



DEPARTMENT OF THE NAVY

CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
300 HIGHWAY 361
CRANE, INDIANA 47522-5000

IN REPLY REFER TO:

5090
Ser 095/9146

- 9 JUL 1988

U.S. Environmental Protection Agency, Region V
Waste, Pesticides, & Toxics Division
Waste Management Branch
Illinois, Indiana, and Michigan Section
Attn: Mr. Peter Ramanauskas (DRP-8J)
77 West Jackson Blvd.
Chicago, IL 60604

Dear Mr. Ramanauskas:

Crane Division, Naval Surface Warfare Center (NAVSURFWARCENDIV Crane) submits for review and approval three copies of the Response to Comments and Revised Pages for the Quality Assurance Project Plan (QAPP) for Full Scale (FS) Bioremediation Operations as enclosure (1). The Response to Comments address comments received from Ms. Carol Witt-Smith and Mr. Allen Debus. An Errata Page is provided for the replacement pages. Only the revised pages affected by this revision are provided. Enclosure (2) is the required certification statement.

NAVSURFWARCENDIV Crane point of contact is
Ms. Christine D. Freeman, Code 09511, telephone 812-854-4423.

Sincerely,

A handwritten signature in cursive script that reads "James M. Hunsicker".

JAMES M. HUNSICKER
Director, Environmental Protection Department
in Reaction of
the Commander

Encl:

- (1) Response to Comments & Revised Pages for FS Bioremediation Operations QAPP (Quanterra addition)
- (2) Certification Statement

Copy to:

ADMINISTRATIVE RECORD (2 copies)
COMNAVSEASYS COM (SEA OOT) (w/o encls)
IDEM (S. Riddle)
MK Crane (D. Beall) (w/o encls)
SOUTHNAVFACENGCOM (Code 1864) (w/o encls)

**RESPONSE TO COMMENTS
QUALITY ASSURANCE PROJECT PLAN FOR FULL-SCALE OPERATIONS AT THE
BIOREMEDIATION FACILITY
NSWC CRANE
CRANE, INDIANA
REVISION 3 DATED OCTOBER 1998**

Commentor: Carol Witt-Smith and Allen Debus, U.S. EPA Region 5

GENERAL COMMENTS:

COMMENT 1: The Navy gives no rationale as to whether Quanterra will be a "backup" lab, or if it will effectively replace Southwest Laboratory of Oklahoma for most analyses to be performed. This must be clarified in the modification request, and the text of the document needs to reflect when the Navy would decide to send samples to one lab or the other.

RESPONSE 1: Southwest Laboratory of Oklahoma (SWOK) is currently being used for all analyses relative to the Biofacility. During pilot scale operations, a degradation period of 28 days was anticipated to meet clean-up objectives. During full-scale operations this time frame has been significantly shorter and is approximately eight to ten days. The facility is capable of six concurrent windrows and the current sampling plan requires that fifteen samples per windrow be collected on Day 0 and on Day final. Based upon these sampling requirements, there is the potential for approximately 200 samples to be collected during a one to two week period, which is greater than the current laboratory's capability. Due to this volume and the fact that most of the Day 0 samples require numerous dilution runs, it is necessary to ensure that we have adequate laboratory capacity in order to meet the turn-around requirements. The Navy would like to be allowed the flexibility to utilize at least two laboratories to ensure that operations are not impacted by laboratory problems and ensure that they are cost effective. It is the Navy's intention that prior to starting a new windrow, the laboratory to be used will be determined based upon the capacity at that time, required turn-around, and cost. Once the analysis for the windrow is started at one lab it will be continued at that lab, through the duration of that windrow. This will ensure comparability of the results for a given windrow. Because the treatment, initial concentrations etc. are unique to each windrow it is not necessary that the data be comparable from one windrow to another and this should not present any technical problems.

SPECIFIC COMMENTS:

COMMENT 1: At the time of the review it remains unclear as to exactly why there are references to Southwest Laboratory of Oklahoma (SWOK) in the tables

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preceding the SOPs. Also on page 3 of 44, section 1.1.2, there is a reference to SWOK. Is Quanterra replacing SWOK?

RESPONSE 1: Quanterra is not replacing SWOK. SWOK remains an approved laboratory, and both laboratories are intended to be available for use based upon the volumes as noted in Response 1.

COMMENT 2: The nature of the analytical reporting limits should be defined. (Are these Method Detection Limits (MDLs)?)

RESPONSE 2: Analytical reporting limits are not MDLs. Reporting limits are calculated by the laboratory according to their SOPs and are periodically updated to reflect current operating conditions. The analytical reporting limit is generally 5 to 10 times the MDL. For many analytes this concentration is selected as the lowest non-zero standard in the calibration curve.

COMMENT 3: It is stated in footnotes to tables that 2,6 DNT will be used as a surrogate of the toxicity potential for 4-A-2,6 DNT. Also, 2,4 DNT will be used as a surrogate for 2-A-4,6 DNT. From a risk assessment perspective, is this acceptable?

RESPONSE 3: This statement refers to Table 1-1, and 1-2, notes 5 and 6 which are flagged as “***” and “****”. These footnotes were part of the approved FS-QAPP Revision 2 dated March 12, 1998 and have not been changed in this most recent revision.

COMMENT 4: Table 1-1 indicates only one set of reporting limits. Will SWOK still be relied upon for measuring 2,3,7,8 TCDD toxicity equivalence?

RESPONSE 4: Table 1-1 indicates two sets of reporting limits, representing both laboratories, for every compound except 2,3,7,8 TCDD. In the search for a qualified laboratory, the expected analysis required to complete Mine Fill A (MFA) and Mine Fill B (MFB) was projected for the next year. Quanterra was not asked to submit their qualifications for Dioxins which will not be required until work is started in the Ammunition Burning Ground (ABG). If Quanterra continues to be used when the analysis of Dioxins will be required, their SOPs, reporting limits, and QC accuracy and precision information will be submitted at that time.

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COMMENT 5: Why have 1,2 DNB and 1,4 DNB been deleted from the Tables?

RESPONSE 5: These compounds were removed in a previous revision of the FS-QAPP. The Comment Resolution regarding Revision 1, dated March 4, 1998 Question 2 addresses this comment. From that response, "1,2 DNB, 1,4-DNB, and DNT (total) are not identified as constituents of concern at the SWMU-sites and are not routinely analyzed as part of the U.S. EPA SW846 Method 8330. Therefore, these compounds will not be analyzed as requested by EPA."

COMMENT 6: In the case of tables 1-1, 1-2, and 1-3, the detection limit listed for thallium is insufficient for project purposes. Note also that Quanterra's proposed reporting limit is less sensitive than what SWOK had proposed previously.

RESPONSE 6: Comment noted. Neither lab is able meet the clean-up goals for Residential, Industrial or Ecological use. In these cases, the laboratory reporting limit will be utilized.

COMMENT 7: Several ecological data quality levels will not be met through use of Quanterra's analytical methods. (Note this was also the case with SWOK's methods).

RESPONSE 7: Comment noted. The ecological data quality levels have not been used for any site. Residential and industrial clean-up objectives have been used for MFA.

COMMENT 8: There is an apparent discrepancy (or typo) in the presentation of detection limits for PETN. Table 1-1 of the QAP indicates a reporting limit of 0.25 mg/kg, while Page C-4-136b indicates a reporting limit of 0.5 mg/kg.

RESPONSE 8: The reporting limit on Page C-4-136b of 0.5 mg/kg is correct. Tables 1.1 through 1.3 have been revised accordingly.

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COMMENT 9: In the case of Table 1-4a, for RDX, there is a slight exceedance between the proposed reporting limit and target level for drinking water (i.e., 0.8 ug/L > 0.61 ug/L).

RESPONSE 9: RDX reporting limits exceed the target level for drinking water which is 0.61 ug/L. Quanterra is able to report at 0.80 ug/L and SWOK is able to report at 0.84 ug/L. Neither lab is able to meet the target level for drinking water with Method 8330.

COMMENT 10: Referring to Tables 1-4a and 1-4b, Pages 8g and 9g of 44, note that Method 8310 could provide increased sensitivity for PAHs if needed for project purposes. If this is important, then additional review work of SOPs would be necessary.

RESPONSE 10: Method 8270 was the method proposed in the approved FS-QAPP dated March 5, 1998. For consistency purposes, Method 8270 continues to be suggested as the method for analysis of semi-volatile contaminants by Quanterra due to the already high number of HPLC analysis performed for explosive analysis.

COMMENT 11: Referring to Tables 3-1 and 3-2, given the unusual nature of the sample matrices, it would be best if all the compounds stated in the target parameter list tables could be spiked into both matrix spiking samples and lab control spike samples.

RESPONSE 11: Tables 3-1 and 3-2 of the text, Section 3 on page 6 and 7 of 14 provide the accuracy and precision requirements for both volatiles and explosives. SWOK has provided matrix spike and lab control spikes that include all target parameters. Quanterra will provide the same spike data for all target parameters in their data packages.

COMMENT 12: Referring to Table 3-3, note that Quanterra's RPD QC limit for metals in soil seems rather high. What is the rationale for the proposed acceptance limit?

RESPONSE 12: Quanterra bases their RPD QC criteria for soils on historical data from all samples that are weighed for analysis. This may include sands, soils, or

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wastes of any sort. As a result, their matrix type may be more variable than traditional "soil" matrix types.

COMMENT 13: The limits expressed in Table 6-1, should be based only on the anticipated limits which will apply to the set of SVOC target analytes proposed in previous QAPP target parameter tables. The ranges cited may not apply to certain target compounds.

RESPONSE 13: Table 6-1 provides a list of every parameter requested, which SOP will be used to perform that analysis of that parameter, what section number of the SOP discusses calibration, and what page in the appendix that section can be found on. There are no limits expressed in this table.

COMMENT 14: While QAPP target parameters indicate that 1,2 dichloroethylene will be measured and reported, note that Quanterra can report both the trans and cis isomers. Will it be important to report the cis and trans species of DCE separately to accomplish any particular project objective?

RESPONSE 14: Both Quanterra and SWOK can report the cis- and trans- isomers of 1,2-dichloroethylene. Because individual clean-up goals for these isomers do not exist, a clean-up goal based on total-1,2-dichloroethene was established. Therefore, the need to report these compounds separately does not exist based on the objectives of this project.

COMMENT 15: Referring to the VOCs in soil Region 5 Directive and the Quanterra VOCs SOP, it is uncertain as to whether the compost samples will be collected in accordance with the Regional Directive. The Quanterra SOP accounts for SW-846 Method 5035, but the QAPP does not specify whether any version of this procedure will be implemented. The concentrations of non-VOC target analytes are exceedingly high in Day 0 samples, but under composting conditions this will not poison the "bugs" from potentially degrading VOCs. Also, it is understood that atmospheric exposures will cause progressive losses of VOCs. Our recommendation would be to determine VOCs samples in field preserved methanol extracts by SIM to achieve relatively low reporting limits. This approach would apply to both SWOK and Quanterra.

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RESPONSE 15: Compost samples have not been collected for VOC analysis to date. Initial concentrations found in pre-excavation samples have been below the clean-up objectives in all situations, which has not warranted additional monitoring of VOCs through the composting operation.

Method 5035 and the use of Encore samplers is the proposed method in the QAPP for the collection of soil samples for initial characterization and post-excavation sampling discussed in Field SOP: QAPP-1.0 found in Appendix A. Both Quanterra and SWOK propose to use this method for soil analysis.

COMMENT 16: Referring to Section 8.7.1 of the VOCs SOP, would effervescence be anticipated in these samples? (Are they naturally acidic?)

RESPONSE 16: The pH of the pre-excavation and post-excavation samples is not measured as part of full-scale operations. The pH of the windrows are monitored during windrow activity, and pH values range from 7.7 s.u. to 9.2 s.u. Effervescence is not anticipated to be a problem in these samples.

COMMENT 17: It is not recommended to implement the option described in Section 8.7 of the VOCs SOP.

RESPONSE 17: Section 8.7 discusses the low-level procedure for soil samples using encore samplers and laboratory preservation with sodium bisulfate. This is the currently approved method used for analysis of VOCs as promulgated under SW846 and is utilized by SWOK. The use of this option has been used for initial characterization and post excavation analysis of VOCs since the FS-QAPP was approved on March 04, 1998.

COMMENT 18: Referring to Section 8.7 of the VOCs SOP, the holding times for each sampling approach (i.e., both with and without effervescence) should be specified.

RESPONSE 18: Holding times from Quanterra to SWOK have not changed, nor has the sampling approach, holding times, container sizes, and preservations have been provided in Table 4-4, and did not change in this revision.

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- COMMENT 19: Referring to Sections 9.5 and 9.6, and Table 9 of the VOCs SOP, the solutions should also include the poor purging water soluble VOCs included on the Crane QAPP target list as LCS/MS compounds.
- RESPONSE 19: Comment noted. Both laboratories spike per their SOP and compounds spiked in both the LCS and the MS solution represent all target analytes. Recoveries of these compounds should be within that specified in Table 3-1. Quanterra's SOP allows for adjustments in their spiking solution in Section 9.5.2.
- COMMENT 20: For VOCs analysis, a quadratic calibration fit should not be used, unless it conforms to Method 8000 of SW-846 (as of June 17, 1997).
- RESPONSE 20: Comment noted. The quadratic fit will not be used for calculation of concentration unless it is necessary as outlined in SW-846.
- COMMENT 21: Section 11.8 of the VOCs SOP should not be implemented for analysis.
- RESPONSE 21: Section 11.8 already contains a disclaimer about applicability and use, and will not be used for this project.
- COMMENT 22: Referring to Section 12.2 of the VOCs SOP, none of the Crane target analyte VOCs should be reported as TICs.
- RESPONSE 22: None of the target analytes will be reported as TICs. All target compounds will be present in the initial calibration standards.
- COMMENT 23: Referring to Table 1 of the VOCs SOP, note that it would be more informative to report cis and trans isomers of DCE separately especially since Quanterra's SOP can capture this data. From a data comparison perspective, then SWOK should also report the trans and cis isomers.
- RESPONSE 23: As stated in Table 1 of Quanterra's SOP on page C4-41 both isomers of DCE can be reported. SWOK can also report these isomers as stated in Table 2 on page C2-20. However, because individual Clean-up Goals for these isomers do not exist, a clean-up goal based on total-1,2-dichloroethene was established. Therefore, the need to report these

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compounds separately does not exist based on the objectives of this project.

COMMENT 24: Referring to Table 1 of the VOCs SOP, and with reference to proposed reporting limits cited elsewhere in the QAPP, while we have the impression that most VOCs will be reported using a 5 mL purge volume, acetone will apparently be reported using a 25 mL purge volume. Is this correct? Will the "low soil" technique be used for each VOC? It may be better to couple methanol preservation with SIM analysis to achieve accuracy without further losses due to difficult sampling using EnCore samplers. (We envision that it may be difficult to stuff compost into a 5 mL EnCore device.)

RESPONSE 24: All samples will be analyzed using low soil technique and 5 ml purges for water samples. Acetone's reporting limit has been revised on Table 1-1, 1-2, 1-3, and 1-4a, and 1-4b to 20 ug/kg, and 20 ug/L.

Compost samples have not been collected for VOC analysis to date, and therefore there has not been a need to collect EnCore samplers for a compost matrix. Initial concentrations found in pre-excavation samples have been below the clean-up objectives in all situations, which has not warranted additional monitoring of VOCs through the composting operation.

COMMENT 25: Referring to Explosives SOP, which of the options cited in Section 2.7 of the method will actually be used for compost samples? Will there be any difficulties in comparing data from Quanterra if they use the first method option one time and another for the next round of sampling? Or, in comparing SWOK data generated using HPLC-UV to Quanterra's data achieved using HPLC-MS?

RESPONSE 25: Quanterra intends to analyze and confirm extracts by High Performance Liquid Chromatography with Ultraviolet Detector and with Triple-Stage Quadrapole Mass Spectrometer (LC/TSP/MS) using a C-8 reverse phase column. Windrow samples will not be split between the two laboratories. Day 0 and Day Last samples from the same windrow will go to the same laboratory.

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COMMENT 26: Potential cyano-column confirmation difficulties are cited in Section 8.3.1. of the explosives analysis SOP. Some attention should be given in the QAPP to how data possibly subject to such problems will be qualified and assessed.

RESPONSE 26: The cyano-column is not being proposed for analysis or confirmation. Quanterra intends to analyze and confirm extracts by LC/TSP/MS using a C-8 reverse phase column. The difficulties discussed in section 8.3.1 refer to a co-elution problem with one of the two surrogates used. If the need were to arise for use of a cyano-column, this surrogate would not be used for analysis.

COMMENT 27: Unless separate chromatography and detection settings will be utilized, PETN, picric acid and nitroglycerine are missing from the elution order table indicated in Section 12.8.7 of the explosives analytical SOP. Please clarify this circumstance.

RESPONSE 27: Section 12.10.6 discusses the elution order for the LC/TSP/MS, which is the method that Quanterra will be using for analysis of PETN. Picric acid and nitroglycerine are on the elution order table presented in Section 12.10.6, but neither are contaminants of concern.

**Quality Assurance Project Plan
For Full-Scale Operations at the Bioremediation Facility
NSWC Crane, Crane, Indiana
Revision 3 dated October 5, 1998**

ERRATA SHEET

1. Enclosed is a cover and spine binder dated July 2, 1999 to replace Revision 3 Cover Page dated October 05, 1999.
2. Table 1-1: Remove page 5a and 5e of 44 and discard. Replace with new page 5a and 5e of 44 dated 07/02/99.
3. Table 1-2: Remove page 6a and 6e of 44 and discard. Replace with new page 6a and 6e of 44 dated 07/02/99.
4. Table 1-3: Remove page 7a and 7e of 44 and discard. Replace with new page 7a and 7e of 44 dated 07/02/99.
5. Table 1-4a: Remove page 8e of 44 and discard. Replace with new page 8e of 44 dated 07/02/99.
6. Table 1-4b: Remove page 9e of 44 and discard. Replace with new page 9e of 44 dated 07/02/99.

5090
Ser 095/9146

09 JUL 1999

The letter Ser 095/9146 was for the submittal of response to comment and replacement pages for the Full Scale Bioremediation Quality Assurance Project Plan. This set of revision pages have not been incorporated into the previously submitted QAPP dated 12/07/98.

**QUALITY ASSURANCE PROJECT PLAN
FOR
FULL-SCALE OPERATIONS AT THE
BIOREMEDIATION FACILITY**

**NSWC CRANE
CRANE, INDIANA**

**CONTRACT #N62467-93-D-1106
DELIVERY ORDER #0009
STATEMENT OF WORK #0007**

REVISION 03

July 02, 1999

Prepared for:

**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
2155 EAGLE DRIVE
P.O. BOX 190010
NORTH CHARLESTON, SOUTH CAROLINA 29419-9010**

Prepared by:

**MORRISON KNUDSEN CORPORATION
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**QUALITY ASSURANCE PROJECT PLAN
FOR
FULL-SCALE OPERATIONS AT THE
BIOREMEDIATION FACILITY**

**NSWC CRANE
CRANE, INDIANA**

**CONTRACT #N62467-93-D-1106
DELIVERY ORDER #0009
STATEMENT OF WORK #0007**

REVISION 03

July 02, 1999

Prepared for:

**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
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**QUALITY ASSURANCE PROJECT PLAN
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**NSWC CRANE
CRANE, INDIANA**

U.S. EPA ID NUMBER [IN5 170 023 498]

REVISION 03

July 02, 1999

Prepared for:
**SOUTHERN DIVISION
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MK Program Manager

Date

MK Program Quality Control Manager

Date

US Navy Responsible Authority

Date

USEPA RCRA Project Coordinator

Date

USEPA Region 5 QAPP Coordinator

Date

Laboratory Representative

Date

TABLE 1 - 1
RESIDENTIAL USE SOIL REMEDIAL GOALS,
SWMU-SPECIFIC CHEMICALS OF CONCERN,
AND ACCEPTABLE REPORTING LIMITS
NAVAL SURFACE WARFARE CENTER - CRANE

Parameter	SWMU Parameter Applicable To				IM Residential Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis ¹	Analytical Reporting Limit (mg/kg)	
	M A	M B	A B G	R E			SWL	Quanterra
EXPLOSIVES								
Pentaerythritol tetranitrate (PETN)	X	X	X	X	To be determined by U.S. EPA 1998	8330	0.25	0.25 0.50
2,4,6-trinitrotoluene (TNT)	X	X	X	X	15	8330	0.50	0.25
Cyclotrimethylene trinitramine (RDX) (Hexahydro 1,3,5 trinitro 1,3,5 triazine)	X	X	X	X	4.0	8330	0.625	0.25
Cyclotetremethylene tetranitramine (HMX) (Octahydro 1,3,5,7 tetranitro 1,3,5,7 tetrazocine)	X	X	X	X	3,300	8330	1.60	0.25
Tetryl (Methyl 2,4,6 trinitro phenyl nitramine)	X	X	X	X	650	8330	0.38	0.25
Trinitrobenzene (TNB)	X	X	X	X	3.3	8330	0.575	0.25
1,3-Dinitrobenzene (DNB)	X	X	X	X	6.5	8330	0.49	0.25
1,2-DNB	X	X	X	X	26 *	8330		
1,4-DNB	X	X	X	X	26 *	8330		
Nitrobenzene (NB)	X	X	X	X	18	8330	0.26	0.25
Dinitrotoluene (DNT) (total)	X	X	X	X	0.65	8330		
4-Amino 2,6 Dinitrotoluene (4-Am DNT)	X	X	X	X	65 **	8330	0.45	0.25

**TABLE 1 - 1
RESIDENTIAL USE SOIL REMEDIAL GOALS,
SWMU-SPECIFIC CHEMICALS OF CONCERN,
AND ACCEPTABLE REPORTING LIMITS
NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Residential Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis ¹	Analytical Reporting Limit (mg/kg)	
	M A	M B	A B G	R E			SWL	Quanterra
VOLATILE ORGANICS								
Dichloromethane (methylene chloride)	X	X	X		7.8	8260	0.005	0.005
Acetone	X	X	X		2,000	8260	0.005	0.010 0.020
Methyl ethyl ketone (2 - butanone)	X T	X T	X T		7,100	8260	0.005	0.010
Methyl isobutyl ketone (4 - methyl -2- pentanone)	X	X			770	8260	0.005	0.010
Toluene	X	X			790	8260	0.005	0.005
Xylene (total)	X	X		X	320	8260	0.005	0.005
Trans 1,3 dichloropropene				X	0.25	8260	0.005	0.005
1,1,1 Trichloroethane			X	X	1,200	8260	0.005	0.005
1,1,2 Trichloroethane			X	X	0.65	8260	0.005	0.005

**TABLE 1 - 2
INDUSTRIAL USE SOIL REMEDIAL GOALS,
SWMU-SPECIFIC CHEMICALS OF CONCERN,
AND ACCEPTABLE REPORTING LIMITS
NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Industrial Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis ¹	Analytical Reporting Limit (mg/kg)	
	M A	M B	A B G	R E			SWL	Quanterra
EXPLOSIVES								
Pentaerythritol tetranitrate (PETN)	X	X	X	X	To be determined by U.S. EPA 1998	8330	0.25	0.25 0.50
2,4,6-trinitrotoluene (TNT)	X	X	X	X	64	8330	0.50	0.25
Cyclotrimethylene trinitramine (RDX) (Hexahydro 1,3,5 trinitro 1,3,5 triazine)	X	X	X	X	17	8330	0.625	0.25
Cyclotetremethylene tetranitramine (HMX) (Octahydro 1,3,5,7 tetranitro 1,3,5,7 tetrazocine)	X	X	X	X	34,000	8330	1.60	0.25
Tetryl (Methyl 2,4,6 trinitro phenylnitroamine)	X	X	X	X	6,800	8330	0.38	0.25
Trinitrobenzene (TNB)	X	X	X	X	34	8330	0.575	0.25
1,3-Dinitrobenzene (DNB)	X	X	X	X	68	8330	0.49	0.25
1,2-DNB	X	X	X	X	270	8330		
1,4-DNB	X	X	X	X	270	8330		
Nitrobenzene (NB) [#]	X	X	X	X	94	8330	0.26	0.25
Dinitrotoluene (DNT) (total)	X	X	X	X	2.8	8330		

**TABLE 1 - 2
INDUSTRIAL USE SOIL REMEDIAL GOALS,
SWMU-SPECIFIC CHEMICALS OF CONCERN,
AND ACCEPTABLE REPORTING LIMITS
NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Industrial Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis ¹	Analytical Reporting Limit (mg/kg)	
	M A	M B	A B G	R E			SWL	Quanterra
VOLATILE ORGANICS								
Dichloromethane (methylene chloride)	X	X	X		18	8260	0.005	0.005
Acetone	X	X	X		8,800	8260	0.005	0.010 0.020
Methyl ethyl ketone (2 - butanone)	X T	X T	X T		27,000	8260	0.005	0.010
Methyl isobutyl ketone (4 - methyl -2- pentanone)	X	X			2,800	8260	0.005	0.005
Toluene	X	X			880	8260	0.005	0.005
Xylene (total)	X	X		X	320	8260	0.005	0.005
Trans 1,3 dichloropropene				X	0.55 *	8260	0.005	0.005
1,1,1 Trichloroethane			X	X	3,000	8260	0.005	0.005
1,1,2 Trichloroethane			X	X	1.5	8260	0.005	0.005

**TABLE 1-3
 ECOLOGICAL USE SOIL REMEDIAL GOALS,
 SWMU-SPECIFIC CHEMICALS OF CONCERN,
 AND ACCEPTABLE REPORTING LIMITS
 NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Cleanup Goal (Ecological Only) (mg/kg)	Method of Analysis ¹	Analytical Reporting Limit (mg/kg)	
	M A	M B	A B G	R E			SWL	Quanterra
EXPLOSIVES								
Pentaerythritol tetranitrate (PETN)	X	X	X	X	To be determined by U.S. EPA in 1998	8330	0.25	0.250.50
2,4,6-trinitrotoluene (TNT)	X	X	X	X	No listing *	8330	0.50	0.25
Cyclotrimethylene trinitramine (RDX) (Hexahydro 1,3,5 trinitro 1,3,5 triazine)	X	X	X	X	No listing *	8330	0.625	0.25
Cyclotetremethylene tetranitramine (HMX) (Octahydro 1,3,5,7 tetranitro 1,3,5,7 tetrazocine)	X	X	X	X	No listing *	8330	1.60	0.25
Tetryl (Methyl 2,4,6 trinitro phenylnitroamine)	X	X	X	X	No listing *	8330	0.38	0.25
Trinitrobenzene (TNB)	X	X	X	X	0.00946 +	8330	0.575	0.25
1,3-Dinitrobenzene (DNB)	X	X	X	X	0.00748 +	8330	0.49	0.25
1,2-DNB	X	X	X	X	No listing *	8330	-	
1,4-DNB	X	X	X	X	No listing *	8330		
Nitrobenzene (NB)	X	X	X	X	0.0148 +	8330	0.26	0.25
Dinitrotoluene (DNT) (total)	X	X	X	X	0.000029 ++	8330		

**TABLE 1 - 3
 ECOLOGICAL USE SOIL REMEDIAL GOALS,
 SWMU-SPECIFIC CHEMICALS OF CONCERN,
 AND ACCEPTABLE REPORTING LIMITS
 NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Cleanup Goal (Ecological Only) (mg/kg)	Method of Analysis ¹	Analytical Reporting Limit (mg/kg)	
	M A	M B	A B G	R E			SWL	Quanterra
VOLATILE ORGANICS								
Dichloromethane (methylene chloride)	X	X	X		0.072 +	8260	0.005	0.005
Acetone	X	X	X		0.257 ++	8260	0.005	0.010 0.020
Methyl ethyl ketone (2 - butanone)	X T	X T	X T		9.22 ++	8260	0.005	0.010
Methyl isobutyl ketone (4 - methyl -2- pentanone)	X	X			58 +	8260	0.005	0.005
Toluene	X	X			0.2997 +	8260	0.005	0.005
Xylene (total)	X	X		X	1.25 +	8260	0.005	0.005
Trans 1,3 dichloropropene				X	0.00449 +	8260	0.005	0.005
1,1,1 Trichloroethane			X	X	0.2225 +	8260	0.005	0.005
1,1,2 Trichloroethane			X	X	0.3229 +	8260	0.005	0.005

TABLE 1 - 4a
HUMAN DRINKING WATER USE REMEDIAL GOALS,
SWMU-SPECIFIC CHEMICALS OF CONCERN,
AND ACCEPTABLE REPORTING LIMITS
NAVAL SURFACE WARFARE CENTER - CRANE

Parameter	SWMU Parameter Applicable To				IM Drinking Water Cleanup Goal (Human Health Only) (ug/l)	Method of Analysis ¹	Analytical Reporting Limit (ug/l)	
	M A	M B	A B G	R E			SWL	Quanterra
VOLATILE ORGANICS								
Dichloromethane (methylene chloride)	X	X	X		4.3	8260	5	1
Acetone	X	X	X		610	8260	5	520
Methyl ethyl ketone (2 - butanone)	X T	X T	X T		1,900	8260	5	5
Methyl isobutyl ketone (4 - methyl -2- pentanone)	X	X			160	8260	5	5
Toluene	X	X			720	8260	5	1
Xylene (total)	X	X		X	1,400	8260	5	1
Trans 1,3 dichloropropene				X	0.081	8260	5	1
1,1,1 Trichloroethane			X	X	200	8260	5	1
1,1,2 Trichloroethane			X	X	0.2	8260	5	1

TABLE 1 - 4b
ECOLOGICAL SURFACE WATER USE REMEDIAL GOALS,
SWMU-SPECIFIC CHEMICALS OF CONCERN,
AND ACCEPTABLE REPORTING LIMITS
NAVAL SURFACE WARFARE CENTER - CRANE

Parameter	SWMU Parameter Applicable To				IM Cleanup Goal (Ecological Only) (ug/l)	Method of Analysis ¹	Analytical Reporting Limit (ug/l)	
	M A	M B	A B G	R E			SWL	Quanterra
VOLATILE ORGANICS								
Dichloromethane (methylene chloride)	X	X	X		45	8260	5	1
Acetone	X	X	X		122,000	8260	5	520
Methyl ethyl ketone (2 - butanone)	X T	X T	X T		26,000	8260	5	5
Methyl isobutyl ketone (4 - methyl -2- pentanone)	X	X			3,680	8260	5	5
Toluene	X	X			253	8260	5	1
Xylene (total)	X	X		X	117.0	8260	5	1
Trans 1,3 dichloropropene				X	7.9 ++	8260	5	1
1,1,1 Trichloroethane			X	X	88	8260	5	1
1,1,2 Trichloroethane			X	X	650	8260	5	1

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.


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