years.
updated