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TECHNICAL MEMORANDUM REGARDING RECALCULATIONS OF MEDIA BACKGROUND
SCREENING VALUES NS MAYPORT FL
11/17/2000
TETRA TECH



1100-I001

To: Terry Hansen, Task Order Manager, Tetra Tech NUS, Tallahassee, Florida
From: Allan Jenkins, Hydrogeologist, Tetra Tech NUS, Oak Ridge, TN
Date: November 17, 2000
Subject: Recalculation of Media Background Screening Values
NAVSTA Mayport, Florida

This memo presents a recalculation of the background screening values for surface soil, subsurface soil, groundwater, surface water, and sediment at Naval Station (NAVSTA) Mayport, Florida. The screening values were calculated using background data presented in the RCRA General Information Report (GIR) for NAVSTA Mayport, Florida (ABB-ES, July 1995). The recalculation of background screening concentrations was performed following current regulatory guidance. Review of the GIR background data during the recalculation process identified apparent spurious or problematic data that was corrected or that was not used in the recalculation of the background screening values.

GIR Background Data

The recalculation of the background screening values was performed using data presented in the GIR (ABB-ES, July 1995). The background data were summarized (positive detects only) and data statistics were presented for all media in GIR Tables 3-11 through 3-30. The validated background sampling data sheets for all media were presented in GIR Appendix C. The recalculations were performed using electronic data files that were provided to Tetra Tech NUS, Inc, by the Navy. These data were subsequently compared to the data sheets in GIR Appendix C to verify their completeness and accuracy.

The recalculation was performed primarily to conform with newer regulatory guidance that recommends how non-detect concentrations are utilized in the mathematical treatment of the data. Other attributes of the background data sets were not scrutinized in depth and, in general, the following assumptions were made regarding the data:

- Background sample locations are representative of background conditions at the station
- Samples were collected using the appropriate methods and techniques to ensure that the samples are representative of the media sampled. (As noted below, groundwater samples obtained using bailers were not considered).
- Quality assurance and quality control objectives were met, and that the data were validated to ensure their usefulness.
- The analytical results in the GIR tables and electronic data base are accurate.

While verifying the data sets and evaluating the previous GIR background screening calculations, it was noted that groundwater background samples collected during the 1992 and 1993 sampling events were



collected using bailers to purge and sample the wells. Water quality data, such as NTU readings, could not be located to investigate the potential for high sample turbidity. However, comparison of the 1992/1993 data with samples collected in 1994 at the same wells (i.e., MPT-S-MW01S, MPT-01-MW01S, and MPT-08-MW05S) shows significantly higher concentration of some metals, particularly iron, in the bailed samples. Based on the sample methodology and the chemical differences, the evidence suggests that samples from bailed wells result in a high bias for some metals probably as a result of sample turbidity. It was decided that recalculation of the groundwater screening values should not include data from the 1992/1993 sampling event. Only data from the later sampling events that were performed using low-flow purging and sampling techniques were used in the recalculation.

Recalculation of Background Screening Values

The background data set presented in the GIR were used to recalculate background screening values using methods consistent with the EPA Region 4 Supplemental Guidance to RAGS: Region 4 Bulletins – Addition #1, Data Collection and Evaluation, Human Health Risk Assessment, November, 1998, Interim Draft, “Statistical Tests for Background Comparison at Hazardous Waste Sites.” This bulletin describes the “twice background” criterion and offers guidance on how to calculate the appropriate value. In summary, the following procedures were used in the recalculation of the NAVSTA Mayport background mean and screening values:

1. Constituents that were not detected in any sample within a media-specific data set were eliminated from the background evaluation for that media.
2. All nondetect concentrations were replaced with $\frac{1}{2}$ of the laboratory reporting limit for detected chemicals.
3. Duplicate sample results were averaged prior to calculating the background screening value. If one or both of the duplicate sample results were non-detect, then $\frac{1}{2}$ the reporting limit was used for either or both results in calculating the average concentration for that sample.
4. If a sample location was resampled, then results for that location were averaged prior to calculating the background screening value. Any nondetect concentration was replaced with $\frac{1}{2}$ the reporting limit.
5. Bailed well data from the 1992/1993 sampling events were not used in the groundwater background calculation.
6. The mean concentration was calculated for each chemical using a spreadsheet formula.
7. The background screening value was calculated by multiplying the mean concentration by a factor of 2 using a spreadsheet formula.

The above methodology follows EPA policy-based criteria that are easily used and easily reviewed. EPA Region 4 states that the twice background screening criterion is believed to be health-protective and to yield a reasonable decision. Furthermore, EPA states that the method is particularly useful for sites that have a small number (i.e., less than 10) of background samples where the power of statistical methods would be low. The method also assumes that the background concentration range is normally distributed.



Therefore, the likelihood of detecting a background concentration greater than twice the average for a given media will be low, but not impossible.

It was noted during review of the background data sets that many of the results for each of the media sampled were below the detection limits of the laboratory methods used. Step 1 as described above may then result in an unnatural dilution of the mean concentration. Therefore, the background screening concentration as calculated above was compared with the maximum background concentration in each media's data set. If the screening concentration (i.e., 2 times the mean of the background data set) for a chemical was less than the maximum concentration for that chemical, then the background screening concentration for that chemical was footnoted. For these chemicals, if a detection occurs in site media within the range of concentration between the screening concentration and the maximum concentration, then these chemicals will receive additional evaluation on a case by case basis to determine if the site detection represents the upper range of background or a site release. Tables 1 through 5 attached to this memo present the recalculated background screening values for each media at NAVSTA Mayport. The GIR data that was used in the recalculations are presented in Tables A-1 through A-5 in Attachment A to this memo. Duplicate samples and resamples (surface water and sediment only) are identified in the Attachment A tables.

AJ:mc

c Mike Albert, Tetra Tech NUS, Inc.
File/wdb

Attachments

TABLE 1
Statistics and Background Screening Concentrations
Surface Soil - Mayport NAVSTA

Chemical ¹	Frequency of Detection ²	Range of Reporting Limits ³	Range of Detected Concentrations ³	Arithmetic Mean ⁴	BG Screen ⁵
Pesticides/PCBs (ug/kg)					
4,4'-DDE	1 / 6	0.7 -- 0.81	2.3 -- 2.3	0.69	1.385 ⁶
Inorganics (mg/kg)					
ANTIMONY	0 / 6	5.2 -- 6	** -- ** ⁷	** ⁷	**
ARSENIC	0 / 6	0.76 -- 2.6	** -- **	**	**
BARIUM	6 / 6	* -- * ⁸	0.76 -- 5	2.75	5.50
BERYLLIUM	1 / 6	0.06 -- 0.07	0.06 -- 0.09	0.05	0.09
CADMIUM	1 / 6	0.83 -- 0.96	1 -- 1	0.5	1.1
CHROMIUM	6 / 6	* -- *	0.68 -- 2.5	1.3	2.6
COBALT	0 / 6	0.47 -- 0.55	** -- **	**	**
COPPER	1 / 6	0.35 -- 0.41	2.1 -- 2.1	0.35	0.69
CYANIDE	0 / 6	0.16 -- 0.18	** -- **	**	**
LEAD	0 / 6	0.25 -- 1.7	** -- **	**	**
MERCURY	0 / 6	0.03 -- 0.07	** -- **	**	**
NICKEL	0 / 6	2.6 -- 3	** -- **	**	**
SELENIUM	5 / 6	0.45 -- 0.45	0.47 -- 0.86	0.6	1.2
SILVER	0 / 6	0.51 -- 0.59	** -- **	**	**
THALLIUM	4 / 6	0.53 -- 0.62	0.77 -- 1.1	0.7	1.4
TIN	0 / 6	7.3 -- 8.5	** -- **	**	**
VANADIUM	5 / 6	0.46 -- 0.46	1.2 -- 2.5	1.7	3.4
ZINC	6 / 6	* -- *	0.35 -- 1.9	1.3	2.7
Miscellaneous Parameters (mg/kg)					
TOTAL ORGANIC CARBON	6 / 6	* -- *	1440 -- 8030	3499	6998

¹ Includes VOCs, SVOC, and Pest./PCBs detected in at least one background sample; includes all inorganic analytes.

² Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected results); duplicates included but not counted.

³ Ranges include duplicate and/or re-sample results, where appropriate.

⁴ The mean includes detected concentrations and one-half the laboratory reporting limit for non-detect results; duplicate samples and re-sample results were averaged prior to calculation of the mean (see Table A-1).

⁵ Background (BG) Screen is twice the arithmetic mean of the data.

⁶ Bold BG Screen result indicates that value is less than maximum concentration of that chemical.

⁷ All results were non detects; mean and BG screening value not applicable.

⁸ All results were positive detects.

TABLE 2
Statistics and Background Screening Concentrations
Subsurface Soil - Mayport NAVSTA

Chemical ¹	Frequency of Detection ²	Range of Reporting Limits ³	Range of Detected Concentrations ³	Arithmetic Mean ⁴	BG Screen ⁵
Semivolatile Organics (ug/kg)					
BENZOIC ACID	1 / 4	1700 -- 1900	110 -- 110	690	1380
Pesticides/PCBs (ug/kg)					
4,4-DDE	1 / 4	0.72 -- 0.78	3.5 -- 3.5	1.2	2.31 ⁶
Inorganics (mg/kg)					
ANTIMONY	0 / 4	1.1 -- 1.2	** -- ** ⁷	** ⁷	**
ARSENIC	3 / 4	0.13 -- 0.13	0.33 -- 0.58	0.35	0.70
BARIUM	4 / 4	* -- * ⁸	1.9 -- 6.8	3.6	7.2
BERYLLIUM	1 / 4	0.07 -- 0.07	0.07 -- 0.07	0.04	0.09
CADMIUM	0 / 4	0.22 -- 0.23	** -- **	**	**
CHROMIUM	3 / 4	0.57 -- 0.57	1.4 -- 3	1.4	2.7
COBALT	1 / 4	0.67 -- 0.72	0.71 -- 0.71	0.4	0.8
COPPER	2 / 4	0.2 -- 0.9	1.4 -- 2.3	1.0	2.1
CYANIDE	1 / 4	0.15 -- 0.16	0.58 -- 0.58	0.1	0.3
LEAD	2 / 4	0.58 -- 0.59	0.75 -- 1.9	0.83	1.66
MERCURY	3 / 4	0.03 -- 0.03	0.03 -- 0.03	0.02	0.05
NICKEL	0 / 4	1.3 -- 1.4	** -- **	**	**
SELENIUM	0 / 4	0.13 -- 0.14	** -- **	**	**
SILVER	0 / 4	0.45 -- 0.49	** -- **	**	**
THALLIUM	0 / 4	0.13 -- 0.14	** -- **	**	**
TIN	4 / 4	* -- *	2.2 -- 4	2.7	5.4
VANADIUM	4 / 4	* -- *	0.71 -- 2.5	1.6	3.1
ZINC	4 / 4	* -- *	2 -- 2.9	2.4	4.9

¹ Includes VOCs, SVOC, and Pest./PCBs detected in at least one background sample; includes all inorganic analytes.

² Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected results); duplicates included but not counted.

³ Ranges include duplicate and/or re-sample results, where appropriate.

⁴ The mean includes detected concentrations and one-half the laboratory reporting limit for non-detect results; duplicate samples and re-sample results were averaged prior to calculation of the mean (see Table A-2).

⁵ Background (BG) Screen is twice the arithmetic mean of the data.

⁶ Bold BG Screen result indicates that value is less than maximum concentration of that chemical.

⁷ All results were non detects; mean and BG screening value not applicable.

⁸ All results were positive detects.

TABLE 3
Statistics and Background Screening Concentrations
Groundwater - Mayport NAVSTA

Chemical ¹	Frequency of Detection ²	Range of Reporting Limits ²	Range of Detected Concentrations ³	Arithmetic Mean ⁴	BG Screen ⁵
Volatile Organics (ug/L)					
ACETONE	1 / 8	10 -- 44	16 -- 16	8.5	17
BROMODICHLOROMETHANE	1 / 8	5 -- 5	2 -- 2	2.4	4.8
CHLOROFORM	2 / 8	5 -- 5	2 -- 3	2.5	5.0
Semivolatile Organics (ug/L)					
3&4-METHYLPHENOL	1 / 8	10 -- 10	29 -- 29	8.0	16 ⁶
BIS(2-ETHYLHEXYL)PHTHALATE	1 / 8	5 -- 10	6 -- 6	3.7	7.4
Inorganics (ug/L)					
ARSENIC	5 / 8	0.6 -- 6	0.6 -- 6	2.6	5.3
ANTIMONY	0 / 8	2.2 -- 50	** -- ** ⁷	** ⁷	**
BARIUM	5 / 8	1.2 -- 3.3	6.4 -- 75.5	18.9	37.8
BERYLLIUM	0 / 8	0.18 -- 0.3	** -- **	**	**
CADMIUM	0 / 8	1 -- 3	** -- **	**	**
CALCIUM	8 / 8	* -- * ⁸	65000 -- 251000	113063	226125
CHROMIUM	0 / 8	2 -- 2.6	** -- **	**	**
COBALT	0 / 8	2.7 -- 3.1	** -- **	**	**
COPPER	0 / 8	0.9 -- 12.7	** -- **	**	**
CYANIDE	1 / 8	0.81 -- 2.7	0.95 -- 0.95	1	2
IRON	6 / 8	68.2 -- 78.6	15.4 -- 660	247	494
LEAD	1 / 8	0.6 -- 6	1.5 -- 1.5	1	2
MAGNESIUM	6 / 8	18800 -- 19700	2860 -- 419000	92196	184393
MANGANESE	6 / 8	20.1 -- 23.6	7.1 -- 228	70	141
MERCURY	2 / 8	0.08 -- 0.5	0.08 -- 0.1	0.08	0.16
NICKEL	0 / 8	5.9 -- 7.3	** -- **	**	**
SELENIUM	0 / 6	0.6 -- 13.2	** -- **	**	**
SILVER	0 / 8	2.1 -- 2.3	** -- **	**	**
SODIUM	6 / 8	31500 -- 39500	9300 -- 3E+06	762294	1524588
THALLIUM	0 / 8	0.6 -- 6	** -- **	**	**
TIN	0 / 8	8 -- 9.4	** -- **	**	**
VANADIUM	6 / 8	1.5 -- 1.7	2.3 -- 5.8	3	6
ZINC	1 / 8	1.82 -- 8.8	4.3 -- 4.3	2.9	5.8
Miscellaneous Parameters (mg/L)					
AMMONIA, AS NITROGEN	3 / 3	* -- *	0.7 -- 1.3	1.0	2.1
CHLORIDE	6 / 6	* -- *	15 -- 6600	1142	2284
SULFATE	6 / 6	* -- *	36.4 -- 1230	257	514
TOTAL DISSOLVED SOLIDS	6 / 6	* -- *	417 -- 8150	1881	3762

¹ Includes VOCs, SVOC, and Pest./PCBs detected in at least one background sample; includes all inorganic analytes.

² Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected results); duplicates included but not counted.

³ Ranges include duplicate and/or re-sample results, where appropriate.

⁴ The mean detected concentrations and one-half the laboratory reporting limit for non-detect results; duplicate samples and re-sample results were averaged prior to calculation of the mean (see Table A-3).

⁵ Background (BG) Screen is twice the arithmetic mean of the data.

⁶ Bold BG Screen result indicates that value is less than maximum concentration of that chemical.

⁷ All results were non detects; mean and BG screening value not applicable.

⁸ All results were positive detects.

TABLE 4
Statistics and Background Screening Concentrations
Surface Water - Mayport NAVSTA

Chemical ¹	Frequency of Detection ²	Range of Reporting Limits ²	Range of Detected Concentrations ³	Arithmetic Mean ⁴	BG Screen ⁵
Volatile Organics (ug/L)					
1,2-DIBROMO-3-CHLOROPROPANE	2 / 8	10 – 10	10 – 10	6.4	12.9
Semivolatile Organics (ug/L)					
2-ACETYLAMINOFLUORENE	1 / 8	10 – 10	10 – 10	5.4	10.7
BIS(2-ETHYLHEXYL)PHTHALATE	2 / 8	10 – 40	1 – 3	5.5	11.0
Inorganics (ug/L)					
ANTIMONY	1 / 8	3.1 – 40	57.5 – 57.5	17.5	35 ⁶
ARSENIC	5 / 8	0.9 – 6.9	0.86 – 8.1	2.8	5.6
BARIIUM	8 / 8	* – * ⁷	6.8 – 15.4	11.4	22.9
BERYLLIUM	0 / 8	0.1 – 0.27	** – ** ⁸	** ⁸	**
CADMIUM	1 / 8	1.6 – 4	2.4 – 2.4	1.6	3.1
CALCIUM	4 / 4	* – *	71100 – 168000	141088	282175
CHROMIUM	1 / 8	1.9 – 2.4	4 – 4	1.3	2.6
COBALT	2 / 8	2.3 – 5.1	5.6 – 9.7	3.2	6.4
COPPER	3 / 8	1.4 – 29.5	2.4 – 37.2	7.2	14.5
CYANIDE	2 / 8	1.8 – 3	0.92 – 3.0	1.5	3.0
IRON	3 / 4	187 – 187	85.7 – 435	193	386
LEAD	2 / 4	0.78 – 2.6	0.91 – 1.5	1.0	2.1
MAGNESIUM	4 / 4	* – *	54000 – 490000	335575	671150
MANGANESE	4 / 4	* – *	10.4 – 98.7	41.7	83.5
MERCURY	0 / 8	0.09 – 0.16	** – **	**	**
NICKEL	1 / 8	7 – 19.8	13 – 13	6.3	12.6
SELENIUM	3 / 8	1.1 – 10.6	1.8 – 13.7	4.3	8.5
SILVER	0 / 8	2.1 – 2.4	** – **	**	**
SODIUM	1 / 4	55.6 – 55.6	380000 – 386000	95771	191542
THALLIUM	2 / 5	1.4 – 1.4	1.8 – 73.7	10.0	19.9
TIN	1 / 8	9.4 – 208	776 – 776	108	216
VANADIUM	6 / 8	2.2 – 2.7	3.4 – 5.2	3.2	6.4
ZINC	1 / 8	1.6 – 23.5	3.2 – 3.2	4.4	8.8
Miscellaneous Parameters (mg/L)					
CHLORIDE	5 / 5	* – *	710 – 11500	6075.0	12150
SULFATE	5 / 5	* – *	130 – 1320	839	1679
TOTAL DISSOLVED SOLIDS	4 / 4	* – *	1550 – 18600	11263	22525
TOTAL ORGANIC CARBON	4 / 4	* – *	10.8 – 21.6	15	29

¹ Includes VOCs, SVOC, and Pest./PCBs detected in at least one background sample; includes all inorganic analytes.

² Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected results); duplicates included but not counted.

³ Ranges include duplicate and/or re-sample results, where appropriate.

⁴ The mean includes detected concentrations and one-half the laboratory reporting limit for non-detect results; duplicate samples and re-sample results were averaged prior to calculation of the mean (see Table A-4).

⁵ Background (BG) Screen is twice the arithmetic mean of the data.

⁶ Bold BG Screen result indicates that value is less than maximum concentration of that chemical.

⁷ All results were positive detects.

⁸ All results were non detects; mean and BG screening value not applicable.

TABLE 5
Statistics and Background Screening Concentrations
Sediment - Mayport NAVSTA

Chemical ¹	Frequency of Detection ²	Range of Reporting Limits ²	Range of Detected Concentrations ³	Arithmetic Mean ⁴	BG Screen ⁵
Volatile Organics (ug/kg)					
CARBON DISULFIDE	1 / 8	6 – 12	19 – 83	10.4	20.7 ⁶
TOLUENE	1 / 8	6 – 16	3 – 3	4.1	8.1
Semivolatile Organics (ug/kg)					
BIS(2-ETHYLHEXYL)PHTHALATE	2 / 8	45 – 7200	140 – 260	516	1031
DI-N-BUTYL PHTHALATE	2 / 8	410 – 7200	54 – 71	516	1033
PYRENE	1 / 8	410 – 7200	99 – 99	548	1096
Pesticides/PCBs (ug/kg)					
4,4'-DDD	1 / 8	1 – 7.4	4.2 – 4.2	1.4	2.9
4,4'-DDE	2 / 8	0.7 – 7.4	3 – 7.9	2.1	4.3
4,4'-DDT	1 / 8	1 – 7.4	0.8 – 0.8	1.0	2.0
Inorganics (mg/kg)					
ANTIMONY	0 / 8	0.94 – 18.2	* – * ⁷	* ⁷	* ⁷
ARSENIC	4 / 8	0.01 – 0.21	0.68 – 6.6	1.2	2.5
BARIUM	8 / 8	0 – 0	3.6 – 16.1	7.2	14.3
BERYLLIUM	2 / 8	0.045 – 0.59	0.1 – 0.47	0.1	0.2
CADMIUM	1 / 8	0.44 – 1.3	0.82 – 0.82	0.5	0.9
CHROMIUM	8 / 8	0 – 0	1.3 – 28.1	7.3	14.7
COBALT	1 / 8	0.56 – 6.4	2.4 – 2.4	1.0	2.0
COPPER	7 / 8	0.43 – 0.43	0.88 – 7.5	2.5	5.0
CYANIDE	0 / 5	0.07 – 0.22	* – *	*	*
LEAD	6 / 8	0.2 – 1.2	1.5 – 10	3.4	6.8
MERCURY	3 / 8	0.04 – 0.24	0.22 – 1.1	0.2	0.3
NICKEL	3 / 8	2 – 3.6	5.1 – 7.1	3.1	6.2
SELENIUM	6 / 8	0.56 – 1.1	0.32 – 0.81	0.5	1.1
SILVER	0 / 8	0.6 – 1.1	* – *	*	*
THALLIUM	1 / 8	0.39 – 0.74	0.88 – 0.88	0.3	0.7
TIN	1 / 8	5 – 94.8	12.3 – 12.3	17.9	35.8
VANADIUM	8 / 8	** – ** ⁸	1.6 – 28.4	7.1	14.3
ZINC	8 / 8	** – **	2.1 – 34.3	12.1	24.2
Miscellaneous Parameters (mg/kg)					
TOTAL ORGANIC CARBON	5 / 5	** – **	5160 – 20400	9364	18728

¹ Includes VOCs, SVOC, and Pest./PCBs detected in at least one background sample; includes all inorganic analytes.

² Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected results); duplicates included but not counted.

³ Ranges include duplicate and/or re-sample results, where appropriate.

⁴ The mean includes detected concentrations and one-half the laboratory reporting limit for non-detect results; duplicate samples and re-sample results were averaged prior to calculation of the mean (see Table A-5).

⁵ Background (BG) Screen is twice the arithmetic mean of the data.

⁶ Bold BG Screen result indicates that value is less than maximum concentration of that chemical.

⁷ All results were non detects; mean and BG screening values not applicable.

⁸ All results were positive detects.

TABLE A-1
Surface Soil Background Data
Mayport NAVSTA

Sample Location	MPT-B-SS/BS-1	MPT-B-SS/BS-1	MPT-B-SS/BS-2	MPT-B-SS/BS-3	MPT-B-SS/BS-4	MPT-B-SS/BS-5	MPT-B-SS/BS-6
Sample ID	MPTBSS1	MPTBSS1D	MPTBSS2	MPTBSS3	MPTBSS4	MPTBSS5	MPTBSS6
Sample Date	02/16/93	02/16/93	02/16/93	02/16/93	02/16/93	02/16/93	02/16/93
Top Depth, feet	0	0	0	0	0	0	0
Bottom Depth, feet	1	1	1	1	1	1	1
Pesticides/PCBs (ug/kg)							
4,4'-DDE	0.7 U	0.7 U	0.8 U	0.81 U	2.3	0.7 U	0.7 U
Inorganics (mg/kg)							
ANTIMONY	5.3 U	5.2 U	6 U	6 U	5.2 U	5.2 U	5.2 U
ARSENIC	2.2 U	1.5 U	2.5 U	2.6 U	1.4 U	0.76 U	1.7 U
BARIUM	2.7 J	2.6 J	5 J	2.5 J	3.6 J	0.76 J	2 J
BERYLLIUM	0.06 U	0.06 U	0.07 U	0.07 U	0.06 J	0.06 U	0.09 J
CADMIUM	0.83 U	0.83 U	1 J	0.96 U	0.84 U	0.83 U	0.84 U
CHROMIUM	1.5 J	0.72 J	1.2 J	2.5	0.72 J	0.68 J	1.7 J
COBALT	0.47 U	0.47 U	0.55 U	0.55 U	0.48 U	0.47 U	0.48 U
COPPER	2.1 J	0.35 U	0.41 U	0.41 U	0.36 U	0.35 U	0.36 U
CYANIDE	0.16 U	0.16 U	0.18 U	0.18 U	0.16 U	0.16 U	0.16 U
LEAD	1.5 U	1.2 U	0.25 U	0.94 U	1 U	1.4 U	1.7 U
MERCURY	0.03 U	0.03 U	0.03 U	0.07 U	0.03 U	0.03 U	0.03 U
NICKEL	2.6 U	2.6 U	3 U	3 U	2.6 U	2.6 U	2.6 U
SELENIUM	0.72 J	0.59 J	0.86 J	0.71 J	0.69 J	0.47 J	0.45 U
SILVER	0.51 U	0.51 U	0.59 U	0.59 U	0.51 U	0.51 U	0.51 U
THALLIUM	0.53 UJ	0.54 UJ	0.78 J	0.62 UJ	1.1 J	0.77 J	0.94 J
TIN	7.3 U	7.3 U	8.4 U	8.5 U	7.4 U	7.3 U	7.4 U
VANADIUM	1.7 J	1.2 J	1.6 J	2.5 J	2.3 J	0.46 U	2 J
ZINC	1.7 J	0.35 J	1.2 J	0.71 J	1.4 J	1.9 J	1.8 J
Miscellaneous Parameters (mg/kg)							
TOTAL ORGANIC CARBON	1950	1740	2620	5400	8030	1440	1660

"D" in sample ID denotes duplicate sample.
MPTBSS1D is a duplicate of MPTBSS1.

TABLE A-2
Subsurface Soil Background Data
Mayport NAVSTA

Sample Location	MPT-B-BS1	MPT-B-BS1DUP	MPT-B-BS4	MPT-B-BS5	MPT-B-BS6
Sample ID	OBBS00104	OBBS00104D	OBBS00404	OBBS00504	OBBS00604
Sample Date	11/22/94	11/22/94	11/22/94	11/22/94	11/22/94
Top Depth, feet	3	3	3	3	3
Bottom Depth, feet	4	4	4	4	4
Semivolatile Organics (ug/kg)					
BENZOIC ACID	1700 U	1700 UJ	1700 UJ	110 J	1900 UJ
Pesticides/PCBs (ug/kg)					
4,4-DDE	0.72 U	0.72 U	3.5	0.74 U	0.78 U
Inorganics (mg/kg)					
ANTIMONY	1.1 U	1.1 U	1.1 U	1.1 U	1.2 U
ARSENIC	0.58 J	0.43 J	0.5 J	0.13 U	0.33 J
BARIUM	3.3 J	3.9 J	6.8 J	2.1 J	1.9 J
BERYLLIUM	0.07 J	0.07 J	0.07 U	0.07 U	0.07 U
CADMIUM	0.22 U	0.22 U	0.22 U	0.22 U	0.23 U
CHROMIUM	1.5 J	3	0.57 U	1.4 J	1.5 J
COBALT	0.67 U	0.71 J	0.67 U	0.69 U	0.72 U
COPPER	2 J	2.3 J	0.2 U	0.9 U	1.4 J
CYANIDE	0.58	0.15 U	0.15 U	0.15 U	0.16 U
LEAD	0.93	0.75	0.59 U	1.9	0.58 U
MERCURY	0.03 U	0.03 J	0.03 J	0.03 J	0.03 U
NICKEL	1.3 U	1.3 U	1.3 U	1.3 U	1.4 U
SELENIUM	0.13 U	0.13 U	0.13 UJ	0.13 U	0.14 U
SILVER	0.45 U	0.45 U	0.46 U	0.47 U	0.49 U
THALLIUM	0.13 U	0.13 U	0.13 U	0.13 U	0.14 U
TIN	4 J	2.8 J	2.2 J	2.2 J	3 J
VANADIUM	1.7 J	1.9 J	2.5 J	0.71 J	1.2 J
ZINC	2.9 J	2.8 J	2 J	2.5 J	2.4 J

"D" in sample ID denotes duplicate sample.
OBBS00104D is a duplicate of OBBS00104.

from bkgso_sam.dbf
from bkgso_res.dbf
from bkgso_res.xls
from p:\mayport\more_1026

**TABLE A-3
Groundwater Background Data
Mayport NAVSTA**

Sample Location Sample ID Sample Date	MPT-01-MW01S 01MW001 07/08/94	MPT-S-MW01S 0SMW001R 07/08/94	MPT-S-MW01S 0SMW001RD 07/08/94	MPT-B-MW1S 0BMW001S 07/08/94	MPT-B-MW1I 0BMW001I 07/09/94	MPT-B-MW1D 0BMW001D 07/08/94	MPT-08-MW05S 08MW005S 07/26/94	MPT-08-MW05I 08MW005I 07/26/94	MPT-08-MW05D 08MW005D 08/29/94
Volatile Organics (ug/L)									
ACETONE	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U	44 U	16
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2 J	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	3 J	5 U	5 U	2 J	5 U
Semivolatile Organics (ug/L)									
3&4-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	29	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	6 J	10 U	10 U	10 U	10 U	10 U	10 U
Inorganics (ug/L)									
ANTIMONY	2.2 U	3 U	2.2 U	2.2 U	2.2 U	22.3 UJ	5 U	5 U	50 UJ
ARSENIC	6 J	1.9 J	1.9 J	3.3 J	0.9 U	5.5 J	0.6 U	0.6 J	6 U
BARIUM	3.3 U	9.2 J	9.2 J	8.2 J	6.4 J	48.9 J	1.4 U	1.2 U	75.5 J
BERYLLIUM	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.3 UJ	0.3 UJ	0.3 UJ
CADMIUM	3 U	3 U	3 U	3 U	3 U	3 U	1 U	1 U	1 U
CALCIUM	65000	113000	113000	79000	100000	251000	84500 J	82000 J	130000
CHROMIUM	2.09 U	2 U	2 U	2 U	2.09 U	2 U	2.6 UJ	2.6 UJ	2.6 U
COBALT	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	3.1 UJ	3.1 UJ	3.1 U
COPPER	12.7 U	9.86 U	9.86 U	10.1 U	4 U	9.86 U	0.9 U	0.9 U	0.9 U
CYANIDE	0.95 J	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U	2.7 U	2.7 U	2.7 U
IRON	15.4 J	95 J	75 J	425	660	609	78.6 UJ	68.2 UJ	108
LEAD	0.97 U	2 U	0.97 U	2 UJ	1.5 J	2.6 U	0.6 U	0.6 U	6 UJ
MAGNESIUM	2860 J	7670	7450	12300	23600	419000	18800 U	19700 U	253000
MANGANESE	7.1 J	67.8	64.7	70.9	119	228	23.6 UJ	20.1 UJ	49.5
MERCURY	0.1 J	0.08 J	0.08 U	0.08 U	0.08 U	0.08 U	0.1 U	0.1 U	0.5 UJ
NICKEL	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	5.9 UJ	5.9 UJ	5.9 U
SELENIUM	1.3 UJ	---	---	---	1.3 UJ	13.2 UJ	0.6 U	0.6 UJ	6 UJ
SILVER	2.3 U	2.1 U	2.1 U	2.1 U	2.3 U	2.1 U	2.1 U	2.1 U	2.1 U
SODIUM	9300	13800 J	13300 J	10500 J	79500	3310000 J	31500 U	39500 U	2640000
THALLIUM	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 U	1.3 UJ	0.6 U	0.6 U	6 UJ
TIN	9.4 U	9.4 U	9.4 U	9.4 U	9.4 U	9.4 U	8 U	8 U	8 U
VANADIUM	4.4 J	5.8 J	5.8 J	2.8 J	3.6 J	1.7 U	1.5 UJ	2.3 J	3.8 J
ZINC	6.1 U	4.2 U	4.2 U	8.8 U	8 U	5.8 U	1.82 U	3.1 U	4.3 J
Miscellaneous Parameters (mg/L)									
AMMONIA, AS NITROGEN		0.3 U	0.3 U	0.3 U	0.3 U	0.7	1.3	1.1	
CHLORIDE		15	15.1	20	146	6600	31.7	39.7	
SULFATE		57.7	59	67	99.6	1230	36.4	49.3	
TOTAL DISSOLVED SOLIDS		776	470	824	811	8150	417	460	

OSMW001RD is a duplicate of OSMW001R.

"S", "I", and "D" at end of sample location indicate "shallow", "intermediate", and "deep" wells, respectively, in the surficial aquifer.

from bkgw_samrev1.dbf
 from bkgw_resrev1.dbf
 from bkgw_resrev1.xls
 from p:\mayportz_new_cms\background

TABLE A-4
Surface Water Background Data
Mayport NAVSTA

Sample Location Sample ID Sample Data	MPT-B-SW/SD-1 MPT-B-SW-1 01/21/92	MPT-B-SW/SD-2 MPT-B-SW-2 01/21/92	MPT-B-SW/SD-3 MPT-B-SW-3 01/21/92	MPT-B-SW/SD-1 (3) MPTBSWDUP1 01/21/92	MPT-B-SW/SD-4 MPTBSW4 02/17/93	MPT-B-SW/SD-5 MPTBSW5 02/18/93	MPT-B-SW/SD-5 OOSW001 08/03/94	MPT-B-SW/SD-6 MPTBSW6 02/17/93	MPT-B-SW/SD-7 MPTBSW7 02/17/93	MPT-B-SW/SD-7 MPTBSW7D 02/17/93
Volatile Organics (ug/L)										
1,2-DIBROMO-3-CHLOROPROPANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 J	10 J	10 J
Semivolatile Organics (ug/L)										
2-ACETYLAMINOFLOURENE	10 UJ	10 UJ	10 UJ	10 UJ	10 U	10	10 U	10 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	3 J	10 U	10 U	10 U	40 U	1 J	10 U	10 U	10 U
Inorganics (ug/L)										
ANTIMONY	40 U	40 U	57.5 J	40 U	24.6 U	24.6 U	3.1 U	24.6 U	24.6 U	24.6 U
ARSENIC	1.2 J	0.86 J	1.2 J	1.4 J	6.9 U	3.8 J	0.9 UJ	8.1 J	5.1 U	4.8 U
BARIIUM	11.1 J	12.3 J	15.4 J	15.4 J	11.7 J	10.6 J	10.9 J	11.6 J	6.8 J	7.6 J
BERYLLIUM	0.1 U	0.1 U	0.1 U	0.1 U	0.27 U	0.27 U	0.18 U	0.27 U	0.27 U	0.27 U
CADMIUM	1.6 U	1.6 U	1.6 U	2.4 J	4 U	4 U	3 U	4 U	4 U	4 U
CALCIUM					168000 J	166000 J		159000 J	71600 J	71100 J
CHROMIUM	1.9 U	1.9 U	1.9 U	4 J	2.4 U	2.4 U	2 U	2.4 U	2.4 U	2.4 U
COBALT	5.1 U	5.6 J	9.7 J	9.7 J	2.3 U	2.3 U	2.7 U	2.3 U	2.3 U	2.3 U
COPPER	1.4 U	37.2	2.4 J	1.4 U	1.7 U	2.4 J	29.5 U	1.7 U	1.7 U	1.7 U
CYANIDE	3 J	1.8 U	1.8 U	1.8 U	3 U	3 U	0.92 J	3 U	3 U	3 U
IRON					435	187 U		155	92.5 J	85.7 J
LEAD	1.3 J	0.78 UJ	0.91 J	1.5 J	2.6 R	2.6 UJ	20.5 R	2.6 R	2.6 R	2.6 R
MAGNESIUM					490000	453000		345000	54600	54000
MANGANESE					10.4 J	23.7		36.5	94	98.7
MERCURY	0.16 U	0.16 U	0.16 U	0.16 U	0.1 U	0.1 U	0.09 U	0.1 U	0.1 U	0.1 U
NICKEL	7 U	19.8 U	7 U	7 U	12.5 U	13 J	7.3 U	12.5 U	12.5 U	12.5 U
SELENIUM	2.6 J	1.1 UJ	1.8 J	1.3 UJ	10.6 U	10.6 U	13.7 J	10.6 U	10.6 U	10.6 U
SILVER	2.3 U	2.3 U	2.3 U	2.3 U	2.4 U	2.4 U	2.1 U	2.4 U	2.4 U	2.4 U
SODIUM					55.6 U	55.6 U		55.6 U	386000	380000
THALLIUM	1.4 UJ	1.4 UJ	1.4 UJ	1.4 UJ	12.7 R	73.7 J	1.8 J	12.7 R	12.7 R	12.7 R
TIN	208 U	208 U	208 U	208 U	34.8 U	776	9.4 U	34.8 U	34.8 U	34.8 U
VANADIUM	3.6 J	2.7 U	2.7 U	2.7 U	4.5 J	5 J	3.4 J	5.2 J	3.5 J	2.2 U
ZINC	6.1 U	23.5 U	10.7 U	8.4 U	1.6 UJ	6.6 U	23.5 U	1.6 UJ	1.6 UJ	3.2 J
Miscellaneous Parameters (mg/L)										
AMMONIA, AS NITROGEN					0.06 U	0.6 U	0.3 U	0.06 U	0.06 U	
CHLORIDE					8340	8680	11500	5160	710	
SULFATE					1160	1100	1320	857	130	
TOTAL DISSOLVED SOLIDS					18600	14400		10500	1550	

MPTBSWDUP1 and MPTBSW7D are duplicates of MPT-B-SW-3 and MPTBSW7, respectively.
OOSW001 is a re-sample at location MPT-B-SW/SD-5.

TABLE A-5
Sediment Background Data
Mayport NAVSTA

Sample Location Sample ID Sample Data	MPT-B-SW/SD-1 MPT-B-SD-1 01/21/92	MPT-B-SW/SD-2 MPT-B-SD-2 01/21/92	MPT-B-SW/SD-3 MPT-B-SD-3 01/21/92	MPT-B-SW/SD-1 (3) MPTBSDDUP1 01/21/92	MPT-B-SW/SD-4 MPTBSD4 02/17/93	MPT-B-SW/SD-5 MPTBSD5 02/18/93	[MPT-B-SW/SD-5] OOSD001 08/03/94	MPT-B-SW/SD-6 MPTBSD6 02/17/93	MPT-B-SW/SD-7 MPTBSD7 02/17/93	MPT-B-SW/SD-7 MPTBSD7D 02/17/93
Volatile Organics (ug/kg)										
CARBON DISULFIDE	7 U	7 U	83	19	6 U	6 U	12 U	7 U	7 U	7 U
TOLUENE	7 U	3 J	14 U	16 U	6 U	6 U	12 U	7 U	7 U	7 U
Semivolatile Organics (ug/kg)										
BIS(2-ETHYLHEXYL)PHTHALATE	440 U	430 U	260 J	650 U	840 U	45 U	7200 U	960 U	140 J	200 J
DI-N-BUTYL PHTHALATE	440 U	54 J	70 J	71 J	840 U	410 U	7200 U	960 U	940 U	930 U
PYRENE	440 U	430 U	610 U	650 U	840 U	410 U	7200 U	960 U	99 J	930 U
Pesticides/PCBs (ug/kg)										
4,4'-DDD	1.1 U	1 U	7.4 U	1.6 U	1.5 U	1.6 U	2.4 U	4.2	1.7 U	1.8 U
4,4'-DDE	3	1 U	7.4 U	1.6 U	0.7 U	0.82 U	1.2 U	7.9	0.89 U	0.9 U
4,4'-DDT	0.8 J	1 U	7.4 U	1.6 U	1.5 U	1.6 U	2.4 U	1.7 U	1.7 U	1.8 U
Inorganics (mg/kg)										
ANTIMONY	11.4 UJ	11 UJ	18.2 UJ	16.4 UJ	6.3 U	6.1 U	0.94 U	7.2 U	7.1 U	6.9 U
ARSENIC	0.68 J	0.21 U	4.2 J	6.6	0.01 U	1.3 J	3.6 J	0.02 U	0.01 U	0.01 U
BARIUM	3.6 J	7.4 J	16.1 J	15.2 J	6.5 J	4.7 J	12.3 J	4.4 J	4 J	4 J
BERYLLIUM	0.059 U	0.045 U	0.59 U	0.54 U	0.07 U	0.07 U	0.47 J	0.08 U	0.08 U	0.1 J
CADMIUM	0.46 U	0.44 U	0.82 J	0.66 U	1 U	0.98 U	1.3 U	1.2 U	1.1 U	1.1 U
CHROMIUM	2.5 J	4.4	28.1	26.6	1.3 J	2.4 J	17.1	3.1	3	2.8
COBALT	2.1 U	1.5 U	6.4 U	4.9 U	0.57 U	0.56 U	2.4 J	0.66 U	0.65 U	0.63 U
COPPER	2 J	2.3 J	3.1 J	3.5 J	0.43 U	5 J	7.5 J	2.6 J	0.88 J	0.88 J
CYANIDE					0.19 U	0.19 U	0.07 U	0.22 U	0.22 U	0.21 U
LEAD	3.4	3	8.5	10	1.2 U	1.5 J	7.7	0.2 U	3.1	2.5
MERCURY	0.078 U	0.068 U	0.15 U	0.13 U	0.04 UJ	0.24 U	1.1 J	0.24 J	0.22 J	0.04 UJ
NICKEL	2 U	5.5 J	7.1 J	6.4 J	3.2 U	3.1 U	5.1 J	3.6 U	3.6 U	3.5 U
SELENIUM	0.39 J	0.32 J	0.52 J	0.62 J	0.71 J	1.1 U	0.56 UJ	0.81 J	0.65 J	0.6 U
SILVER	0.66 U	0.64 U	1.1 U	0.95 U	0.62 U	0.6 U	0.87 U	0.71 U	0.7 U	0.68 U
THALLIUM	0.4 UJ	0.39 UJ	0.84 UJ	0.58 UJ	0.85 UJ	0.83 U	0.55 U	0.74 UJ	0.88 J	0.72 UJ
TIN	59.1 U	57.3 U	94.8 U	85.4 U	8.9 U	12.3 J	5 U	10.2 U	10.1 U	9.8 U
VANADIUM	2.2 J	3.7 J	28.4	26.2	1.6 J	1.8 J	17 J	3.3 J	2.7 J	2.2 J
ZINC	7.7	6.1	26.7	32.1	3 J	2.1 J	34.3	11.6 J	9.5 J	7.9 J
Miscellaneous Parameters (mg/kg)										
TOTAL ORGANIC CARBON					5870	8760	20400	10800	7250	5160

MPTBSDDUP1 and MPTBSD7D are duplicates of MPT-B-SD-3 and MPTBSD7, respectively.

OOSD001 is a re-sample at location MPTBSD5.