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LETTER OF TRANSMITTAL AND U S NAVY RESPONSES TO REGULATOR COMMENTS ON  
DRAFT REMEDIAL INVESTIGATION WORK PLANS FOR SITE 1 INCINERATOR LANDFILL  
AND SITE 41 FORMER INCINERATOR MCRD PARRIS ISLAND SC  
6/30/1997  
BROWN AND ROOT ENVIRONMENTAL



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June 30, 1997  
Project Number 7394

Commanding Officer  
Department of the Navy  
SOUTHNAVFACENGCOM  
ATTN: Art Sanford (Code 1862)  
2155 Eagle Drive  
North Charleston, South Carolina 29406

Reference: Clean III Contract No. N62467-94-D-0888  
Contract Task Order No. 020

Subject: Parris Island, Marine Corps Recruit Depot, South Carolina  
Final Remedial Investigation Work Plan for Sites 1/41

Dear Mr. Sanford:

Enclosed please find two copies, each, of the Final Remedial Investigation Work Plans for Sites 1/41. This documents has been revised to incorporate comments from the U.S. Environmental Protection Agency - Region 4, the South Carolina Department of Health and Environmental Control, and the Navy. All comments and comment responses have been bound within the Work Plans. Additionally, the Work Plans have been revised to follow investigation guidance provided in the Presumptive Remedy for CERCLA Municipal Landfill Sites.

Please call me at 412-921-8916 or Jason Brown at 412-921-8401 with any questions.

Very truly yours,

Mark P. Speranza, P.E.  
Task Order Manager

MPS/dt  
Enclosure

c: D. Evans-Ripley, SOUTHDIV (w/o enclosure)  
T. Harrington, MCRD Parris Island (one copy)  
D. Bradley, MCRD Parris Island (one copy)  
A. Humphris, U.S. EPA (two copies)  
D. Hargrove, SCDHEC (one copy)  
S. Peterson, SCDHEC (one copy)  
K. Atchley, Bechtel Environmental, Inc. (one copy)  
D. Wroblewski, B&R Environmental (w/o enclosure)  
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File 7394

**RESPONSE TO SCDHEC COMMENTS TO  
DRAFT REMEDIAL INVESTIGATION WORK PLAN  
SITE 1/41 - INCINERATOR LANDFILL AND FORMER INCINERATOR  
MARINE CORPS RECRUIT DEPOT PARRIS ISLAND, SOUTH CAROLINA**

**(J. TAPIA, REVIEWER)**

**1. Comment: Section 2.2.3**

This section confirms the existence of a public water supply well within 1/4 of a mile radius of the MCRD. This public supply well should be identified on either Figure 2-1 or Figure 2-2.

**Response:**

*Figure 2-1 will be revised to indicate the exact location of the public water supply well. However, it will be noted that the well is currently not in use but has not been abandoned.*

**2. Comment: Page 4-6, Table 4-2**

Footnote (4) says that three surface soil samples will be collected upgradient of Site 1 for background determination, and ten surface soil samples will be collected at specified soil boring locations. This footnote disagrees with what is shown on Table 4-2. This table proposes the collection of fourteen surface soil samples (including four for background determination). This table should be revised to clarify the discrepancy.

**Response:**

*A total of four background soil samples will be collected. This footnote will be revised to read "Includes four surface soil samples for background determination upgradient of Site 1 ..." In the revised Work Plan, this table has been renumbered as Table 4-3.*

**3. Comment: Section 6.2, Site Restoration**

This paragraph states "The site will be restored to its original condition prior to investigation activities." It should be explained what "original condition" means, and why the site will be restored before to start investigation activities and then will be disturbed again to do the investigation. The paragraph is vague and should be more specific and/or correct the proposed approach.

**Response:**

*Section 6.2 will be changed to read "If investigation activities (e.g., monitoring well installation) disturb or alter the landscape, vegetation, or other features of Site 1, the site may require restoration to conditions prior to the investigation. If vegetation is stressed or damaged as a result of investigation activities, the affected area will be reseeded. Portions of Site 1 will be regraded if investigative activities alter the natural contour of the site. Additionally, all equipment used during the investigation and investigative-derived waste will be removed from the site."*

**4. Comment: Table 7-1**

This comment makes reference to page 7-4, where the identification of all soil sampling and boring locations is described. It seems that soil boring #3 has been mislabeled as soil boring #2 sampling locations. For example, PAI-01-SB02 should be labeled PAI-01-SB03. Table 7-1 should be corrected accordingly.

**Response:**

*As discussed in the response to U.S. EPA Region 4 Comment Number 16 for Site 1/41, subsurface soil samples have been removed from investigation activities.*

**(D. HARGROVE, REVIEWER)**

1. **Comment:** Figure 1-1, Depot Location Map  
Remove "Site 1 - Incinerator Landfill" from title.

**Response:**

*"Site 1 - Incinerator Landfill" will be removed from the title of Figure 1-1.*

2. **Comment:** Section 2.2.1, Surficial Aquifer

Typographical error: "Pamlico" should be "Pamplico".

**Response:**

*This typographical error will be corrected.*

3. **Comment:** Section 2.2.2, Confining Layer, fifth sentence

This sentence is vague. It implies that the depth to the top of the Hawthorn Formation is 70' below ground level while a previous sentence describes the top of the Hawthorn at 30' below msl. Please clarify.

**Response:**

*The third, fourth, and fifth sentences will be replaced with the following text. "The elevation at the top of the Hawthorn Formation is reported to be within the range of 30 to 60 feet below msl at Parris Island. The thickness of the Hawthorn Formation at Site 1 is anticipated to be between 20 to 40 feet. The actual depth of this formation at Site 1 will be determined during the field investigation."*

4. **Comment:** Figure 7-1, Proposed SW/Sediment Sample Locations

The approximate locations for the upgradient samples should be specified on this figure.

Section 3.3 describes surficial groundwater flow in a radial pattern towards the tidal stream. If this is the case, the upgradient sample locations can be approximated.

Section 4.2.3.4 Water-Level Measurements describes a plan to measure groundwater levels during low and high tides and determine groundwater flow directions in the surficial aquifer. If further groundwater investigation is necessary before choosing upgradient sample locations, then Section 6.0 Field Operations should be revised to include a methodology describing the chronology of events pertaining to the characterization of groundwater flow followed by the determination of upgradient sample locations.

Please revise the text and figures for the appropriate scenario.

**Response:**

*Tidal influences may affect the flow of groundwater. Although an estimation of upgradient could be made without taking into account this tidal effect, water-level measurements taken during the initial phase of field activities would help to better depict the location of the upgradient samples. As such, the following sentences will be inserted after the first sentence of the second paragraph of Section 6.0 Field Operations.*

*"Monitoring well installation will be a priority of the field effort followed by water-level measurements. The results of these measurements will be used to better characterize the depth, flow direction, and gradient of the groundwater. From this information, the location of background surface water and sediment will be determined in the field."*

*Additionally, the following sentence will be inserted into Section 7.2.1, Surface Water and Sediment Sampling. "The location of the four background samples for surface water and sediment will be determined in the field from the results of water-level measurements conducted during the initial portion of the remedial investigation field effort."*

*The four background surface water and sediment samples taken for Site 1 will also be used as background for Sites 2/15 and 3. The text of the Work Plans for these sites will reflect this statement.*

5. **Comment: Figure 7-2 Proposed Soil Sample Locations**

See comment 4.

**Response:**

*The location of the four background soil samples will be illustrated on a new figure in Section 7.0. The four background soil samples taken for Site 1 will also be used as background for Sites 2/15 and 3. The text of the Work Plans for these sites will reflect this statement.*

6. **Comment: General Comment**

All figures showing well locations or proposed well locations, proposed sample locations, or groundwater contamination plumes should include arrows indicating groundwater flow directions from the latest data. Please revise.

**Response:**

*Figure 7-3, Proposed Groundwater Sample Locations, will be revised to include estimates of surficial groundwater flow directions in the vicinity of each monitoring well that is proposed to be sampled. In the revised version of the Work Plan, Figure 7-3 has been renumbered as Figure 7-4.*

**RESPONSE TO SCDHEC COMMENTS TO  
DRAFT FINAL REMEDIAL INVESTIGATION WORK PLAN  
SITE 1/41 - INCINERATOR LANDFILL AND FORMER INCINERATOR  
MARINE CORPS RECRUIT DEPOT PARRIS ISLAND, SOUTH CAROLINA**

**(S. PETERSON, REVIEWER)**

**1. Comment:**

Please modify the title of this work plan to include RCRA terminology. As known, understood, and accepted by the MCRD Tier I technical and Tier II teams, the State of South Carolina has authorization under the Hazardous & Solid Waste Amendment to implement correction action activities.

The Department reviewed this document to meet the requirements of an RCRA Facility Investigation (RFI) Work Plan. The Department is willing to recognize the following dually-titled document:

Draft Final RCRA Facility Investigation/Draft Final Remedial Investigation Work Plan  
for  
SWMU/Site 1 - Incinerator Landfill and  
SWMU/Site 41 - Former Incinerator

or

Draft Final  
RCRA Facility Investigation/Remedial Investigation Work Plan  
for  
SWMU/Site 1 - Incinerator Landfill and  
SWMU/Site 41 - Former Incinerator

Marine Corps Recruit Depot  
Parris Island, South Carolina  
SC6 170 022 762

**Response:**

*The suggested title will be used. However, in accordance with Navy CLEAN format, the word "FINAL" will not be included in the title of the FINAL report.*

**2. Comment:**

According to the Region 4 RFI Work Plan Checklist, prepared by A.T. Kearney, dated 1989, an EPA Identification Number should be included on the cover page. The EPA identification number for MCRD Parris Island is SC6 170 022 762. Please include that identification number on the Final Work Plan.

**Response:**

*The EPA Identification Number will be added to the cover page of the document.*

**(D. HARGROVE, REVIEWER)**

1. **Comment:** The title should reflect whether this document is a "DRAFT" or a "FINAL" document. Please revise.

**Response:**

*The last version of the site-specific sampling and analysis plan (SAP) for Site 1/41 was incorrectly missing the words "DRAFT FINAL" in the title and header of the document. However, Navy CLEAN format stipulates when a document is issued "FINAL", the words "DRAFT" or "DRAFT FINAL" are to be removed from the title and header of the report. As such, the title and header will not contain the "FINAL" designation.*

2. **Comment:** Response to Comments

Only the comments concerning the "DRAFT" version of this document should be included in this section. The Division of Hydrogeology understands that some comments made on other work plans have been incorporated into this document due to comparable applicability. Any additional comments that have been incorporated into this document should be included at the end of this section. Please revise.

**Response:**

*Comments made to the "DRAFT" and "DRAFT FINAL" Work Plans for Site 1/41 will be included in the Response to Comments Section of the "FINAL" Work Plan. Additionally, applicable comments concerning the Work Plans for Site 2/15 and 3 will be added to the end of this section.*

**RESPONSE TO U.S. EPA REGION 4 COMMENTS TO  
DRAFT REMEDIAL INVESTIGATION WORK PLAN  
SITE 1/41 - INCINERATOR LANDFILL AND FORMER INCINERATOR  
MARINE CORPS RECRUIT DEPOT PARRIS ISLAND, SOUTH CAROLINA**

1. **Comment: Page 1-3, Figure 1-1**

Given the title and purpose of this figure, Site 1 (Incinerator Landfill) should be clearly depicted on the map.

**Response:**

*The purpose of Figure 1-1 is to provide the general layout and features of MCRD Parris Island. As such, "Site 1 - Incinerator Landfill" will be removed from the title of this figure. However, to illustrate the location of Site 1 in relation to the other features of the Depot, Site 1 will be depicted on this figure.*

2. **Comment: Page 2-1, Section 2.1, Paragraph 2**

The text should also briefly describe the level and type (if applicable) of activity that took place at the site between 1965 and present.

**Response:**

*No significant disposal or intrusive activity has taken place at Sites 1 and 41 since 1965. This statement will be included in Section 2.1.*

3. **Comment: Page 2-10, Section 2.3.2, Paragraph 1, Bullet 2**

This section recommends that action be taken to determine if chloroform is present at greater depths in the surficial aquifers. However, the text on page 2-6 states that no organic compounds were detected in the groundwater samples collected during the 1990 verification study. The text should present further rationale for determining the presence of chloroform at greater depths in the surficial aquifer.

**Response:**

*This section summarizes the results of the Verification Study conducted by McClelland Consultants in 1990. In this study, chloroform was recommended for further evaluation in the surficial aquifers at Site 1. This evaluation was based on the presence of chloroform in sediment and the density and possible mobility of this compound. The text of the last paragraph of Section 2.3.2 will be revised to include the basis of McClelland Consultants recommendations.*

4. **Comment: Pages 3-1 through 3-2, Section 3.0**

This section repeatedly mentions Archers Creek as a potential receiving media for Site 1 contaminants. It may thus be helpful to modify the scale of all figures showing landfill boundaries (e.g. Figures 2-2 and 7-1) to include this surface water body.

**Response:**

*The scale of all figures showing landfill boundaries will be modified to include Archers Creek.*

5. **Comment: Page 3-1, Section 3.3, Sentence 3**

The text states that the marsh deposits underlying the landfill are assumed to be a barrier to the deeper aquifer. This statement appears to contradict Figure 3-1 (Site Conceptual Model), which depicts these deposits as providing a partial barrier to the shallow aquifer. Please clarify and revise as needed.

**Response:**

*During field activities, the presence of the marsh deposits will be confirmed during the installation of deep surficial monitoring wells. Additionally, the vertical conductivity of the deposits will be investigated. The last sentence of Section 3.3 Groundwater will be revised to "However, the marsh deposits underlying the landfill including the clay comprising the Hawthorn Formation may act as a partial barrier to the deeper aquifer and will be determined during the investigation."*

6. **Comment: Page 4-1, Section 4.1**

Given the relatively low numbers and concentrations of contaminants detected during previous investigations of this site, a primary sampling rationale for each media should be to characterize worst-case site conditions for that media. The text should be modified to include this objective.

**Response:**

*Section 4.1 will be revised to include this sampling rationale.*

7. **Comment: Page 4-6, Table 4-2**

The body of the table does not appear to include a reference to footnote number 1. Please check and revise as needed.

**Response:**

*The column titled "Samples per Location" should be referenced with footnote number 1. This change will be made accordingly. In the revised version of the Work Plan, this table has been renumbered as Table 4-3.*

8. **Comment: Page 4-7, Section 4.2.2.2**

Based on the site description provided in Section 2.1 of the SAP, this landfill appears to consist primarily of incinerated Municipal Landfill (MLF)-type wastes and cover an area in excess of 29,000 cubic yards. Given these site characteristics, wholesale excavation of Site 1 landfill contents would seem unlikely (see EPA/OSWER Quick Reference Fact Sheet: Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills (June 27, 1995)). Toxicity Characteristic Leaching Procedure (TCLP) analyses of subsurface soil and sediment samples to determine if waste material/fill is a characteristic RCRA waste (presumably for purposes of off-site disposal) should therefore be delayed until a determination regarding the need to excavate these materials has to be made. For example, if hot spots are identified during the RI/RFI, these may require further characterization to determine if removal and/or treatment is warranted.

Also, depending on RI/RFI results, a second type of leach test which may prove helpful is RCRA Method 1312: Synthetic Precipitation Leach Test for Soils. This method is designed to determine the mobility of organic and inorganic contaminants in soils.

**Response:**

*As will be discussed in Comment Number 16 for Site 1/41, the focus of the investigation will be changed to address 1) onsite exposure pathways for direct contact and 2) offsite exposure pathways.*

*As such, characterization of landfill contents will not be addressed by investigation activities and TCLP analyses of subsurface soil and sediment samples will not be conducted. The text of the Work Plan will be revised to eliminate reference to TCLP analysis.*

9. **Comment: Page 4-7, Section 4.2.2.3**

For use in assessing effects on ecological receptors, it is recommended that temperature and Secchi Disk readings also be collected for surface water.

**Response:**

*The text of Section 4.2.2.3 will be revised to indicate that temperature and Secchi Disk readings will be collected for surface water.*

10. **Comment: Page 5-1, Section 5.0, Paragraph 4**

Unless the groundwater beneath Parris Island is determined not to be potable, the following exposure routes must also be included under the "Future Resident" receptor group heading for groundwater: ingestion and inhalation. These exposure routes should also be considered for future construction workers, and/or maintenance workers.

**Response:**

*For the Future Resident receptor groups, groundwater exposure through ingestion and inhalation will be evaluated in the human health risk assessment and will be added to the text of Section 5.1. However, if it is found from investigation activities that the groundwater beneath Parris Island is not potable, it will be removed as a pathway of concern from the human health risk assessment.*

11. **Comment: Page 6-1, Section 6.3:**

The inner diameter of the augers should be at least 6.25 inches.

**Response:**

*The fourth sentence of Section 6.3 will be replaced with the following text.*

*"For monitoring well construction, hollow stem augers of sufficient diameter will be used to produce a 2-inch annular space between the casing and the borehole wall."*

*This complies with Section 6.4, "Borehole Construction", of the U.S. EPA Region 4 EISOPQAM.*

12. **Comment: Page 6-5, Section 6.4.1**

The grout seal should be cored, not drilled, to prevent shattering.

**Response:**

*As discussed in the response to Comment Number 16, the Work Plan will be revised to reflect an approach consistent with Presumptive Remedy for CERCLA Municipal Landfill Sites (Directive No. 9355.0-49FS, June 27, 1995). The investigation of the Floridan Aquifer will be delayed until characterization of the surficial aquifer. As such, a monitoring well to the Floridan Aquifer will not be installed at this time and Section 6.4.1 has been removed from the Work Plans.*

13. **Comment: Page 6-6, Section 6.8, Paragraph 2**

The acronym FOL is not defined here. All acronyms should either be defined in text (first occurrence only), or in an acronym list to be included with the document.

**Response:**

*The acronym FOL will be defined in Section 6-6 as Field Operations Leader. Additionally, an acronym list has been added to the document.*

14. **Comment: Page 7-1, Section 7.2.1**

In order to ensure that the sediment samples collected reflect worst-case conditions, sediments should be collected from at least two depth intervals at each location. Recommend that samples be collected from the top few inches, to reflect recent off-site migration, and from some greater depth interval (suggest 1 foot) to reflect historical accumulations. Visual inspection, or other available information, should be used to ensure sample collection from the depth interval with the greatest potential for contamination.

**Response:**

*Sediment samples will be collected at two sample depth intervals. At each site (1/41, 2/15, and 3), one sediment sample will be collected at a 6- to 12-inch sample depth to reflect historical accumulation. This sample will be collected at a downgradient location where preferential accumulation of contaminants is likely to occur. The remainder of the sediment samples will be collected at a 0- to 6-inch sample depth to reflect recent offsite migration.*

15. **Comment: Page 7-1, Section 7.2.2**

A. Surface soil samples should be collected from the depression observed during the October 15-17 1996 base tour and from any other areas where contaminants are likely to have preferentially accumulated (e.g. based on visual inspection of existing site conditions, aerial photographs, historical information, etc.). A reasonable effort should also be made to locate the former incinerator and collect samples near it.

**Response:**

*The following sentence will be added to the text of Section 7.2. "If during field activities, the FOL deems that an area not contained in the Work Plan should be sampled because of surface features (e.g., depressions) that would cause accumulation of contaminants, the location of samples presented in the sampling plan will be altered to include such areas."*

*As presented in the Addendum to the Draft Remedial Investigation Work Plan for Site 1 - Incinerator Landfill submitted on October 7, 1996, surface soil sampling locations in the vicinity of the Former Incinerator have been included in the Work Plan.*

B. Per Region 4 Supplemental Guidance to RAGS, all surface soil samples should also be collected from the 0-1 foot interval, or biased to reflect worst-case conditions. For example, if historical records, visual inspection or aerial photographs indicate that the soil/fill layer on top of the landfill is less than 1 foot thick in any area, a surface soil sample should be collected from the ash/waste layer contained within the top foot of the landfill.

**Response:**

*The text of Section 7.2.2 will be revised to include that all surface soil samples will be collected from the 0-1 foot interval in accordance with this Region 4 guidance document. Additionally, the text of Section 7.2.2 will be revised to indicate that samples will be collected to bias the worst-case scenario.*

16. **Comment: Page 7-11, Section 7.2.3**

Given the Site 1 characteristics mentioned previously (e.g. primarily incinerated MLF-type wastes, size: >29,000 cubic yards), engineering controls, such as containment, would appear to be a more likely remedy than treatment (see Section 300.430(a)(iii)(B) of the NCP and EPA/OSWER Quick Reference Fact Sheet: Presumptive Remedy for CERCLA Municipal Landfill Sites (Directive No. 9355.0-49FS, June 27, 1995)). For this reason, the RI should initially focus on characterizing (i) on-site exposure pathways for direct contact (e.g. surface soil contamination) and (ii) all off-site exposure pathways (e.g. off-site contamination of surface water, sediment and groundwater). EPA recommends that a decision regarding the need to characterize landfill contents (i.e. source characterization) be delayed until this initial round of data becomes available. Evaluation of this data

for purposes of determining whether source characterization is appropriate should include consideration of such factors as: (i) magnitude and risk-level of detected off-site contamination (ii) presence/absence and nature of any hot spots and (iii) length of time for which contaminants have been available for off-site transport (in this case between 32 and 76 years).

Use of the above approach makes it critical that the locations and numbers of samples collected during this first round of activities provide adequate characterization of worst-case site conditions. To this end, specific justification/rationale must be provided for each sample collected. Care should also be taken to ensure that the number of samples collected provides coverage of all areas where significant potential for off-site migration and/or concentration of contamination exists.

**Response:**

*It is agreed that given the conditions of the site, containment would appear to be a more likely remedy than treatment. Therefore, an investigation approach is proposed that will initially characterize the extent of contamination in all areas where significant potential for offsite migration of contamination exists. Groundwater samples will be taken downgradient of groundwater flow at Sites 1/41 and 2/15, and below Site 3 due to the site-specific characteristics of the Causeway Landfill. Additionally, surface water and sediment samples will be taken downgradient of the path of surface water runoff at all sites. Lastly, surface soil (0-1 foot below ground surface) will be sampled throughout the sites as previously proposed in the Draft Work Plan.*

*If the results of these investigation activities indicate that offsite migration of contamination exceeds regulatory standards or poses unacceptable human and ecological risks, additional investigation may be considered to characterize the extent of contamination within the landfill. Additionally, if analytical results indicate the lower surficial aquifer has been adversely impacted by the landfill, further investigation of the competency of the Hawthorn Formation as an adequate confining layer and evaluation of potential impacts to the Floridan aquifer may be warranted.*

17. **Comment:** Page 7-11, Section 7.2.4

Given that metals were the only contaminants detected in groundwater samples during earlier Site 1 investigations, it is important that the current RI use sampling methods which will facilitate the collection of clear ground water samples and reduce the likelihood of false positives. The Navy should use the ground water sampling techniques provided in the Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), May 1, 1996 and summarized in the final paragraph of Section 3.1.1 (Groundwater Sampling) of the Draft Volume II Master Work Plan.

**Response:**

*It is agreed that the groundwater sampling techniques provided in the Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), May 1, 1996 and summarized in the final paragraph of Section 3.1.1 (Groundwater Sampling) of the Draft Volume II Master Work Plan should be used. The final paragraph of Section 3.1.1 is fully detailed in SOP SA-1.1, Section 5.7, "Low Flow Purging and Sampling." The text of section 7.2.4 will be revised accordingly.*

18. **Comment:** Page 7-12, Section 7.3.2

This section stipulates that the last two digits of the sample number will specify the middle of the sample interval, yet the sample numbers in Table 7-1 specify the bottom of the sample interval. This discrepancy in sample nomenclature should be addressed.

**Response:**

*The explanation of the sample depth portion of the sample identification number will be changed from "Middle of sample interval" to "Bottom of the sample interval or sample round."*

19. **Comment:** Page 10-1, Section 10.2

A number of needed field QA/QC blanks are missing. Grout, sand, bentonite, and preservative blanks should also be collected.

**Response:**

*Brown & Root Environmental recommends that material QA/QC blanks not be taken because the contractor will provide certified-clean well construction materials and false positive detections have not been a historical problem.*

*Additionally, it is recommended that preservative QA/QC blanks not be taken. In Section 10.2.1, trip blanks, field blanks, and rinsate blanks are proposed. Historically, such blanks very rarely shown positive detection of contaminants. Therefore, if the analytical results indicate that these samples are clean, the results indicate that preservatives used in such samples are pure.*