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NWS EARLE
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UNITED STATES ENVIRONMENT
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278

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12/11/89
US EPA COMMENT PACKAGE ON

DEC 11 1989

Ms. Adrienne Townsel
Project Manager
Code 1421, Building 77L NORDIVNAVFAC
U.S. Naval Base
Philadelphia, PA 19112-5094

Re: Naval Weapons Station Earle (NWS Earle)
Colt's Neck, N.J.

Dear Ms. Townsel:

The U.S. Environmental Protection Agency (EPA) has reviewed the Workplan for the Phase III - Remedial Investigation/Feasibility Study (RI/FS) to be conducted under the Installation Restoration Program (IRP) for the above referenced site.

The RI/FS as presently planned focuses on the 11 sites investigated during the Phase II - Confirmation Study. However, on page 1-3, Section 1.3 indicates that "other sites identified during the Phase I Preliminary Assessment are being studied in a separate Site Investigation". By a letter dated November 1, 1988 from Mr. Sheckels of the Navy to Ms. Karas of EPA, the Navy proposed the development of a Site Inspection (SI) Workplan for 16 additional IRP sites. We agree that these 16 additional sites should be investigated and look forward to commenting on the SI Workplan. All sites that need to be investigated should be addressed in the Interagency Agreement currently being negotiated between our agencies.

Comments on the RI/FS Workplan (dated October 1989) are listed in Attachment I. In addition, comments on the related Quality Assurance Project Plan (dated September 1989) and Health and Safety Plan (dated August 1989) are provided in Attachments II and III, respectively.

I look forward to discussing these comments with you during the Technical Review Committee meeting on December 12, 1989.

EPA is requesting that these comments be incorporated in a Final RI/FS Workplan by January 23, 1990. If you have any questions concerning this matter, please contact me at (212) 264-6609.

Sincerely yours,

Paul G. Ingrisano

Paul G. Ingrisano
Environmental Engineer

Enclosure

cc: R. Hayton, w/encl.

ATTACHMENT I

Workplan Evaluation

The Workplan for the Phase III Remedial Investigation/ Feasibility Study for the Naval Weapons Station Earle was reviewed and evaluated using criteria established and enforced in the following documents:

- National Oil and Hazardous Substances Contingency Plan, 40 CFR Part 300;
- Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA Interim Final, October 1988 (OSWER 9355.3-01);
- A Compendium of Superfund Field Operations Methods (OSWER 9355.0-14);
- RCRA Ground Water Monitoring Technical Enforcement Guidance Document (TEGD), September 1986 (OSWER 9950.1).

The evaluation is presented by first listing general comments made on the Workplan, followed by specific comments, which are organized by site and Workplan section number.

A remedial investigation (RI) should focus on quantitative site specific information on the geology and hydrogeology of a site, and not just for the upper aquifer. If these units will not be investigated in this Phase III work (and it appears that they will not), it is recommended that a sound argument for not investigating them be developed and agreed upon with the regulatory agencies before field work commences.

An RI will look for quantitative estimates of lateral and vertical ground water flow rates and volumes, for any of the aquifers that are investigated; for the Phase III work at Earle this is at least the water table aquifer. Estimates of this kind require that porosity and hydraulic conductivity of the aquifer material(s) be determined, as well as hydraulic gradient and stratigraphic heterogeneities. These latter two will be obtained from the piezometric measurements and gamma log work proposed in the Workplan, but no plans have been specified for porosity measures of the aquifer sands, or insitu or other conductivity measures; it is recommended that some of these simple and inexpensive tests be conducted.

will do well slug test

It is advisable to calculate the rate of contaminant flow to prove that the downgradient monitor wells are neither too far downgradient to detect a plume that has not yet reached them or too far upgradient (to detect a plume that has passed them by some years before).

During an RI, seasonal variability of surface water and ground water flow rates and volumes, and contaminant concentrations in these media should be determined. The Workplan calls for singular sampling events at each site. It is recommended that sampling and piezometric surface be determined for the spring and winter seasons. It is advised that the piezometric surface for all the sites be determined synoptically, such that water levels in all the wells and piezometers be measured over a very short period of time (e.g., 1 day).

During an RI, seasonal variability of surface water flow volumes and rates, and the relations between surface water and ground water should be determined. The Workplan does not presently call for this. It is recommended that, like ground water measurements, surface water flow rates and volumes be determined for the spring and winter seasons, and water level(s) for surface water and ground water be measured simultaneously.

An RI should determine amount of runoff, and ground water recharge estimates, in order to estimate leachate generation. Precipitation, and potential evapotranspiration could be generically determined for a small locale such as Earle, with estimates of runoff made for each site based on its particular slope, soil, plant cover, and size.

When soil samples are taken, it is advisable that they be screened for volatile organic chemicals in the field. In some instances during this investigation, test pits may provide more soils information than split spoon or augered soil samples.

All soil samples should be classified with a standard system [e.g., Unified Soil Classification System (USCS)], placed in labeled jars, and stored for at least the duration of the RI/FS review, approval, and final determination (e.g., 5 years or longer). The QAPP (submitted separately from the Workplan) addresses archiving samples. The Workplan should reference the QAPP when discussing this subject.

It is advisable to specify in some detail the analyses that will be conducted for ground water, surface water, soils, sediments, and air to assure that the CERCLA data analysis requirements for determining the source, extent, and fate of contamination in each of the media can be suitably made.

When picric acid is a contaminant of concern it is advisable to test also for ammonia (as nitrogen), which may also be a contaminant associated with explosives.

The "regulatory limit" that is specified in some of the tables should identify the source of the limit [e.g., Maximum Contaminant Level (MCL)], or where no MCL exists, some other limit.

A list of acronyms and mnemonics, as well as a glossary for the specialized military vocabulary (e.g., RDX, HMX, demilitarize ordnance) would be helpful to the reader.

Despite the preliminary investigation suggestion that there is not currently an air emission concern at NWS Earle, the workplan states on page 4-18 (Section 4.2.3) that air sampling will be performed to evaluate the potential for contaminant migration into the air. What portion of the workplan addressed air sampling? Also, the QAPP does not make any mention of air sampling.

The Workplan indicated potential remedial alternative technologies. Following is a list of air concerns that would need to be addressed during the selection of a remedial alternative.

- Diversion and collection (surface water)

  Any regrading or movement of soils can result in volatilization and dust generation.

- Containment/capping (soils/sediments/waste)

  Movement of soils/sediments/waste can result in volatilization and dust generation. A venting system may be necessary and the emissions would have to be considered.

- Complete or partial removal (soils/sediments)

  Fugitive emissions and volatiles may result.

- In situ treatment (soils/sediments/waste/ground water)

  By-products of these processes may be emitted into the air and/or direct emission of contaminants into the air may occur.

- On-site treatment (soils/sediments/waste)

  By-products of these processes may be emitted into the air and/or direct emission of contaminants into the air may occur.

- Off-site treatment (soils/sediment/waste)

  Volatilization and dust generation from movement of soils/sediments/waste. Air emissions from incineration.

- Off-site disposal (soils/sediments/waste)

  Volatilization and dust generation from movement of soils/sediments/waste.

- On-site disposal (soils/sediments/waste)

  Volatilization and dust generation from movement of soils/sediments/waste. Air emissions from landfill.

- Ground water and surface water treatment

  Direct emission of contaminants to air, i.e., emissions from air stripping.

15 In addition to the air requirements mentioned in the Workplan, the National Ambient Air Quality Standard from lead must be considered as well as OSWER Directive 9355.0-28 addressing the control of air emissions from air strippers (Attachment IV).

16 Wetlands exist in the areas of the sites, and some of the sites appear to lie within the floodplain of concern (i.e., the 500-year floodplain as defined by the Federal Emergency Management Agency). Therefore, E.O. 11990 (Protection of Wetlands), E.O. 11988 (Floodplain Management), and EPA's Statement of Policy on Floodplains and Wetland Assessments for CERCLA Actions should be listed as ARARS for the project sites. Wetlands and floodplains should be identified and assessments should be completed where necessary for the sites as part of the RI/FS process. These assessments may be combined.

EPA is currently conducting a review of the sensitivity of the site with respect to the potential for impacts to cultural resources, and to identify what steps, if any will need to be taken to comply with the National Historic Preservation Act. EPA will forward the results of our review of this particular ARAR to you shortly.

Although the Workplan does not address it, there is a possibility of encountering federally designated endangered/threatened species in the vicinity of the sites. Informal consultation with the U.S. Fish and Wildlife Service is required under Section 7 of the Endangered Species Act.

There are no wild and scenic rivers, environmentally significant agricultural land or coastal barriers in the vicinity of the sites. Therefore, the Wild and Scenic Rivers Act, the Farmland Protection Policy Act, and the Costal Barrier Resource Act should not be considered ARARS for this project.

Several streams flow through the Main Base to estuaries on the Atlantic Coast and several of these streams contain blueback herring and alewife near the sites. Other streams have barriers that prevent anadromous migration. The catadromous American eel may breach these barriers and this species is present in habitats close to the Main Base.

Swimming River Basin (Sites 2, 4, 5, 10, 11, 20 and 22)

A dam is present at the Swimming River Reservoir, approximately 11 kilometers to the north of the Main Base, therefore no anadromous species access exists via the main channel of the river. The confluence of Mine Brook and the Swimming River is above the dam so there is no access to this stream either. However, Hockhockson and Pine Brooks flow from the Main Base, join each other north of the base and empty into the Swimming River below the Swimming River Reservoir and dam, hence, anadromous species have access to areas on the base via these two streams. Alewife and blueback herring have been documented in Pine Brook within six kilometers of the Main Base. Areas further upstream or on the Main Base have not been sampled so it is not known whether these species use habitats closer to the base, but no impediments to migration are present.

Shark River and Manasquan River Basins (Sites 3, 19 and 26)

Access to the Main Base is not available via Shark River or Manasquan River, nor to their tributaries. On the Shark River, the Remson Mill Pond Dam prevents further upstream migration of anadromous fishes. On the Manasquan River, the Little Silver Lake Dam prevents access. Alewife and blueback herring have been documented below both these dams.

Sandy Hook Bay (Site 7)

Anadromous and marine species are present in Sandy Hook Bay and the streams that drain into the bay in the vicinity of the Waterfront and Chapel Hill areas. Alewife have been documented in Comptons Creek, approximately one kilometer west of the Waterfront area and two kilometers northwest of the Chapel Hill area.

The lower reaches of both Compton Creek and Ware Creek are tidally influenced with extensive salt marsh systems surrounding their banks. Tidally influenced portions of Ware Creek and adjoining wetlands flow adjacent to the Waterfront area. These systems provide nursery and foraging habitats for Atlantic menhaden, white perch, striped bass, weakfish, spot, Atlantic croaker, Northern kingfish, silver perch, summer flounder, winter flounder, bluefish and other fish and invertebrate species.

Extensive hard clam and softshell clam populations are present in Sandy Hook Bay and near the Waterfront area where coarse sandy sediment is present. Blue crabs also use the lower reaches of Compton Creek and Ware Creek.

Important recreational fisheries are present in Sandy Hook Bay. Striped bass, weakfish, bluefish, summer flounder are among the species fished for recreationally. No information regarding recreational fishing on streams near the Main Base was found.

Sampling/Biological Assessment and Recommendations

Low to moderate concentrations of volatile organic compounds and base neutral extractable compounds were observed in the ground water at some sites. The levels observed, while possible threats to human health, are not likely to pose a threat to anadromous, catadromous or marine resources of concern to the National Oceanic and Atmospheric Administration (NOAA).

The data appears to indicate that either limited hazardous waste disposal has occurred at the sites (from NOAA's viewpoint), or that only limited residual contamination remains at the sites from past disposal practices. The former circumstances would indicate that the sites are not a major concern to NOAA if verified through the RI/FS process. The latter circumstance may, however, indicate that substantial contamination may have migrated away from the sites towards or into the watersheds of concern. This migration is a possibility in that many of the disposal areas were used prior to 1978.

To verify that waste disposal and subsequent environmental contamination was either not severe or that contamination has already migrated away from the sites, the RI/FS should conduct investigations in source areas of concern and in the migratory pathways away from the site.

The proposed soil investigations in the probable source areas at the 11 sites appear adequate to characterize potential sources of contamination, but a few comments are warranted. Samples, particularly in the landfill areas where various wastes were disposed of, should be analyzed for trace elements and pesticides. These substances are of major concern to NOAA and the Confirmation Study did not document that they are not present. In addition, no soil samples were proposed at Landfill sites 3 and 5. It is recommended that soil sampling accompany the proposed ground water studies to help confirm whether or not a source is present. Many persistent substances are difficult to detect in water samples even when present at toxic concentrations.

The proposed ground water sampling program also appears adequate. Additional investigations will occur downgradient of most of the sites. It should be noted, however, that substantial migration may have already occurred at some of the sites due to the fact that many have not been used for quite some time. If contaminant plumes are detected in the ground water sampling program, the proposed placement of wells may not adequately define the extent of the plume. If such is the case, then further downgradient ground water investigations are warranted.

The proposed surface water and sediment program in the streams of concern may not be sufficient to confirm that contamination has not occurred. Additional sampling beyond that proposed in the Workplan is recommended since disposal occurred many years ago and often on sporadic poorly documented occasions. Contamination in surface waters and sediments may be difficult to document under these circumstances.

Will check Pine Brook

Additional surface water and sediment investigations are recommended for Sites 2 and 5. These sites are fairly close to each other and adjacent to Pine Brook. It is recommended that one upgradient surface water/sediment sample be collected (upstream of Site 5) and that four to six sediment samples be collected adjacent to and downgradient of the sites in Pine Brook. The Workplan does not propose investigating Pine Brook and previous limited investigations observed some elevated trace metals in the surface waters (no sediment investigations were performed previously).

3 sed samples proposed

An additional one or two surface water and sediment samples are also recommended on Hockhockson Creek adjacent to and downstream of Site 10. This site is located near the creek and previous analyses found elevated levels of mercury and silver in surface waters. The Workplan proposes only one downgradient surface water and sediment sample on Hockhockson Creek.

Because of the distance to NOAA resources from Site 19 on Mingamahone Brook, the one proposed downgradient sample is sufficient to document that the site is not a threat. If extensive contamination is found, additional samples may be required.

Site 7 is the only site in the Waterfront area and this landfill appears to be in the Comptons Creek watershed (via a ground water migratory pathway). Very little contamination was observed in limited previous investigations. Additional downgradient ground water sampling is proposed in the Workplan. If these downgradient ground water investigations indicate contamination, then additional surface water and sediment studies on Comptons Creek would be warranted.

Field investigations and sampling are not proposed at sites 20 and 22. The Confirmation study found no contamination at these sites in limited sampling. The Workplan indicates that areal photography will be evaluated to confirm that previous samples were indeed collected in areas of disposal. This approach is acceptable considering the type and the small quantity of disposal that has been documented at these sites. The Workplan should, however, set criteria for what constitutes doubt as to whether previous investigations were in the incorrect area.

In general, investigations at NWS Earle should take the philosophy that waste disposal has occurred over wide areas, on several watersheds, and over a long time period and therefore, contamination may be present in environmental media over a wider area than might be expected. The additional sampling recommended above takes into account such circumstances. This level of effort is warranted even though previous limited investigations did not observe extensive contamination. In the same vein, it is recommended that all surface water and sediment samples be analyzed for the entire HSL scan. The Workplan was confusing as to whether complete HSL scans or whether selected contaminants of concern would be analyzed for.

The Workplan proposes to conduct a literature search prior to and during field investigations of the RI/FS. Included in this literature search would be a section to determine the "Biology and ecology, including flora, fauna and sensitive areas" and "Natural Resources". Considering the sensitive nature of the environments potentially impacted (headwaters of several streams; productive salt marshes of Sandy Hook Bay), it is recommended that this effort be expanded into an ecological risk assessment:

- The biological literature search the Workplan is proposing should include all sampling, fish survey and monitoring data from NJDEP (and other agencies involved in anadromous restoration and marine fisheries in the state) on anadromous/catadromous use of the watersheds involved and the marine environment of Sandy Hook Bay. The fisheries discussion should focus on: 1) proximity of organisms to the site; and 2) the types of habitat present and their present or future use by these organisms.

- The Workplan reports that the biological literature search will be limited to a three mile radius around the Main Base and Waterfront Area. This is an artificial boundary that does not take into account the anadromous migratory corridor that some of the streams provide. The literature search should focus on the entire surface water basins involved, including the Navasink River. The Swimming River discharges directly into the Navasink River and the Navasink River provides habitat for numerous resources of concern to NOAA

(i.e., Striped bass, American eel, flounder, blue crab, and various shellfish).

- For the ecological risk assessment, a literature review on the toxicity of contaminants of concern to aquatic and wetland resources should be conducted. Analyses should be made comparing the concentrations on the sites, off the sites, within migratory pathways and surface waters of concern with levels observed to be toxic.

- The ecological risk assessment should attempt to predict concentrations and potential impact on site-related contaminants in surface waters of concern.

According to the EPA's proposed Ground Water Classification Guidelines, ground water at this site is at least Class IIB, a potential source of drinking water. Because of this classification, maximum contaminant levels (MCLs) are applicable or relevant and appropriate requirements (ARARs) for ground water at the site, and the 500 series method of analysis should be used for determining volatile organic (VOC) concentrations. EPA recommends reporting analytical methods used, and their associated detection limits, in all tables which present analytical results. If detection limits are above ARARs, sampling/analyses should be repeated using appropriate methodology.

The report shows locations of active water supply wells, but fails to identify abandoned wells. EPA recommends that the Work-plan include a search for abandoned wells on the Station grounds and, if any are found, sealing of them in accordance with NJDEP regulations.

Mechanical integrity of the active supply wells should be assessed to assure the safety of the casings and proper sealing of the annular spaces so that contamination may not find its way into the wells from surface sources.

On page 5-10 of the above document it is stated that PVC is the proposed construction material for the new ground water monitoring wells and no further explanation is offered as to why PVC was selected. Is it because PVC is the alternative that offers the least possibility of interaction with the expected contaminants?

On page 5-10 a deep ground water monitoring well is proposed to be completed in the upper Englishtown Formation using standard hydraulic rotary drilling techniques where sodium bentonite based drilling fluids will be used. No development procedure is proposed for that well.

Specific comments by section of the Workplan for the

particular sites are as follows:

Site 2	Comments
5.3.1	Explain or justify why volatile organic chemicals (VOC's) were not looked for in water samples during the Confirmation Study (e.g., Tables 5-5, and 5-6).
5.3.1.2.	The labels that identify the soil borings collected during the Confirmation Study are ambiguous and not unique; no table of soil analysis results are presented; no description of the sampling methodology is presented. Explain why analyses for VOC's semivolatiles, and metals were not performed in soil during the Confirmation Study.
5.3.1.3.	Soil samples for chemical analysis should not be composited over the length of the boring (i.e., from surface to five feet below water table) because this masks vertical distribution of contamination; compositing should occur over short depth intervals; concentration results should be reported for a number of depth composites from surface to ground water. Some samples should be analyzed for VOC's and semivolatiles (in addition to the constituents listed in Table 5-7) in order to satisfy CERCLA requirements; some duplicates and field blanks should be taken for field quality control of soil sampling (i.e., Table 5-7).
Site 3	
5.4.1.	Indicate the boundary of the 5-acre landfill site on Figure 5-2.
Site 4	
5.5.1.	Indicate the boundary of the 5-acre landfill site on Figure 5-3; explain and draw arrows to indicate the "divide" that is labeled on Figure 5-3.
5.5.1.2.	Indicate how the soil samples will be selected or composited for analysis; these samples should also be tested for semivolatile's (the BNA's, Table 5-12) that were discerned in one of four spring water samples.

5.5.1.5. Break down Table 5-14 into separate tables for surface water and ground water analyses.

Site 5

5.6.1. Indicate the approximate size and location of the landfill on Figure 5-4.

5.6.1.2. Because soil contamination had apparently not been looked at in the Confirmation Study, it is recommended the some chemical analysis of soils be performed to help determine potential contamination sources.

Site 7

5.7.1. Indicate size of the landfill; show approximate boundaries of landfill on Figure 5-4; investigation of the aquiclude clays that overlie the Englishtown aquifer should include collection of undisturbed soil samples (e.g., shelby tube) and subsequent laboratory analysis for vertical hydraulic conductivity.

5.7.1.1. Explain how the in-ground storage tanks will be examined for corrosion; explain how leakage of the tanks will be determined from historical use studies; explain how current leaking of the tank(s) if any, will be determined.

5.7.1.2. More than four soil samples may be necessary to confirm or reject soil contamination from a leaking tank; some soil samples should also be obtained from a depth as deep or deeper than the tank bottom; these soil samples should be analyzed for total petroleum hydrocarbons, VOC's, semivolatiles, and for species as indicated by the historical use studies, and not solely for metals (as shown in Table 5-18).

5.7.1.4. The well through the aquiclude into the Englishtown aquifer should be double cased to avoid cross contamination from above aquifer; undisturbed soil samples of the aquiclude should be taken, and laboratory vertical conductivity of the clays should be determined, for at least two samples.

5.7.1.6. Break down Table 5-19 into separate specifications for ground water samples and surface water samples; justify why nitrate/nitrite are not being looked for, even though they were found in the Confirmation Study.

5.7.1.7. Break down Table 5-19 into separate specifications for ground water and surface water analyses.

Site 10

5.8.1. Show approximate boundaries of landfill on Figure 5-6.

5.8.1.2. Indicate how and for what purpose the soil samples are intended to be used.

Site 11

5.9.1. Indicate approximate boundaries of landfill or activity areas on Figure 5-7.

5.9.1.2. Compositing the soil samples over the whole 2 foot length may mask the true extent of soil contamination with grease and oil; it may be more informative to composite the soils in two groups, as 0-1 foot, and 1-2 feet.

5.9.1.3. Table 5-24, which shows contamination in monitor wells 11-1 and 11-3, suggests that there is either a strong seasonal change in ground water gradients, a local gradient aberration toward MW 11-1, very high dispersion, or some contaminant source(s) other than the site proper; the new monitor well might triangulate the gradient and characterize northwestward contamination better if it were located about 120 feet to the northeast of proposed location (approximately 48 degrees).

5.9.1.4. No surface water sampling is discussed, yet Table 5-26 suggests that there is surface water sampling for this site; break down Table 5-26 to separate ground water and surface water specifications;

Table 5-26 indicates that some groups of contaminants may be looked for only once (e.g., semivolatiles), even though four samples will be collected: it is recommended that at least two samples and a duplicate be analyzed for semivolatiles and total petroleum hydrocarbons.

Site 19

5.10.1 Indicate the location of the swale on Figure 5-8; the highest level of cadmium in ground water was found in MW 19-2 (Table 5-29), and not MW 19-1, as stated on page 5-53; the pH of the ground water samples is low, and no discussion is developed to explain it.

5.10.1.2 Indicate what criteria will be used for selecting soil samples for laboratory analysis.

5.10.1.3 Indicate the location of the "solvent/paint sludge discharge pipe" on Figure 5-8.

5.10.1.4 Break down Table 5-32 into separate tables for surface water and ground water analyses.

Site 20

5.11.1 It is not clear if ground water samples were obtained from this site during the Confirmation Study; a determination of ground water flow and contamination is recommended.

It is not clear what the symbol at the end of the drainage ditch, north of soil boring 20-D represents; if it is a marsh, then it should be sampled for soil contamination.

A determination of runoff directions and volumes, and subsequent surface water discharge should be made, to rule-out contaminant transport by these vectors, or to delineate other soil, sediment, or surface water samples.

It is not clear if soil samples had been analyzed for constituents other than total petroleum hydrocarbons and metals; the historical use study, including a records and manifest review of the site's operations, should develop and document an argument to support a limited analysis of soils, ground water, and surface water.

Site 22

5.12.1 It is not clear if ground water samples were obtained from this site during the Confirmation Study; a determination of ground water flow and contamination is recommended.

It is not clear what the symbol at the end of the drainage ditch, east of building D-2 represents; if it is a marsh, it should be sampled for soil contamination.

A determination of runoff directions and volumes, subsequent infiltration or surface water discharge should be made, to rule-out contaminant transport by these vectors, or to delineate other soil, sediment or surface water samples.

It is not clear if soil samples had been analyzed for constituents other than total petroleum hydrocarbons and metals; the historical use study, including a records and manifest review of the site's operations, should develop and document an argument to support a limited analysis of soils, ground water, and surface water.

Site 26

5.13.1 Indicate the location of the settling basin, and the four soil sampling locations;

No soil analysis results from the Confirmation Study are presented for this site; if there are none, then it is advisable to analyze the soil samples for metals as well as picric acid, nitrate and nitrite (i.e., Table 5-36).

The last two paragraphs of this section are contradictory: if the well to be sampled will be chosen based on observed gradients, then well 26-4 cannot be chosen for sampling before the gradients are known.

Some inconsistencies in the various tables are as follows:

Table 5-17 states no regulatory limits for VOC's in ground water, while Table 5-20 shows a limit of 10 ug/l.

Table 5-21 shows a petroleum hydrocarbon limit of 1 mg/l in surface water, while Table 5-28 shows a limit of non detectable.

Table 5-21 shows a BNA limit of 100 ug/l in surface water, while Table 5-28 shows a limit of NRC.

7.0 - A schedule of activities is not provided in the Workplan. Although the schedule is being prepared by the Navy, Weston should include some type of schedule that indicates relationship between RI and FS activities and the order in which activities will be performed, and expected time frame for each activity.

ATTACHMENT II

Quality Assurance Project Plan Evaluation

The Quality Assurance Project Plan (QAPP) for Phase III of the "Installation Restoration Program," for the Naval Weapons Station Earle, Colts Neck, New Jersey, has been reviewed and evaluated using: Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, Office of Exploratory Research, USEPA, Washington, D.C., February 1983; and Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Office of Emergency and Remedial Response, USEPA, Washington, D.C., October 1988, as guidance.

General and specific comments were made on the QAPP. The general comments are presented first, followed by specific comments organized by section numbers in the QAPP.

The QAPP is generally complete. The sixteen essential elements of a QAPP as specified in the Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans have been provided; however, a few improvements could be made. Because much of the specific background information on each site (such as contaminant source characteristics and history, physiography, pedologic, and hydrogeologic characteristics) is in the Workplan (a separate document), the QAPP should either reference the Workplan or replicate this information in the QAPP.

A key to acronyms would be helpful, especially for tables (e.g., Table 1-6).

Specific comments are as follows:

	Section	Comments
1.	1.2.1 pg. 1-1	References to the Workplan for more detailed descriptive information on the base and for each site (such as site features, limits of study area, probable types and sources of contamination) should be included in this section.
2.	1.2.2 pg. 1-1, 1-5	A general description of the project including background information, basis for the experimental design, and anticipated dates of initiation and completion of the sampling program should be provided, or make reference to the Workplan.
3.	1.4 pg. 1-8	The QC specified for this project as Level D (defined in NEESA 20.2-047B, Section 7.1) is acceptable; however, the specific validation standard operating procedures to be used are as follows:

For Organics: EPA Region II SOP No. HW-6, Revision 6, CLP Organics Data Review, April 14, 1989. (Attachment V)

For Inorganics: EPA Region II SOP No. HW-2, Revision IX, Evaluation of Metals Data for CLP, October 27, 1989. (Attachment VI)

These procedures replace those specified in NEESA 20.2-047B, Section 7.3.1.

4.	1.4.3 pg. 1-9, 1-10	The "overall completeness goal" of 85 percent for data collection should be for each media that is investigated (e.g., soil, ground water), and not for all the data as a whole. The selection of "critical data points" (where 100% completeness is required) should be identified in the RI/FS final report.
5.	1.6.3.1 pg. 1-30, 1-31	Assure that all field samples are iced in coolers, immediately after collection. Specify how water used for sample container decontamination in the field will be disposed of.

Done! Undone

6. 1.6.3.2 pg. 1-31 — Ice should be placed around the sample bottles to ensure attainment of 4° C during shipment.

7. 1.6.3.3 pg. 1-31 — Assure that all custody seals are used on the coolers or packing containers; they should not be optional, as suggested in Figure 1-8. Undone.

8. 1.7.1 pg. 1-34 — The expiration dates for the field equipment calibration standards must be printed on the standards bottles and will be examined during a field audit.

9. 1.8.1.3 pg. 1-40 — The protocol: SW846 method 3810, is not included in Appendix B.

10. Table 1-6 pg. 1-41

a. The information presented in this table seems incomplete, with respect to the parameters of interest, when compared to the table in Appendix B, page B-1. Please correct this inconsistency.

b. The most recent Statement of Work for Organics is dated 2/88 and for Inorganics, 7/88.

11. 1.8.2 pg. 1-42 — For organics, the Contract Required Quantitation Limits (CRQLs) listed in Appendix B from the CLP SOW should be used as the Practical Quantitation Limits (PQLs), where any result less than the CRQL is reported as estimated, "J". The listed CRQLs should be sufficiently higher than the instrument detection limits (IDLs) from a GC/MS and a GC. Done

12. 1.9.2.2 pg. 1-44 — This section on data validation is insufficient. While the laboratory QA Manager should examine the data as stated here, a validation using the procedures specified in comment 3 above must be performed. The personnel doing the validation should have prior experience in this field and can be either the laboratory's QA group or an independent contractor firm (as has been done on previous projects for the Navy). Additionally, at the EPA RPM's request, the Environmental Services Division can audit a certain percentage of the validated data. In either case, a CLP deliverables package is required. Done in Response to Comment #3

Underl.

13. 1.9.3 pg. 1-45 — It is recommended that this data be retained by the RP after WESTON's 5 year limit.

14. 1.10.1 pg. 1-45 — EPA does not require trip blanks when collecting soil samples. Also, the ASTM Type II water used for trip blanks, equipment rinse blanks and during the decontamination procedure must be demonstrated as analyte free prior to the start of sampling.

15. 1.10.1 pg. 1-46

a. The ambient conditions blank is not required by EPA.

b. Equipment rinse blanks must be collected and analyzed at a frequency of one blank per day, each day sampling is occurring, for each type of equipment used.

c. Field duplicates must be collected for soil/sediment samples. The term "replicate" is acceptable when describing duplicates. Calling them "splits" may confuse the issue if EPA contractors will be doing oversight, as the oversight samples are called "splits".

d. Comment 14 above applies here as well.

16. 2.2 pg. 2-2 — Explain how an underground tank will be visually inspected for cracks and inadequate seals from the surface. A visual inspection of an underground storage tank requires more than an inspection from the surface. Under this circumstance only the top of the tank can be viewed.

17. 2.3 pg. 2-2, 2-3 — Explain how contamination of the drilling cuttings by metals or other non-total volatile organics (TVO) will be determined. Also, provide criteria used to judge cuttings considered visually contaminated.

18. 2.3.1 pg. 2-3, 2-4

a. Specify the screen length of the piezometers. The entire vertical extent of the water table should be screened in order to measure true water levels.

b. The use of brass tubing inside the split spoon to collect samples undergoing laboratory analysis is prohibited as the brass material has the potential to contaminate the samples, thereby biasing the results produced.

c. PVC pipe is not an acceptable well construction material when ground water samples will be collected and analyzed for low-level organics. See the enclosed guidance on selection of well casing materials. (Attachment VII) Unless

19.	2.3.2 pg. 2-4	Explain how contamination of water discharged from a well will be determined.
20.	2.4.1 pg. 2-4 para. 2	At sites where solvents may be present in the ground water, stainless steel may be a better choice of screen and riser than PVC.
21.	2.4.1 pg. 2-4	The screen length for monitoring wells should be no greater than 5 to 10 feet as screens of longer length may potentially dilute contaminants present in the ground water.
22.	pg. 2-8 para.1	The description of the placement of the "natural gravel and sand" and the "Ottawa sand" as a sandpack do not agree dimensionally. In addition, the Ottawa sand should be used as a sandpack and not drilling cuttings of uncertain grain size and contamination. The "concrete plug of Type I Portland cement" does not agree with Figure 2-3; length dimensions should be included in Figure 2-3. Any bentonite used downhole must be <u>pure</u> bentonite, not the type which contains polymer additives as extraneous contamination of the ground water may occur. Regarding well casings, see comment 18(c) above. Reference is made to NJDEP specifications for monitor wells; however, the following items required by the NJDEP have been omitted from Table 2-1 and should be included: • Notification to the NJDEP is required two weeks prior to drilling. • State well permits are required for each monitor well constructed by the driller. The well permit tag must be permanently affixed to each monitoring well.

- Copies of the site specific well specifications must be maintained at the drilling site by the driller.

- Wells must be developed to a turbidity-free discharge. Modifications to designs are allowed only with NJDEP approval.

- In addition to the above referenced omissions, the following items contain errors and should read as follows (corrections underlined):

  2. Monitor well design must conform with <u>NJAC 7:9-7,8, and 9</u>.

  4. Acceptable grouting materials are: Nonexpandable cement - <u>7.5</u> gallons of water per half teaspoon of aluminum hydroxide mixed with 4 pounds of bentonite and 94 pounds of cement.

23. 2.4.2 pg. 2-8, 2-10

Explain how ground water "free of settleable solids" will be determined.

A development time of three hours is not uncommon in some coastal plain wells; it may be advisable to develop the wells for longer than one hour, if necessary for stabilization of pH and specific conductance. It is advisable to use turbidity as another measure of an adequately developed well.

24. 2.4.2. pg. 2-8

If well development will be done by air jetting, the use of an oil filter between the compressor pump and the borehole is required in order to control the purity of the air introduced downhole. Also, a 10-14 day waiting period must be observed prior to sampling to allow the aquifer to recover from the stresses of development.

<u>All</u> pump tubing used must be polyethylene or Teflon only and must be dedicated to individual wells.

25. 2.6.1 pg. 2-11

a. The use of an acrylic bailer or thief sampler is prohibited as interference with the organics analysis may occur. The acceptable materials are Teflon or stainless steel.

b. For the collection of the VOCs, the separate sample used to determine specific conductance, temperature and pH should also be used to determine the volume of HCl needed to achieve ph<2.

c. Ground water samples must be collected for total metals (unfiltered) in addition to soluble metals analysis. The 0.45 micron filter used must be a membrane filter and the filtration device must be made of polyethylene, polypropylene or borosilicate glass. This apparatus must be cleaned with a 10% HNO_3 solution and rinsed with demonstrated analyte free water prior to and between collection of each sample.

d. The sample bottles for the VOA aliquot must be filled completely with no headspace or air bubbles present.

26. 2.6.1 pg. 2-12

The monofilament bailer line used must be polypropylene in addition to the stainless steel wire stated in the Plan. Braided rope of any kind must not be used.

27. 2.6.1 pg. 2-13

Table 2-2 should be presented as separate tables for surface water and ground water analyses.

28. 2.6.2 pg. 2-12

Sediment samples must be homogenized using a stainless steel pan and stainless steel spoon prior to being placed in sample containers, except those aliquots taken for VOC and TOX analyses.

29. 2.6.3 pg. 2-15

It is not permissible to use the brass tubing on soil samples collected for chemical analysis. Soil samples may become cross contaminated when in contact with the brass material. Also, soil samples must be homogenized once removed from the sampling equipment (see comment 28 above), prior to being placed in the glass sample bottles, except those aliquots taken for VOC and TOX analyses.

30. 2.6.4.1 pg. 2-15

Split spoons must be decontaminated as per the procedure listed on pages 2-16 and 2-17, corrected as per comment 31 below.

31. 2.6.4.4 pg. 2-16

As the water and soil/sediment samples are being collected for inorganic chemical analysis, the following steps must be added to the decontamination procedure listed on pages 2-16 and 2-17:

After step 4, the potable water rinse, add a 10% nitric acid rinse (ultra pure grade) followed by a potable water rinse. When decontaminating carbon steel split spoons only, the nitric acid rinse may be reduced to 1% from 10%.

32. 2.6.5.1 pg. 2-17

The sampling containers obtained from I-Chem must be the 300 series, in which I-Chem supplies documentation that the bottles are analyte free as well as employing certain additional quality control requirements.

Also, the specific type and volume of containers used must be added to either Table 1-6 (page 1-41) or Table 2-2 and 2-3 (pages 2-13 and 2-14) for <u>each</u> parameter listed.

33. 2.6.5.2 2.6.5.3 pg. 2-17

Specific preservation and holding time requirements must be provided on Table 1-6 or Tables 2-2 and 2-3 for <u>each</u> parameter listed.

34. 2.6.6 pg. 2-18

a. Equipment rinse blanks must be collected <u>for all</u> sampling equipment used to collect water and soil/sediment samples.

b. All soil samples collected as field duplicates or splits must be homogenized prior to being placed in the sample containers, except those aliquots taken for VOC and TOX analyses.

c. Regarding soil sample duplicates, comment 29 above applies here as well.

Appendix B

1. Please correct the dates of the CLP SOW as per comment 10b above.

2. The methods listed for soil at TOX: SW-9020, Nitrate/ Nitrite: EPA-353.1, and Cyanide: SW-9010 are for aqueous matrices only. Please cite the correct soil methods or supply the modifications used by the lab to accommodate soil samples.

3. Please correct the CRQL lists as they appear in the most recent CLP SOWs (see comment 10b above).

ATTACHMENT III

Health and Safety Plan Evaluation

The Health and Safety Plan for the Phase III Remedial Investigation/Feasibility Study, Naval Weapons Station Earle, has been reviewed and evaluated using the Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (DHHS-NIOSH Publication 85-115) and the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA as guidance.

The Health and Safety Plan (HASP) is generally complete. However, some inadequacies were observed and are mentioned below.

Because much of the specific background to the site is in the Work-plan (a separate document), the HASP would benefit from either reference to the Workplan for site specific information (such as contaminant source characteristics and history, physiography, climate, proximity of resident populations, and surrounding land use) or replication of this information in the HASP.

Determining action levels is currently based on previous sampling results and historical data. A more detailed description of the correlation between the sample results, history, and health related criteria is recommended, or reference should be made to previous studies and documents. This should include a discussion of why the set limits are acceptable and what, if any, are the dangers of operating within these limits.

Procedures must be documented for the handling of unexpected emergency situations, including injuries in the exclusion and support zones, fire/explosion incidents, and personnel protective equipment failure. Details on removal of injured personnel, emergency signals, and evacuation plans should be specified. On-site communication has not been addressed by the HASP. A system of communication should be set up to allow information to be passed from one individual to another, especially during an emergency situation.

The levels of protection for personnel conducting equipment decontamination need to be specified to ensure proper protection of the environment and personnel during this time. Also, levels of protection should be documented for all personnel entering the contamination reduction zone.

Specific comments on the HASP are presented by the section number in which they appear.

Section No.	Comments
Page iv	Include mileage distances between nodes in the directions from the site to the Riverview Medical Center; put the directions in a "bullet" type format for easy reading in an emergency; include a map of the hospital route. Identify the main gate, and other ingress/egress locations on Figure 1; enhance the graphics of Figure 1 to show the main on-base travel routes. Include a map for the Leonardo location.
3.2	Document that WESTON's 24 and 32 hour-training courses and "grandfathering" meet the OSHA 40-hour course requirements for hazardous waste site personnel.
4.1	Contaminant concentrations and potential toxicological effects of the contaminants of interest are not included. The highest concentration of each contaminant observed during previous site studies should be included in Table 1. A table listing the potential toxicological effects and the symptoms of exposure for each contaminant is necessary to evaluate the overall risk to personnel and to provide personnel with information that will be needed during some emergency situations. Any potential threats to the populations outside the facility boundaries should be addressed in this section.
5.0	The following information is required in Section 5.0. • Emergency procedures - injuries in the exclusion zone or support zone - fire/explosion - personnel protective equipment failure • Communication procedures • Decontamination procedures for equipment are not specified. • Disposal of wastewater from decontamination washes is not discussed. • Disposal of well development water is not

discussed.

5.1 Table 3 refers to "aquifer testing" at some sites, but no mention of this is made in the Workplan.

Levels of protection required for personnel operating in the contamination reduction zone are not specified.

5.2 The HNU is commonly calibrated with isobutane.

Explain how the action levels have been developed. An action level for air quality quantification of 50 ppm in the breathing zone is too high for adequate personnel safety; an action level of 20 ppm is preferable.

Define the criteria of "if necessary" for upgrading personnel to Level B protection (table on center of page).

A "miniram" portable respirable dust counter is recommended for use in monitoring respirable dust at Site 19, and wherever dust may create a hazard or nuisance.

5.5 It is advisable to have a portable hand wash station at each site; bathroom facilities at each site should be made available.

It is recommended that the Explosive Ordnance Detail be consulted for drilling and sampling procedures at Site 26, and that these operations be certified as safe by them.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 15 1989

ATTACHMENT IV

OSWER Directive 9355.0-28

MEMORANDUM

SUBJECT: Control of Air Emissions From Superfund Air Strippers at Superfund Groundwater Sites

FROM: Henry L. Longest II, Director
Office of Emergency and Remedial Response

Gerald Emison, Director
Office of Air Quality Planning and Standards

TO: Addressees

PURPOSE

This memorandum establishes guidance on the control of air emissions from air strippers used at Superfund sites for groundwater treatment and establishes procedures for implementation. Under this guidance, Regions should continue to make air emission control decisions on a case-by-case basis using the nine remedy selection criteria and the remedy selection process set forth in the proposed National Contingency Plan (NCP). As described below, however, the evaluation and weighing of the criteria in a "to be considered" (TBC) context will differ according to the air quality status of the site's location.

BACKGROUND

Approximately 35% of the Records of Decision (RODs) signed to date have involved sites which use a pump and treat technique to either partially or fully remediate groundwater contamination. Close to 45% of these pump and treat sites have selected air stripping. For the foreseeable future, OERR expects to use air stripping at about the same rate. This treatment technique relies on volatilization to remove volatile organic compounds (VOCs) from the groundwater, i.e. it transfers the contaminants from the liquid to vapor phase. One known side effect of air stripping is the emission of VOCs, many of which

STATEMENT OF POLICY

For sites located in areas that are attaining the National Ambient Air Quality Standards for ozone, Regions should continue applying controls based on existing Agency policy. In most cases, this will mean the adoption of controls largely in response to State ARARs, risk management (i.e., protectiveness) guidelines, and other requirements of CERCLA Section 121.

In ozone nonattainment areas, however, the adoption of controls is more likely to be indicated even if they are not mandated by current Federal or State laws and regulations or indicated by a cancer risk analysis. Aside from cancer risk from air toxics, VOC emissions contribute to non-cancer health risks in nonattainment areas because most are precursors to the formation of ozone. Consideration of these non-cancer risks when applying the remedy selection criteria generally will show that in nonattainment areas Superfund air strippers, except those with the lowest emissions rates as indicated below, generally merit controls. In determining the need for air stripper controls at a particular Superfund site in a nonattainment area, the Regions should be guided by the emissions limit goals in the document entitled, "Issues Relating to VOC Regulation Cutpoints, Deficiencies, and Deviations," issued in May 1988 by the Office of Air Quality Planning and Standards (OAQPS) to aid States in revising their State Implementation Plans (SIPs) to incorporate post-1987 ozone attainment strategies. The OAQPS guidance indicates that the sources most in need of controls are those with an actual emissions rate in excess of 3 pounds per hour (lb/hr) or 15 lb/day or a potential (i.e., calculated) rate of 10 tons per year (TPY) of total VOCs. The calculated rate assumes 24-hour operation, 365 days per year. Regions should note that control levels are applied on a facility basis. For the purposes of this guidance, facility is defined as a contiguous piece of property under common ownership.

This guidance applies to air strippers at Superfund sites. In establishing the policy, however, the potential for applicability to other VOC sources is recognized. Generally, the guidelines described for air strippers are suitable for VOC air emissions from other vented extraction techniques (e.g., soil vapor extraction) but not from area sources (e.g., soil excavation).

This guidance applies to future remedial decisions at Superfund sites. The policy is not explicitly designed for

The RI/FS scoping phase and work plan development should describe the specific data to be generated and the methods for doing so. Remedial Project Managers should consult with the designated Air Superfund Coordinator for technical assistance. Additional assistance is available from National Technical Guidance Manuals developed jointly by the Air and Superfund program offices for estimating air emissions and conducting air pathway analyses. The ROD should summarize this information as appropriate and clearly document the basis for the air emissions control decision.

Addressees:
Regional Waste Management Division Directors
Regional Superfund Branch Chiefs
Regional Air Division Directors
Regional Air Branch Chiefs
OERR Division Directors
OAQPS Division Directors

ATTACHMENT V

SOP NO. HW-6
Revision #6

CLP ORGANICS DATA REVIEW
AND PRELIMINARY REVIEW

CONCURRED BY: _____ Date: 4/6/89
Louis Bevilacqua
Monitoring Management Branch

APPROVED BY: _____ Date: 4/14/89
Gerard F. McKenna, Chief
Monitoring Management Branch

INTRODUCTION TO DATA VALIDATION

1.0 Scope

1.1 This procedure is applicable to organic data obtained from contractor laboratories working for the Contract Laboratory Program (CLP).

1.2 The data validation is based upon analytical and quality assurance requirements specified in the Statement of Work (SOW).

2.0 Responsibilities

Data reviewers will complete the following tasks as assigned by the Data Review Coordinator:

2.1 Data Assessment - The reviewer must answer every question on the checklist. All response shall be in ink.

2.2 Data Assessment Narrative (Attachment 1) - Data reviewer is required to use these forms and must match the action in the narrative with the action taken on the Form I(s).

2.3 Rejection Summary Form (Attachment 2) - Fill in the total number of analytes measured by different analyses and the number of analytes rejected or flagged as estimated due to corresponding quality control criteria. Place an "X" in the boxes where analyses were not performed or criteria do not apply.

2.4 Organic Regional Data Assessment - Data reviewer is also required to fill out Organic Regional Data Assessment Form (Attachment 3).

2.5 Telephone Record Log - The data reviewer should enter the bare facts of inquiry before initiating any authorized telephone conversation with a CLP laboratory. After the case review has been completed, mail the white copy of the Telephone Record Log to the laboratory and the pink copy to SMO. File the yellow copy in the Telephone Record Log folder and attach a photocopy of the Telephone Record Log to the completed Data Assessment Narrative.

2.6 Forwarded Paperwork - Upon completion of the review, the following are to be forwarded to the Regional Sample Control Center (RSCC) located in the Surveillance and Monitoring Branch:

a. data package
b. completed assessment checklist
c. SMO Contract Compliance Screening (CCS)

Forward four (4) copies of the completed Data Assessment Narrative along with four (4) copies of the Organic Data Assessment Form: one each for the appropriate Regional DPO, the Sample Management Office (SMO), and to the last two addresses of the Data Reviewers Mailing List.

2.7 Filed Paperwork - Upon completion of the review, the following are to be filed within the Monitoring and Management Branch (MMB) files:

a. Telephone record Log (copy)
b. Record of Communication (original)
c. Rejection Summary Form

3.0 Rejection of Data - All values determined to be unacceptable on the Organic Analysis Data Sheet (Form I) must be flagged with an "R". As soon as review criteria causes data to be rejected, that data can be eliminated from any further review or consideration.

4.0 Acceptance Criteria - In order that the reviews be consistent among reviewers, this Standard Operating Procedure (SOP) should be used. Additional guidance can be found in the Functional Guidelines.

5.0 SMO Contract Compliance Screening (CCS) - This is intended to aid the reviewer in locating any problems, both corrected and uncorrected. However, the validation should be carried out even if CCS is not present. Resubmittals received from the laboratory in response to CCS must be used by the reviewer.

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____

LAB: _____

SITE: _____

1.0 Data Completeness and Deliverables	YES	NO	N/A
1.1 Have any missing deliverables been received and added to the data package.	[___]	___	___
ACTION: Call lab for explanation / resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the package under the "Contract Problems/Non-compliance" section of reviewer narrative.			
1.2 Was SMO CCS checklist included with package?	[___]	___	___
2.0 Cover Letter/Case Narrative			
2.1 Is the Narrative or Cover Letter present?	[___]	___	___
2.2 Are Case Number and/or SAS number contained in the Narrative or Cover Letter?	[___]	___	___

Data Validation Checklist

The following checklist is divided into three parts. Part A is filled out if the data package contains any VOA analyses, Part B for any BNA analyses and Part C for Pesticide/PCBs.

Does this package contain:

VOA data?	___	___
BNA data?	___	___
Pesticide/PCB data?	___	___

ACTION: Complete corresponding parts of checklist.

	YES	NO	N/A

PART A: VOA ANALYSES

1.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [___] ___ ___

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ___ [___] ___

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be rejected.

ACTION: If both VOA vials for a sample have air bubbles, flag all positive results "J" and all non -detects "R".

2.0 Holding Times

2.1 Have any VOA holding times, determined from date of collection to date of analysis, been exceeded? ___ [___] ___

If unpreserved, aqueous aromatic volatiles must be analyzed within 7 days of collection and non-aromatic volatiles must be analyzed within 14 days. If preserved with hydrochloric acid and stored at 4°C, then both aromatic and non-aromatic volatiles must be analyzed within 14 days. If uncertain about preservation, contact the sampler to determine whether the samples were preserved.

A ten-day holding time for soil samples is recommended.

Table of Holding Time Violations

Sample	Sample Matrix	Preserved ?	(See Traffic Report) Date Sampled	Date Lab Received	Date Analyzed
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

ACTION: If holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

	YES	NO	N/A
If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. The reviewer may determine that non-detect data are unusable ("R").			
3.0 Surrogate Recovery (Form II)			
3.1 Are the VOA Surrogate Recovery Summaries (Form II) present for each of the following matrices:			
a. Low Water	[___]	___	___
b. Med Water	[___]	___	___
c. Low Soil	[___]	___	___
d. Med Soil	[___]	___	___
3.2 Are all the VOA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:			
a. Low Water	[___]	___	___
b. Med Water	[___]	___	___
c. Low Soil	[___]	___	___
d. Med Soil	[___]	___	___
ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.			
3.3 Were outliers marked correctly with an asterisk?	[___]	___	___
ACTION: Circle all outliers in red.			
3.4 Was one or more VOA surrogate recovery outside of contract specifications for any sample or method blank?	___	[___]	___
If yes, were samples reanalyzed?	[___]	___	___
Were method blanks reanalyzed?	[___]	___	___

ACTION: If surrogate recoveries are > 10% but all do not meet SOW specifications:

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ").

	YES	NO	N/A
If any surrogate has a recovery of <10% : 1. Flag all positive results as estimated ("J"). 2. Flag all non-detects as unusable ("R"). Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and re-analyses. Check the internal standard areas.			
3.5 Are there any transcription/calculation errors between raw data and Form II?	___	[___]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
4.0 Matrix Spikes (Form III)			
4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present?	[___]	___	___
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water	[___]	___	___
b. Med Water	[___]	___	___
c. Low Soil	[___]	___	___
d. Med Soil	[___]	___	___
ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.			

4.3 How many VOA spike recoveries are outside QC limits?

Water	Soils
_____ out of 10	_____ out of 10

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soils
_____ out of 5	_____ out of 5

ACTION: If MS and MSD both have less than 10% recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for the MS/MSD analysis. Use professional judgement in applying this criterion to other samples in the package.

	YES	NO	N/A
0 Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	[___]	___	___
5.2 Frequency of Analysis: for the analysis of VOA TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	[___]	___	___
5.3 Has a VOA instrument blank been analyzed at least once every twelve hours for each GC/MS system used?	[___]	___	___
ACTION: If any method blank data are missing, call lab for explanation / resubmittal. If not available, reject all associated positive data ("R").			
5.4 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.			
Is the chromatographic performance (baseline stability) for each instrument acceptable for VOAs?	[___]	___	___
ACTION: Use professional judgement to determine the effect on the data.			
0 Contamination			
NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are <u>not</u> used to qualify data. Do not confuse them with the other QC blanks discussed below.			
6.1 Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for VOAs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.	___	[___]	___
6.2 Do any field/trip/rinse blanks have positive VOA results (TCL and/or TIC)?	___	[___]	___
ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)			
NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.			

YES NO N/A

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

	Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & >10x blank value
Methylene chloride Acetone Toluene 2-butanone	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5 blank value
Other Contaminants	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [___] ___ ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 GC/MS Tuning and Mass Calibration (Form V)

7.1 Are the GC/MS Tuning and Mass Calibration Forms (Form V) present for Bromofluorobenzene (BFB)? [___] ___ ___

7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift? [___] ___ ___

7.3 Has a tuning performance compound been analyzed for every twelve hours of sample analysis per instrument? [___] ___ ___

ACTION: If any tuning data are missing, take action specified in 3.2 above.

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

	YES	NO	N/A
ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.			
7.4 Have the ion abundance criteria been met for each instrument used?	[___]	___	___
ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).			
ACTION: If tuning calibration is in error, flag all associated sample data as unusable ("R"). However, if expanded ion criteria are met (See 1988 Functional Guidelines), the data reviewer may accept data with appropriate qualifiers.			
7.5 Are there any transcription / calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.)	___	[___]	___
7.6 Have the appropriate number of significant figures (two) been reported? (Check at least two values, but if errors are found check more values.)	___	[___]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make necessary corrections and note errors under "Conclusions".			
7.7 Are the spectra of the mass calibration compound acceptable?	[___]	___	___
ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.			
8.0 Target Compound List (TCL) Analytes			
8.1 Are the Organic Analysis Data Sheets (Form I VOA) present with required header information on each page, for each of the following:			
a. Samples and/or fractions as appropriate	[___]	___	___
b. Matrix spikes and matrix spike duplicates	[___]	___	___
c. Blanks	[___]	___	___

	YES	NO	N/A
8.2 Are the VOA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	[___]	___	___
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	[___]	___	___
c. Blanks	[___]	___	___
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	[___]	___	___
8.4 Is chromatographic performance acceptable with respect to:			
Baseline stability	[___]	___	___
Resolution	[___]	___	___
Peak shape	[___]	___	___
Full-scale graph (attenuation)	[___]	___	___
Other:_____	[___]	___	___
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified VOA compounds present for each sample?	[___]	___	___
ACTION: If any mass spectra are missing, take action specified in 3.2 above. If Lab does not generate their own standard spectra, make note in "Contract Problems/Non-compliance".			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[___]	___	___
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[___]	___	___
8.8 Do sample and standard relative ion intensities agree within 20%?	[___]	___	___
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected or flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (at the calculated detection limit).			

	YES	NO	N/A
9.0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "J" qualifier?	[___]	___	___
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate	[___]	___	___
b. Blanks	[___]	___	___
ACTION: If any TIC data are missing, take action specified in 3.2 above.			
ACTION: Add "J" qualifier if missing and "N" qualifier to all identified TIC compounds on Form I, Part B.			
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene--a VOA TCL--and should not be reported as a TIC)?	___	[___]	___
ACTION: Flag with "R" any TCL compound listed as a TIC.			
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[___]	___	___
9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?	[___]	___	___
ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.			
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	___	[___]	___
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	___	[___]	___

	YES	NO	N/A

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant. Reports) present for initial and continuing calibration? [___] ___ ___

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the volatile fraction? [___] ___ ___

ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.

12.2 Are response factors stable for volatiles over the concentration range of the calibration (RSD <30%)? [___] ___ ___

ACTION: Circle all outliers in red.

ACTION: When RSD >30%, non-detects may be qualified using professional judgement. Flag all positive results "J". When RSD >90%, flag all non-detects as unusable ("R"). (Region II policy.)

12.3 Do any compounds have a RRF < 0.05? ___ [___] ___

ACTION: Circle all outliers in red.

ACTION: If any volatile compound has an average RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

	YES	NO	N/A
12.4 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or %RSD? (Check at least two values but if errors are found, check more.)	___	[___]	___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the volatile fraction?	[___]	___	___
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	[___]	___	___

ACTION: List below all sample analyses that were not within twelve hours of the previous continuing calibration analysis.

_____

_____

_____

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, call lab for explanation / resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").

13.3 Do any continuing calibration standard compounds have a RRF < 0.05?	___	[___]	___

ACTION: Circle all outliers in red.

ACTION: If any volatile compound has a RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

13.4 Do any compounds have a % difference between initial and continuing calibration RRF > 25%?	___	[___]	___

ACTION: Circle all outliers in red and qualify associated sample data as outlined in the table below:

YES NO N/A

% DIFFERENCE

25-50	50-90	>90
'J' positive results, no action for non detects	'J' positive results, 'UJ' non detects	'J' positive results, "R" non detects

13.5 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [___] ___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

14.0 Internal Standards (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits for each continuing calibration? [___] ___ ___

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit

(Attach additional sheets if necessary.)

ACTION: If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard. If extremely low area counts are reported, or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? [___] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

	YES	NO	N/A
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for VOA analysis?	[___]	___	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

	YES	NO	N/A

PART B: BNA ANALYSES

Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [___] ___ ___

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ___ [___] ___

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be rejected.

2.0 Holding Times

2.1 Have any BNA holding times, determined from date of collection to date of extraction, been exceeded? ___ [___] ___

Samples for BNA analysis, both soils and waters, must be extracted within seven days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction.

Table of Holding Time Violations

Sample	Sample Matrix	Date Sampled	(See Traffic Report) Date Lab Received	Date Extracted	Date Analyzed

ACTION: If holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

	YES	NO	N/A
If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. The reviewer may determine that non-detect data are unusable ("R").			

3.0 Surrogate Recovery (Form II)

3.1 Are the BNA Surrogate Recovery Summaries (Form II) present for each of the following matrices:			
a. Low Water	[___]	___	___
b. Med Water	[___]	___	___
c. Low Soil	[___]	___	___
d. Med Soil	[___]	___	___
3.2 Are all the BNA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:			
a. Low Water	[___]	___	___
b. Med Water	[___]	___	___
c. Low Soil	[___]	___	___
d. Med Soil	[___]	___	___

ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.

3.3 Were outliers marked correctly with an asterisk?	[___]	___	___

ACTION: Circle all outliers in red.

3.4 Were two or more base-neutral OR acid surrogate recoveries out of specification for any sample or method blank?	___	[___]	___
If yes, were samples reanalyzed?	[___]	___	___
Were method blanks reanalyzed?	[___]	___	___

ACTION: If all BNA surrogate recoveries are > 10% but two within the base-neutral or acid fraction do not meet SOW specifications, for the affected fraction only (i.e. base-neutral OR acid compounds):

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ").

	YES	NO	N/A
If any base-neutral or acid surrogate has a recovery of <10% : 1. Flag all positive results for that fraction (i.e. all acid or base-neutral compounds) "J". 2. Flag all non-detects for that fraction "R".			
Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and re-analyses. Check the internal standard areas.			
3.5 Are there any transcription/calculation errors between raw data and Form II?	___	[___]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
4.0 Matrix Spikes (Form III)			
4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present?	[___]	___	___
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water	[___]	___	___
b. Med Water	[___]	___	___
c. Low Soil	[___]	___	___
d. Med Soil	[___]	___	___
ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.			

4.3 How many BNA spike recoveries are outside QC limits?

Water	Soils
_____ out of 22	_____ out of 22

4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Soils
_____ out of 11	_____ out of 11

ACTION: If MS and MSD both have less than 10% recovery for n analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for MS/MSD analysis. Use professional judgement in applying this criterion to other samples

	YES	NO	N/A
Blanks (Form IV)			
5.1 Is the Method Blank Summary (Form IV) present?	[___]	___	___
5.2 Frequency of Analysis: for the analysis of BNA TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	[___]	___	___
5.3 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.			
Is the chromatographic performance (baseline stability) for each instrument acceptable for VOAs?	[___]	___	___

ACTION: Use professional judgement to determine the effect on the data.

6.0 Contamination

NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.

6.1 Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for BNAs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.	___	[___]	___
6.2 Do any field/rinse blanks have positive BNA results (TCL and/or TIC)?	___	[___]	___

ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)

NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.

YES NO N/A

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

	Sample conc > CRQL but < 10x blank	Sample conc < CRQL & is < 10x blank value	Sample conc > CRQL value & >10x blank value
Common Phthalate Esters	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

	Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL value & > 5 blank value
Other Contaminants	Flag sample result with a 'U'; cross out 'B' flag	Reject sample result and report CRQL; cross out 'B' flag	No qualification is needed

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.3 Are there field/rinse/equipment blanks associated with every sample? [___] ___ ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 <u>GC/MS Tuning and Mass Calibration (Form V)</u>

7.1 Are the GC/MS Tuning and Mass Calibration Forms (Form V) present for Decafluorotriphenylphosphine (DFTPP)? [___] ___ ___

7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift? [___] ___ ___

7.3 Has a tuning performance compound been analyzed for every twelve hours of sample analysis per instrument? [___] ___ ___

ACTION: If any tuning data are missing, take action specified in 3.2 above.

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

	YES	NO	N/A

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

7.4 Have the ion abundance criteria been met for each instrument used? [___] ___ ___

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If tuning calibration is in error, flag all associated sample data as unusable ("R"). However, if expanded ion criteria are met (See 1988 Functional Guidelines), the data reviewer may accept data with appropriate qualifiers.

7.5 Are there any transcription / calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ [___] ___

7.6 Have the appropriate number of significant figures (two) been reported? (Check at least two values, but if errors are found check more values.) ___ [___] ___

ACTION: If large errors exist, call lab for explanation / resubmittal, make necessary corrections and note errors under "Conclusions".

7.7 Are the spectra of the mass calibration compound acceptable? [___] ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 <u>Target Compound List (TCL) Analytes</u>

8.1 Are the Organic Analysis Data Sheets (Form I BNA) present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate [___] ___ ___

b. Matrix spikes and matrix spike duplicates [___] ___ ___

c. Blanks [___] ___ ___

	YES	NO	N/A
8.2 Are the BNA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	[___]	___	___
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	[___]	___	___
c. Blanks	[___]	___	___
ACTION: If any data are missing, take action specified in 3.2 above.			
8.3 Are the response factors shown in the Quant Report?	[___]	___	___
8.4 Is chromatographic performance acceptable with respect to:			
Baseline stability	[___]	___	___
Resolution	[___]	___	___
Peak shape	[___]	___	___
Full-scale graph (attenuation)	[___]	___	___
Other:_____	[___]	___	___
ACTION: Use professional judgement to determine the acceptability of the data.			
8.5 Are the lab-generated standard mass spectra of the identified BNA compounds present for each sample?	[___]	___	___
ACTION: If any mass spectra are missing, take action specified in 3.2 above. If Lab does not generate their own standard spectra, make note in "Contract Problems/Non-compliance".			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[___]	___	___
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[___]	___	___
8.8 Do sample and standard relative ion intensities agree within 20%?	[___]	___	___
ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected, flagged "N" (presumptive evidence of the presence of the compound) or changed to not detected (at the calculated detection limit).			

	YES	NO	N/A
9.0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "J" qualifier?	[___]	___	___
9.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
a. Samples and/or fractions as appropriate	[___]	___	___
b. Blanks	[___]	___	___
ACTION: If any TIC data are missing, take action specified in 3.2 above.			
ACTION: Add "J" qualifier if missing and "N" qualifier to all identified TIC compounds on Form I, Part B.			
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds (example: 1,2-dimethylbenzene is xylene--a VOA TCL--and should not be reported as a TIC)?	___	[___]	___
ACTION: Flag with "R" any TCL compound listed as a TIC.			
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[___]	___	___
9.5 Do TIC and "best match" standard relative ion intensities agree within 20%?	[___]	___	___
ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.			
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	___	[___]	___
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	___	[___]	___

	YES	NO	N/A
ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.			
11.0 Standards Data (GC/MS)			
11.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant. Reports) present for initial and continuing calibration?	[___]	___	___
ACTION: If any calibration standard data are missing, take action specified in 3.2 above.			
12.0 GC/MS Initial Calibration (Form VI)			
12.1 Are the Initial Calibration Forms (Form VI) present and complete for the BNA fraction?	[___]	___	___
ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.			
12.2 Are response factors stable for BNAs over the concentration range of the calibration (RSD <30%)?	[___]	___	___
ACTION: Circle all outliers in red.			
ACTION: When RSD >30%, non-detects may be qualified using professional judgement. Flag all positive results "J". When RSD >90%, flag all non-detects as unusable ("R"). (Region II policy.)			
12.3 Do any compounds have a RRF < 0.05?	___	[___]	___
ACTION: Circle all outliers in red.			
ACTION: If any BNA compound has an average RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").			

	YES	NO	N/A
12.4 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or %RSD? (Check at least two values but if errors are found, check more.)	___	[___]	___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the BNA fraction?	[___]	___	___
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	[___]	___	___

ACTION: List below all sample analyses that were not within twelve hours of the previous continuing calibration analysis.

_____

_____

_____

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, call lab for explanation / resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").

13.3 Do any continuing calibration standard compounds have a RRF < 0.05?	___	[___]	___

ACTION: Circle all outliers in red.

ACTION: If any BNA compound has a RRF < 0.05, flag positive results for that compound as estimated ("J"), and flag non-detects for that compound as unusable ("R").

13.4 Do any compounds have a % difference between initial and continuing calibration RRF > 25%?	___	[___]	___

ACTION: Circle all outliers in red and qualify associated sample data as outlined in the table below:

YES NO N/A

% DIFFERENCE

25-50	50-90	>90
'J' positive results, no action for non detects	'J' positive results, 'UJ' non detects	'J' positive results, "R" non detects

13.5 Are there any transcription / calculation errors in the reporting of average response factors (RRF) or difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [___] ___

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".

14.0 Internal Standards (Form VIII)

14.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits for each continuing calibration? [___] ___ ___

ACTION: List all the outliers below.

Sample #	Internal Std	Area	Lower Limit	Upper Limit

(Attach additional sheets if necessary.)

ACTION: If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard. If extremely low area counts are reported, or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable ("R").

14.2 Are the retention times of the internal standards within 30 seconds of the associated calibration standard? [___] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

	YES	NO	N/A
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for BNA analysis?	[___]	___	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

	YES	NO	N/A

PART C: PESTICIDE/PCB ANALYSES

1.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [___] ___ ___

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ___ [___] ___

ACTION: Use professional judgement to evaluate the effect on the quality of the data.

ACTION: If any sample analyzed as a soil contains more than 50% water, all data should be rejected.

2.0 Holding Times

2.1 Have any PEST/PCB holding times, determined from date of collection to date of extraction, been exceeded? ___ [___] ___

Samples for PEST/PCB analysis, both soils and waters, must be extracted within seven days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction.

3.0 Surrogate Recovery (Form II)

3.1 Are the PEST/PCB Surrogate Recovery Summaries (Form II) present for each of the following matrices:

a. Low Water [___] ___ ___

b. Med Water [___] ___ ___

c. Low Soil [___] ___ ___

d. Med Soil [___] ___ ___

3.2 Are all the PEST/PCB samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:

a. Low Water [___] ___ ___

b. Med Water [___] ___ ___

c. Low Soil [___] ___ ___

d. Med Soil [___] ___ ___

	YES	NO	N/A
ACTION: Call lab for explanation / resubmittals. If missing deliverables are unavailable, document effect on data under "Conclusions" section of reviewer narrative.			
3.3 Were outliers marked correctly with an asterisk?	[___]	___	___
ACTION: Circle all outliers in red.			
3.4 Was surrogate (DBC) recovery outside of the contract specification for any sample or blank?	___	[___]	___
ACTION: No qualification is done if surrogates are diluted beyond detection. If recovery is below contract limit (but above zero), flag all results for that sample "J". If recovery is zero, flag positive results "J" and non-detects "R". If recovery for the blank is zero, flag non-detects for all associated samples "R". If recovery is above contract limit, flag all positive results for that sample "J", unless in the reviewers professional judgement the high recovery is due to co-eluting interference (check the associated blank - if recovery is high there also, flag the sample data).			
3.5 Are there any transcription/calculation errors between raw data and Form II?	___	[___]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			

4.0 Matrix Spikes (Form III)

	YES	NO	N/A
4.1 Is the Matrix Spike Duplicate/Recovery Form (Form III) present?	[___]	___	___
4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:			
a. Low Water	[___]	___	___
b. Med Water	[___]	___	___
c. Low Soil	[___]	___	___
d. Med Soil	[___]	___	___
ACTION: If any matrix spike data are missing, take the action specified in 3.2 above.			

4.3 How many PEST/PCB spike recoveries are outside QC limits?

Water	Soils
_____ out of 12	_____ out of 12

	YES	NO	N/A
4.4 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?			

Water _____ out of 6

Soils _____ out of 6

ACTION: If MS and MSD both have less than zero recovery for an analyte, negative results for that analyte should be rejected, and positive results should be flagged "J". The above applies only to the sample used for MS/MSD analysis. Use professional judgement in applying this criterion to other samples.

5.0 Blanks (Form IV)

5.1 Is the Method Blank Summary (Form IV) present?	[___]	___	___
5.2 Frequency of Analysis: for the analysis of Pesticide TCL compounds, has a reagent/method blank been analyzed for each set of samples or every 20 samples of similar matrix (low water, med water, low soil, medium soil), whichever is more frequent?	[___]	___	___
5.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.			
Is the chromatographic performance (baseline stability) for each instrument acceptable for PEST/PCBs?	[___]	___	___

ACTION: Use professional judgement to determine the effect on the data.

6.0 Contamination

NOTE: "Water blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.

6.1 Do any method/instrument/reagent blanks have positive results for PEST/PCBs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor.	___	[___]	___
6.2 Do any field/rinse blanks have positive PEST/PCB results?	___	[___]	___

ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)

	YES	NO	N/A

NOTE: Only field/rinse blanks taken the same day as the samples are used to qualify data. Blanks may not be qualified because of contamination in another blank. Blanks may be qualified for surrogate, spectral, tuning or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks.

Sample conc > CRQL but < 5x blank	Sample conc < CRQL & is < 5x blank value	Sample conc > CRQL & > 5x blank value
Flag sample result with a "U"; cross out "B" flag	Reject sample result and report CRQL; cross out "B" flag	No qualification is needed

6.3 Are there field/rinse/equipment blanks associated with every sample? [___] ___ ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 Calibration and GC Performance

7.1 Are the following Gas Chromatograms and Data System Printouts for both Primary and Confirmation (confirmation standards not required if there are no positive results above CRQL) column present:

a. Evaluation Standard Mix A [___] ___ ___

b. Evaluation Standard Mix B [___] ___ ___

c. Evaluation Standard Mix C [___] ___ ___

d. Individual Standard Mix A [___] ___ ___

e. Individual Standard Mix B [___] ___ ___

f. Multi-component Pesticides Toxaphene & Chlordane [___] ___ ___

g. Aroclors 1016/1260 [___] ___ ___

h. Aroclors 1221, 1232, 1242, 1248, and 1254 [___] ___ ___

ACTION: If no, take action specified in 3.2 above

	YES	NO	N/A
7.2 Is Form VIII Pest-1 present and complete for each GC column (primary and confirmation) and each 72 hour sequence of analyses?	[___]	___	___
ACTION: If no, take action specified in 3.2 above.			
7.3 Are there any transcription/calculation errors between raw data and Form VIII?	___	[___]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
7.4 Has the total breakdown on quantitation or confirmation column exceeded 20% for DDT?	___	[___]	___
- for Endrin?	___	[___]	___
or if Endrin aldehyde <u>and</u> 4,4'-DDD co-elute and there is a peak at their retention time, has the combined DDT and Endrin breakdown exceeded 20%?	___	[___]	___

ACTION:

a. If DDT breakdown is greater than 20% on quantitation column beginning with the samples following the last <u>in control</u> standard:

1. Flag all positive DDT results "J".
2. If DDT was not detected but DDD and/or DDE are positive, flag the DDT non-detect "R".
3. Flag positive DDD and DDE results "JN".
4. If DDT breakdown is > 20% on confirmation column <u>and</u> DDT is identified on quantitation column but not on confirmation column, use professional judgement to determine whether DDT should be reported on Form I (if reported, flag result "N").

b. If Endrin breakdown is > 20% on quantitation column, beginning with the samples following the last <u>in control</u> standard:

1. Flag all positive Endrin results "J".
2. If Endrin was not detected, but Endrin Aldehyde and/or Endrin Ketone are positive, flag the Endrin non-detect "R".
3. Flag Endrin Ketone positive results "JN".
4. If Endrin breakdown is > 20% on confirmation column <u>and</u> Endrin is identified on quantitation column but not on confirmation column, use professional judgement to determine whether Endrin should be reported on Form I (if reported, flag result "N").

c. If the combined breakdown is used (it can only be used if the conditions in 7.4 above are met) and is > 20% on quantitation column beginning with the last <u>in control</u> standard, take the actions specified in 7.4 a and b above. If the combined breakdown is >20% on confirmation column <u>and</u> Endrin or DDT is identified on quantitation column but not on confirmation column, use professional judgement to determine whether Endrin or DDT should be reported on Form I (if reported, flag result "N").

	YES	NO	N/A
7.5 Is the linearity check RSD of all four calibration factors <10% for the quantitation column?	[___]	___	___
ACTION: If no, flag positive hits for all pesticide and PCB analytes "J" for all associated samples. Do not flag toxaphene or DDT if they are quantified from a 3-point calibration curve.			
7.6 Is the % difference between the EVAL A and each analysis (quantitation and confirmation) DBC retention time within QC limits (2% for packed column, 0.3% for capillary [I.D. < 0.32 mm], 1% for megabore [0.32 < I.D. < 2 mm]) ?	[___]	___	___
ACTION: DBC retention time cannot be evaluated if DBC is not detected. If it is present and has a retention time out of QC limits, then use professional judgement to determine the reliability of the analysis and flag results "R", if appropriate.			
7.7 Was the proper analytical sequence followed for each 72 hour period of analyses (page PEST D-36 in 8/87 SOW).	[___]	___	___
ACTION: If no, use professional judgement to determine the severity of the effect on the data and accept or reject it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.			

8.0 Pesticide/PCB Standards Summary

	YES	NO	N/A
8.1 Is Form IX present and complete for each GC column and 72 hr sequence of analyses?	[___]	___	___
ACTION: If no, take action specified in 3.2 above.			
8.2 Are there any transcription/calculation errors between raw data and Form IX?	___	[___]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
8.3 Is DDT retention time for packed columns > 12 min (except OV-1 and OV-101 columns)?	[___]	___	___
ACTION: If no, check that there is adequate resolution between individual components. If not, flag results for compounds that interfere with each other (co-elute) "R".			
8.4 Do all standard retention times fall within the windows established for the first IND A and IND B analyses?	[___]	___	___

	YES	NO	N/A
ACTION: Beginning with the samples following the last in control standard, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times. If no peaks are found and, DBC is visible non-detects are valid. If peaks are present and cannot be identified through "pattern recognition" or a consistent shift in standard retention times, flag all affected compound results "R".			
8.5 Are the continuing calibration standard calibration factors within 15% (for quantitation column) or 20% (for confirmation column) of the initial (at beginning of 72 hr sequence) calibration factors?	[___]	___	___
ACTION: If no, flag all associated positive results "J". Use professional judgement to determine whether or not to flag non-detects.			
9.0 Pesticide/PCB Identification			
9.1 Is Form X complete for every sample in which a pesticide or PCB was detected?	[___]	___	___
ACTION: If no, take action specified in 3.2 above.			
9.2 Are there any transcription errors between raw data and Form X?	___	[___]	___
ACTION: If large errors exist, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
9.3 Are retention times of sample compounds within the calculated retention time windows for both quantitation and confirmation analyses?	[___]	___	___
Was GC/MS confirmation provided when required (when compound concentration is > 10 ug/ml in final extract)?	[___]	___	___
ACTION: Reject ("R") all positive results (meeting quantitation column criteria, but missing confirmation by a second column or GC/MS (if appropriate). Also, reject ("R") all positive results not meeting retention time window criteria unless associated standard compounds are similarly biased (i.e. base on RRT to DBC).			
9.4 Check chromatograms for false negatives, especially for the multiple peak components toxaphene and PCB's. Were there any false negatives?	___	[___]	___
ACTION: If appropriate PCB standards were not analyzed, or if the lab performed no confirmation analysis, flag the appropriate data with an "R".			

	YES	NO	N/A
10.0 Compound Quantitation and Reported Detection Limits			
10.1 Are there any transcription / calculation errors in Form I results? Check at least two positive values. Were any errors found?	___	[___]	___
NOTE: Simple peak pesticide results can be checked for rough agreement between quantitative results obtained on the two GC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interfering compound is indicated, the lower of the two values should be reported and qualified as presumptively present at an estimated quantity ("JN"). This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has obscured the attempt at a second column confirmation.			
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	___	[___]	___
ACTION: If errors are large, call lab for explanation / resubmittal, make any necessary corrections and note errors under "Conclusions".			
ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" value on the original Form I and substituting it with data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.			
11.0 Chromatogram Quality			
11.1 Were baselines stable?	[___]	___	___
11.2 Were any electropositive displacement (negative peaks) or unusual peaks seen?	___	[___]	___
11.3 Were early eluting peaks (for early eluting analytes) resolved to baseline?	[___]	___	___
ACTION: For 11.1 and 11.2, comment only. For 11.3, reject ("R") those analytes that are not sufficiently resolved.			

	YES	NO	N/A
12.0 Field Duplicates			
12.1 Were any field duplicates submitted for PEST/PCB analysis?	[___]	___	___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

ATTACHMENT 1
SOP NO. HW-6

TOTAL REVIEW

CLP DATA ASSESSMENT

Functional Guidelines for Evaluating Organics Analysis

Case No._____SDG No._____LABORATORY_____SITE_____

DATA ASSESSMENT:

The current functional guidelines (1988) for evaluating organic data have been applied.

All data are valid and acceptable except those analytes which have been qualified with a "J" (estimated), "U" (non-detects), "R" (unusable),or "JN" (presumptive evidence for the presence of the material at an estimated value). All action is detailed on the attached sheets.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant QC problems the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

Reviewer's
Signature:_____Date:___/____/19___

Verified By:_____Date:___/_____/19___

DATA ASSESSMENT:

1. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detects (sample quantitation limits) will be flagged as estimated, "J", or unusable, "R", if the holding times are grossly exceeded.

The following action was taken in the samples and analytes shown due to excessive holding time.

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

2. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, trip field, rinse and water blanks are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field blanks measure cross- contamination of samples during field operations. If the concentration of the analyte is less than 5 times the blank contaminant level (10 times for the common contaminants), the analytes are qualified as non- detects, "U". The following analytes in the samples shown were qualified with "U" for these reasons:

A) Method blank contamination

B) Field or rinse blank contamination ("water blanks" or "distilled water blanks" are validated like any other sample)

C) Trip blank contamination

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

3. MASS SPECTROMETER TUNING:

Tuning and performance criteria are established to ensure adequate mass resolution, proper identification of compounds, and to some degree, sufficient instrument sensitivity. These criteria are not sample specific. Instrument performance is determined using standard materials. Therefore, these criteria should be met in all circumstances. The tuning standard for volatile organics is bromofluorobenzene (BFB) and for semi-volatiles is decafluorotriphenyl- phosphine (DFTPP).

If the mass calibration is in error, all associated data will be classified as unusable, "R".

DATA ASSESSMENT:

4. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) RESPONSE FACTOR:

The response factor measures the instrument's response to specific chemical compounds. The response factor for the Target Compound List (TCL) must be $\geq$ 0.05 in both the initial and continuing calibrations. A value < 0.05 indicates a serious detection and quantitation problem (poor sensitivity). Analytes detected in the sample will be qualified as estimated, "J". All non-detects for that compound will be rejected ("R").

DATA ASSESSMENT:

5. CALIBRATION:

A) PERCENT RELATIVE STANDARD DEVIATION (%RSD) AND PERCENT DIFFERENCE (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance. Percent RSD must be <30% and %D must be <25%. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ" (if %D or RSD >50%). If there is a gross deviation of %RSD and %D, the non-detects may be rejected ("R").

For the PCB/PESTICIDE fraction, %RSD for aldrin, endrin, DDT, and dibutylchlorendate must not exceed 10%. Percent D must be within 15% on the quantitation column and 20% on the confirmation column.

DATA ASSESSMENT:

6. SURROGATES:

All samples are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate concentrations were outside contract specifications, qualifications were applied to the samples and analytes as shown below.

DATA ASSESSMENT:

7. INTERNAL STANDARDS PERFORMANCE:

Internal standard (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must not vary by more than a factor of 2 (-50% to +100%) from the associated continuing calibration standard. The retention time of the internal standard must not vary more than ±30 seconds from the associated continuing calibration standard. If the area count is outside the (-50% to +100%) range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated, "J", and all non-detects as "UJ", or "R" if there is a severe loss of sensitivity.

If an internal standard retention time varies by more than 30 seconds, the reviewer will use professional judgment to determine either partial or total rejection of the data for that sample fraction.

DATA ASSESSMENT:

8. COMPOUND IDENTIFICATION:

A) VOLATILE AND SEMI-VOLATILE FRACTIONS:

TCL compounds are identified on the GC/MS by using the analyte's relative retention time (RRT) and by comparison to the ion spectra obtained from known standards. For the results to be a positive hit, the sample peak must be within ± 0.06 RRT units of the standard compound and have an ion spectra which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. For the tentatively identified compounds (TIC) the ion spectra must match accurately. In the cases where there is not an adequate ion spectrum match, the laboratory may have provided false positive identifications.

B) PESTICIDE FRACTION:

The retention times of reported compounds must fall within the calculated retention time windows for the two chromatographic columns and a GC/MS confirmation is required if the concentration exceeds 10 ng/ml in the final sample extract.

DATA ASSESSMENT:

9. MATRIX SPIKE/SPIKE DUPLICATE, MS/MSD:

The MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD may be used in conjunction with other QC criteria for some additional qualification of the data.

DATA ASSESSMENT:

10. OTHER QC DATA OUT OF SPECIFICATION:

11. SYSTEM PERFORMANCE AND OVERALL ASSESSMENT (continued on next page if necessary):

12. CONTRACT PROBLEMS____NON-COMPLIANCE:

13. This package contains re-extraction, re-analysis or dilution. Upon reviewing the QA results, the following form I(s) are identified to be used.

DATA ASSESSMENT:

11. SYSTEM PERFORMANCE AND OVERALL ASSESSMENT (continued):

ATTACHMENT VI

SOP NO. HW-2

Evaluation of Metals Data for the Contract Laboratory Program (CLP)

based on

SOW. 7/87
REV. 12/87

(SOP Revision IX)

PREPARED BY: Hanif Sheikh DATE: 10-25-84
Hanif Sheikh, Quality Assurance Chemist
Toxic and Hazardous Waste Section

CONCURRED BY: Louis Bevilacqua DATE: 10/27/87
Louis Bevilacqua, Section Chief
Toxic and Hazardous Waste Section

APPROVED BY: Gerard F. McKenna DATE: 10/27/84
Gerard F. McKenna, Chief
Monitoring Management Branch

Title: Evaluation of Inorganic Data for the Contract Laboratory Program

Date: Oct. 1989
Number: HW-2
Revision: 9

1.0 Scope

1.1 This procedure is applicable to inorganic data obtained from contractor laboratories working for Hazardous Waste Site Contract Laboratory Program (CLP).

1.2 The data validation is based upon analytical and quality assurance requirements specified in Statement of Work (SOW) 7/87.

2.0 Responsibilities - Data reviewers will complete the following tasks as assigned by the Data Review Coordinator:

2.1. For a total review:

2.1.1 Data Assessment - "Total Review-Inorganics" Checklist Appendix (A.1).
The reviewer must answer every question on the checklist.

2.1.2 Data Assessment - Data Assessment Narrative (Appendix A.2)
The answer on the checklist must match the action in the narrative (appendix A.2) and on Form I's. Do not use pencil to write the narrative.

2.1.3 Contract Non-Compliance - SMO Report (Appendix A.3)
This report is to be completed only when a serious contract violation is encountered, or upon the request of the Data Review Manager or Deputy Project Officer (DPO). Forward 5 copies: one each for internal files, appropriate Regional DPO, Sample Management Office (SMO) and last two addresses of Mailing List for Data Reviewers (Appendix A.4). In other cases, all contract violations should be appended to end of Data Assessment Narrative (Sec. A.2.2).

2.1.4 Data Summary Sheet - Summary of Inorganic Quality Control Data (Appendix A.5).
Enter in ink on Data Summary Sheet required QC values from Forms I through IX. Circle all values that require data qualification "Action".

2.1.5 CLP Data Assessment Summary Forms

2.1.5.1 Appendix A.6
Fill in the total number of analytes analyzed by different analyses and the number of analytes rejected or flagged as estimated due to corresponding quality control criteria. Place an "X" in boxes where analyses were not performed, or criteria do not apply.

2.1.5.2 Appendix A.7
Data reviewer is also required to fill out Inorganic Regional Data Assessment form (Appendix A.7) provided by EPA Headquarters. Codes listed on the form will be used to describe the Data Assessment Summary.

2.1.6 Data Review Log: It is recommended that each data reviewer should maintain a log of reviews completed to include:
a. date of start of case review
b. date of completion of case review
c. site
d. case number
e. contract laboratory
f. number of samples
g. matrix
h. hours worked
i. reviewer's initials

2.1.7 Telephone Record Log - the data reviewer should enter the bare facts of inquiry, before initiating any phone conversation with CLP laboratory. After the case review has been completed, mail white copy of Telephone Record Log to the laboratory and pink copy to SMO. File yellow copy in the Telephone Record Log folder, and attach a xerox copy of the Telephone Record Log to the completed Data Assessment Narrative (Appendix A.2).

2.1.8 Forwarded Paperwork

2.1.8.1 Upon completion of review, the following are to be forwarded to the Regional Sample Control Center (RSCC) located in the Surveillance and Monitoring Branch:
a. data package
b. completed data assessment checklist (Appendix A.1,original)
c. SMO Contract Compliance Screening (CCS)
d. Data Summary Sheet (Appendix A.5) along with completed Data Assessment Narrative (Appendix A.2)
e. Record of Communication (copy)
f. CLP Reanalysis Request/Approval Record (original + 3 copies)
g. Appendix A.7 (original).

2.1.8.2 Forward 4 copies of completed Data Assessment Narrative (Appendix A.2) along with 2 copies of the Inorganic Data Assessment Form (Appendix A.7) and Telephone Record Log , if any,: one each for appropriate Regional DPO, Sample Management Office (SMO), and last two addressees of Mailing List for Data Reviewers (Appendix A.4) (the Inorganic Data Assessment form does not go to the last two addressees).

2.1.9 Filed Paperwork - Upon completion of review, the following are to be filed within MMB files:

a. Four copies of completed Data Assessment Narrative (Appendix A.2) each carrying Appendix A.7.
b. Telephone Record Log (copy)
c. SMO Report (copy Appendix A-3)
d. CLP Data Assessment Summary Form (Appendix A.6).
e. CLP Reanalysis Request/Approval Record (copy)

3.0 Data Completeness
Indicate incomplete data package on the computer tracking sheet located in MMB office. Authorized contractor personnel may contact the laboratory after discovery of an incomplete data package. If a laboratory will not return phone calls or does not respond to requests, notify MMB coordinator of Region II for resolution.

4.0 Rejection of Data - All values determined to be unacceptable on the Inorganic Analysis Data Sheet (Form I) must be lined over with a red pencil. As soon as any review criteria causes data to be rejected, that data can be eliminated from any further review or consideration.

Acceptance Criteria - In order that reviews be consistent among reviewers, acceptance criteria as stated in Appendix A.1 (pages 4-25) should be used. Additional guidance can be found in the National Inorganic Functional Guidelines of July 1, 1988.

6.0 SMO Contract Compliance Screening (CCS) - This is intended to aid reviewer in locating any problems, both corrected and uncorrected. However, the validation should be carried out even if CCS is not present. Resubmittals received from laboratory in response to CCS must be used by the reviewer.

7.0 Request for Reanalysis - Data reviewers must note all items of contract non-compliance within Data Assessment Narrative.If holding times and sample storage times have not been exceeded, DPO may request reanalysis if items of non-compliance are critical to data assessment. Requests are to be made on "CLP Re-Analysis Request/Approval Record".

8.0 Record of Communication - Provided by the Regional Sample Control Center (RSCC) to indicate which data packages have been received and are ready to be reviewed.

9.0 Rounding off numbers - The data reviewer will follow the standard practice.

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[___]	___	___
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[___]	___	___
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present?	[___]	___	___
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[___]	___	___
Legible?	[___]	___	___
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[___]	___	___
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[___]	___	___
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[___]	___	___
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[___]	___	___
(b) Form I's?	[___]	___	___
ACTION: If no for any of the above, contact RSCC for clarification.			

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[___]	___	___
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[___]	___	___
Are soil sample results for each parameter corrected for percent solids?	[___]	___	___
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[___]	___	___
Are computation/transcription errors less than 10% of reported values?	[___]	___	___
Are all "less than IDL" values properly coded with "U"?	[___]	___	___
Was a brief physical description of samples given on Form I's?	[___]	___	___
Were the result qualifiers used correctly with final data?	[___]	___	___
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?	___	[___]	___
If yes, were dilutions noted on Form I's?	[___]	___	___
ACTION: If no, note under Contract-Problem/Non-Compliance of the"Data Assessment Narrative".			

	YES	NO	N/A
A.1.7 Holding Times - (aqueous samples)			
(Examine sample traffic reports and digestion/distillation logs.)			
Mercury (28 days). . . . . exceeded?	___	[___]	___
Cyanide (14 days). . . . . exceeded?	___	[___]	___
Other Metals (6 months). . . . . exceeded?	___	[___]	___
Soil samples			
Metals (including Hg) and Cyanide (6 months)..exceeded?	___	[___]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data			
A.1.8.1 Digestion Log* for flame AA/ICP present?	[___]	___	___
Digestion Log for furnace AA present?	[___]	___	___
Digestion Log for mercury present?	[___]	___	___
Digestion Log for cyanides present?	[___]	___	___
Are pH values (pH<2 for all metals, pH>12 for cyanide) present in Digestion/Distillation Logs?	[___]	___	___
*Weights, dilutions and volumes used to obtain values.			
Percent solids calculation present for soils/sediments?	[___]	___	___
Are preparation dates present on Digestion Log?	[___]	___	___

		YES	NO	N/A
A.1.8.2 Measurement read out record present?	ICP	[___]	___	___
	Flame AA	[___]	___	___
	Furnace AA	[___]	___	___
	Mercury	[___]	___	___
	Cyanides	[___]	___	___
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?		[___]	___	___
Legible?		[___]	___	___
Properly Labeled?		[___]	___	___

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

A.1.9.1 Calibration

A.1.9.1.1	Is record of at least 2 point calibration present for ICP analysis?	[___]	___	___
	Is record of 5 point calibration present for Hg analysis?	[___]	___	___

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

A.1.9.1.2	Is record of 4 point calibration present for: Flame AA?	[___]	___	___
	Furnace AA?	[___]	___	___
	Cyanides?	[___]	___	___

	YES	NO	N/A

NOTE: 1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

ACTION: Flag associated data as estimated if standards are not within +10% of true values (except CRDL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.

A.1.9.1.3 Is correlation *coefficient less than 0.995 for:

Mercury Analysis?	___	[___]	___
Cyanide Analysis?	___	[___]	___
Atomic Absorption Analysis?	___	[___]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.2 Form II A (Initial and Continuing Calibration Verification)-

A.1.9.2.1 Present and complete for every metal and cyanide?	[___]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[___]	___	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.

A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?

Metals 90-110%	[___]	___	___
Hg - 80-120%	[___]	___	___

The reviewer will calculate correlation coefficient.

	YES	NO	N/A
Cyanides 85-115%	[___]	___	___

ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard of 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%).

Was continuing calibration performed every 10 samples or every 2 hours?	[___]	___	___

ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).

A.1.9.3 Form II B (CRDL Standards for AA and ICP) -

A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[___]	___	___
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[___]	___	___
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[___]	___	___

ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are:

AA Analysis - **True Value ± CRDL

ICP Analysis - **True Value ± 2CRDL

CN Analysis - **True Value ± 0.5 x True Value.

* Find the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[___]	___	___
	ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".			
A.1.9.3.3	Circle all values on summary sheet that are outside acceptance windows.			
	Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[___]	___	___
	Is mid-range standard within control limits: Cyanide 80 - 120%R?	[___]	___	___
	ACTION: Flag as estimated all the data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.			
A.1.9.4	Form III (Initial and Continuing Calibration Blanks)			
A.1.9.4.1	Present and complete?	[___]	___	___
	For both AA and ICP when both are used for same analyte?	[___]	___	___
	Was an initial calibration blank analyzed?	[___]	___	___
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[___]	___	___
	ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.			

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[___]	___	___
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[___]	___	___

ACTION: If no for any of the above, flag as estimated (J) on Form I's all data <5xIDL between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.

A.1.9.5 FORM III (Preparation Blank) -

(Note: The preparation blank for mercury is the same as the calibration blank.)

		YES	NO	N/A
A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[___]	___	___
	each batch?	[___]	___	___
	each matrix type?	[___]	___	___
	both AA and ICP when both are used for same analyte?	[___]	___	___

ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep.blank was not analyzed.

NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).

		YES	NO	N/A
A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?	___	[___]	___
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?	___	[___]	___

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than ten times the prep. blank value, but greater than CRDL.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[___]	___	___
	ACTION: If no, reject (red-line) all data that has a concentration less than 10 times the prep. blank value, but not flagged with a "U" (less than).			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?	___	[___]	___
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
9.6.1	Present and complete?	[___]	___	___
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[___]	___	___
	ACTION: If no, flag as estimated (J) all samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than ± 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (± 20%)?	[___]	___	___
	If no, is concentration of Al, Ca, Fe, or Mg lower in sample than in ICS?	[___]	___	___
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	**Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distallation)**- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[___]	___	___
	each matrix type?	[___]	___	___
	each conc. range (i.e. low, med., high)?	[___]	___	___
	For both AA and ICP when both are used for same analyte?	[___]	___	___
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?	___	[___]	___
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[___]	___	___
	If no, is sample concentration greater than or equal to four times spike concentration?	[___]	___	___
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[___]	___	___

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

(a) less than 30%?	___	[___]	___
(b) between 30-74%?	___	[___]	___
(c) between 126-150%?	___	[___]	___
(d) greater than 150%?	___	[___]	___

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

(a) less than 10%?	___	[___]	___
(b) between 10-74%?	___	[___]	___
(c) between 126-200%?	___	[___]	___
(d) greater than 200%?	___	[___]	___

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	**Form VI (Lab Duplicates)**			
A.1.9.8.1	Present and complete for: each 20 samples?	[___]	___	___
	each matrix type?	[___]	___	___
	each concentration range (i.e. low, med., high)?	[___]	___	___
	both AA and ICP when both are used for same analyte?	[___]	___	___
	ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.			
	Note: If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.			
A.1.9.8.2	Was field blank used for duplicate analysis?	___	[___]	___
	ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.			
	NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[___]	___	___
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[___]	___	___
	ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".			
	NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL. 2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			

* Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.8.4	Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[___]	___
	ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5	Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[___]	___
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[___]	___
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6	Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
	Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[___]	___
	Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[___]	___
	ACTION: If yes, flag the associated data as estimated.			

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
A.1.9.9	**Field Duplicates**			
A.1.9.9.1	Were field duplicates analyzed?	[___]	___	___

ACTION: If yes, prepare a Form VI for each field duplicate pair, report concentrations of soils in ug/l on wet weight basis and calculate RPDs.

NOTE: 1. Do not calculate RPD when both values are less than IDL.
2. Flag all associated data only for field duplicate pair.

A.1.9.9.2	Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?	___	[___]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.9.3 Aqueous

Circle all values on Form VI for field duplicates that are:
RPD > 50%, or
Difference > ± CRDL*

Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[___]	___
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[___]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.9.4 Soil/Sediment

Circle all values on Form VI for field duplicates that are:
RPD >100%, or

Difference > 2 x CRDL*

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) : >100%?	___	[___]	___
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL): >2x *CRDL?	___	[___]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

A.1.9.10.1 Was one LCS prepared and analyzed for: every 20 water samples?	[___]	___	___
every 20 solid samples?	[___]	___	___
both AA and ICP when both are used for same analyte?	[___]	___	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

A.1.9.10.2 Aqueous LCS

Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).

Is any LCS recovery: less than 50%?	___	[___]	___
between 50% and 79%?	___	[___]	___
between 121% and 150%?	___	[___]	___
greater than 150%?	___	[___]	___

* Substitute IDL for CRDL when IDL > CRDL.
** absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.			

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

Is LCS "Found" value higher than the control limits on Form VII?	___	[___]	___
ACTION: If yes, qualify all associated positive data as estimated.			
Is LCS "Found" value lower than the Control limits on Form VII?	___	[___]	___
ACTION: If yes, qualify all associated data as estimated.			

A.1.9.11 Form IX (ICP Serial Dilution) -

NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.

A.1.9.11.1 Was Serial Dilution analysis performed for:

each 20 samples?	[___]	___	___
each matrix type?	[___]	___	___
each concentration range (i.e. low, med.)?	[___]	___	___

		YES	NO	N/A
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DPO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?	___	[___]	___
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[___]	___	___
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values:			
	> 10%?	___	[___]	___
	≥ 100%?	___	[___]	___
	ACTION: Flag as estimated (J) all associated sample results equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			

		YES	NO	N/A
A.1.9.12	**Furnace Atomic Absorbtion (AA) QC Analysis**			
A.1.9.12.1	Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[___]	___	___
	ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
A.1.9.12.2	Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[___]	___	___
	Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[___]	___	___
	ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3	Is *post digestion spike recovery less than 10% or greater than 150% for any result?	___	[___]	___
	ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
	NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			
A.1.9.13	**Form VIII (Method of Standard Addition Results)**			
A.1.9.13.1	Present?	[___]	___	___
	If no, is any Form I result coded with "S" or a "+"?	___	[___]	___
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			

* Post digestion spike is not required on the pre-digestion spiked sample when predigestion spike recovery is within control limits of 75-125% or when SR>4xSA.

	YES	NO	N/A
A.1.9.13.2 Is coefficient of correlation for MSA less than 0.990 for any sample?	___	[___]	___
ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	___	[___]	___
Is coefficient of correlation for MSA less than 0.995?	___	[___]	___
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	___	[___]	___
ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4 Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[___]	___	___
ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			

A.1.9.14 Dissolved/Total or Inorganic/Total Analytes -

A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s).	___	[___]	___
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	___	[___]	___

NOTE:
1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration.
2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents.
3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.

*MSA is not required on LCS and prep. blank.

	YES	NO	N/A
A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%?	___	[___]	___
A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%?	___	[___]	___

ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with: Laboratory name?	[___]	___	___
Case/SAS number?	[___]	___	___
EPA sample No.?	[___]	___	___
SDG No.?	[___]	___	___
Contract No.?	[___]	___	___
Correct units?	[___]	___	___
Matrix?	[___]	___	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[___]	___
(b) all analytes analyzed by GFAA?	___	[___]	___
(c) all analytes analyzed by AA Flame?	___	[___]	___
(d) Mercury?	___	[___]	___
(e) Cyanide?	___	[___]	___

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL or 5xIDL when 5xIDL < CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[___]	___	___
Do concentrations of field blank(s) fall below 5xIDL when 5xIDL < CRDL ?	[___]	___	___
If no, was field blank value already rejected due to other QC criteria?	[___]	___	___

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form XI, XII, XIII (Quarterly Verification of Instrumental Parameters).			
A.1.9.17.1 Is quarterly verification report present for:			
Instrument Detection Limits?	[___]	___	___
ICP Interelement Correction Factors?	[___]	___	___
ICP Linear Ranges?	[___]	___	___
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form XI (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[___]	___	___
all the instruments used?	[___]	___	___
For both AA and ICP when both are used for same analyte?	[___]	___	___
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?	___	[___]	___
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[___]	___	___
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XII (Linear Ranges)			
Was any sample result higher than high linear range of ICP by more than 10%?	___	[___]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[___]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I.	[___]	___	___
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[___]	___
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

Case# _____ Site _____ Matrix: Soil _____

SDG _____ Lab _____ Water _____

Contractor _____ Reviewer _____ Other _____

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

A.2.1 (continuation)

A.2.1 (continuation)

Contract-Problems/Non-Compliance

MMB Reviewer: _____ Date: _____
Signature

Contractor Reviewer: _____ Date: _____
Signature

Verified by: _____ Date: _____

CONTRACT NON-COMPLIANCE
(SMO REPORT)

Regional Review of Uncontrolled Hazardous Waste
Site Contract Laboratory Data Package

CASE NO._____

The hardcopied (laboratory name)_____
Inorganic data package received at Region II has been reviewed and the quality assurance and performance data summarized. The data reviewed included:
SMO Sample No.:_____

Conc. & Matrix:_____

Contract No. WA87-K025,K026,K027(SOW787) requires that specific analytical work be done and that associated reports be provided by the contractor to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- Data Completeness
- Matrix Spike Results
- Calibration Standards Results
- Duplicate Analysis Results
- Blank Analysis Results
- MSA Results

Items of non-compliance with the above contract are described below.

Comments:_____

_____

_____

_____

_____

_____

_____

_____

_____

Reviewer's Initial _____ Date _____

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13. Sample Management Office
Viar and Company
P.O. BOX 818
Alexandria, VA 22313

APPENDIX A 5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: _____ CASE NO. _____ SOW NO. _____ SAMPLE TYPE/SDG: _____

SITE/STUDY DESCRIPTION: _____ SAMPLE NOS: _____

_____ Field Blank _____

FIELD DUP. #'S: _____ LAB DUP. #'S: _____ MATRIX SPIKE #: _____

SERIAL DILUTION SAMPLE NO. _____ COMPLETION DATE: _____ REVIEWERS INITIALS: _____

	XI		I	IIA				IIB		III						IV		V		VI	VII	IX	
Parameter	Detection Limits UG/L		Field Blank	Calib. Ver. %R				CRDL Std Ver. % R		Calibration Blanks				PREP	BLANK	ICP ICS % R		Matrix	Spik	Lab Dup RPD/Diff	LCS	Ser Dil	Meth
					Continued						Continued												
	CRDL	IDL		Init	1	2	3	Init	Fin	Init	1	2	3			Init	Fin				% R	% D	
Al	200																						
Sb	60																						
As	10																						
Ba	200																						
Be	5																						
Cd	5																						
Ca	5000																						
Cr	10																						
Co	50																						
Cu	25																						
Fe	100																						
Pb	5																						
Mg	5000																						
Mn	15																						
Hg	0.2																						
Ni	40																						
K	5000																						
Se	5																						
Ag	10																						
Na	5000																						
Tl	10																						
V	50																						
Zn	20																						
CN	10																						

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: _____ Date: _____ Case #: _____

Site: _____ Lab Name: _____

Reviewer's Initials: _____ Number of Samples: _____

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab	Duplicates Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP														
Flame AA														
Furnace AA														
Mercury														
Total														
Other														

Analytes Flagged as Estimated (J) Due to Exceeding Criteria For:*

ICP														
Flame AA														
Furnace AA														
Mercury														
Total														
Other														

Note:
Asterisk (*) Indicates additional exceedances of review criteria.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.7: CLP Data Assessment Checklist
Inorganic Analysis

Date: Oct. 1989
Number: HW-2
Revision: 9

INORGANIC REGIONAL DATA ASSESSMENT

Region_____

CASE NO._____

SITE_____

LABORATORY_____

NO. OF SAMPLES/ MATRIX_____

SDG#_____

REVIEWER (IF NOT ESD)_____

SOW#_____

REVIEWER'S NAME_____

DPO: ACTION_____ FYI_____

COMPLETION DATE_____

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES				
2.	CALIBRATIONS				
3.	BLANKS				
4.	ICS				
5.	LCS				
6.	DUPLICATE ANALYSIS				
7.	MATRIX SPIKE				
	MSA				
	SERIAL DILUTION				
10.	SAMPLE VERIFICATION				
11.	OTHER QC				
12.	OVERALL ASSESSMENT				

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:_____

AREAS OF CONCERN:_____

NOTABLE PERFORMANCE:_____

ATTACHMENT VII

STANDARD OPERATING PROCEDURE

for

Selecting Ground Water Well Construction Material

at CERCLA Sites

SOP No. HW-6

PREPARED BY: William A. Coakley — Date: Dec. 5, 1986
William A. Coakley, Superfund QA Coordinator
Monitoring Management Branch

APPROVED BY: [signature] — Date: Dec 15, 1986
Vincent Pitruzzello, Chief
Program Support Branch, ERRD

APPROVED BY: Gerard F. McKenna — Date: Dec 5, 1986
Gerard F. McKenna, Chief
Monitoring Management Branch, ESD

Title: Selecting Ground Water Well Construction Material

Background

There is presently no definitive Agency policy for selecting appropriate well casing materials at Superfund sites. Wells which are used for long-term (30 years) monitoring may appropriately fall under the draft RCRA guidance. The Region II CERCLA QA manual (Appendix B - Project Officer's Checklist) reiterates the policy that stainless steel will be used for well screens and casing if a rationale is not provided for using an alternate material. This policy has been misinterpreted to mean that stainless steel must be used at all sites.

Although significantly higher in cost than PVC and other materials, stainless steel has several advantages over other well construction materials with regard to effects on sample integrity. However, depending upon intended use of the well and data, the type of aquifer and geologic formation the well penetrates, and the types of contaminants present, stainless steel is not always warranted.

The relevant questions to consider in selecting well materials are:

1. What is the purpose of sampling ground water in the investigation and remediation of a given Superfund site?

   a. Geohydrologic

      - Determine direction of ground water movement, transmissivity, water table, etc. These determinations are of physical parameters which are not affected by well materials.

   b. Determine extent and degree of contamination

      - to assess characteristics and dimensions of pollutant plume (i.e., how far does the contaminant plume extend vertically and horizontally); this measurement may be gross or refined.

      - to evaluate effectiveness of a remedial action (are the original concentrations decreasing) - this may also be gross or refined.

      - to evaluate potential health impacts or compare pollutant data to standards (generally requires refined level of performance).

2. What is the lifetime expectancy of a well?

   a. for phase I ground water investigation, a well is expected to be useful for 1 to 5 years with an upper limit of 10 years. (Most Remedial Investigations are completed within 2 years.)

   b. It has been predicted that long term Operations and Maintenance to assess performance of remedial action could range in many cases, from 20 to 30 years or more.

3. What type of aquifer will the well penetrate?

   a. natural/pollution characteristics of an aquifer may cause deterioration of certain casing materials. Therefore, consideration should be given for the corrosive nature of the medium or the contaminants present.

   b. How much of the casing will contact ground water?

4. What are the known contaminants at the site?

   a. the types and concentrations of known contaminants at the site are of concern.

   b. the clear establishment of data objectives also will facilitate casing material selection, i.e., how precise and accurate must the data be to establish degree of confidence.

References

There are several publications on the topic of potential impact well construction materials may have on the ground water sample. A bibliography is attached (Attachment C). In addition, a summary table comparing construction material features is also attached (Attachment B).

Recommended Procedure for Selecting Well Construction Materials

Regional Project Managers (RPM) are required to evaluate the following considerations for selecting well casing materials:

- geohydrologic setting
- intended use of well
- intended use of data
- presence of known contaminants and concentrations
- other pertinent information

To facilitate the RPM's evaluation, Attachment A (Application of Selection Criteria for Construction Materials of Ground Water Monitoring Wells and Summary Form) will be implemented as standard operating procedure. The "Selection of Well Construction Material Summary Form" will be completed before approval of the site Work Plan by the RPM and transmitted along with the QA Plan to the Environmental Services Division.

References (Attachment C) and the Summary Table on Comparison of Construction Material Features (Attachment B) should be consulted where additional information is required.

Application of Selection Criteria for Construction Materials of Groundwater Monitoring Wells

Introduction

Within the context of these selection criteria, the following assumptions apply:

- Teflon is relatively inert to leaching, reacting, and absorbing/desorbing contaminants. However, it is not recommended for most applications due to its high cost.
- SS herein means Stainless Steel 304 or 316.
- PVC herein means Polyvinyl Chloride casing and screens listed by the National Sanitation Foundation (NSF).
- CS herein means carbon steel, black iron pipe, and galvanized steel.

Selection Procedure

The RPM is to undertake the following considerations in selecting well construction materials by answering each question in sequence.

Considerations	Acceptable Materials*
1. How long is the well expected to produce data?	
a. less than 5 years	see Consideration 2
b. 5 to 30 years or more	SS 316 if conditions unknown; also see Consideration 4 if applicable and conditions are known
2. What is the intended use of the well?	
a. determine flow direction and water table only?	PVC or SS or CS
b. determine extent and degree of contamination as well as flow direction and water table?	see Consideration 3

3. What is the intended use of the data and what detection level is desirable?

Intended Use		Acceptable Materials*
a. investigative[1], phase I sampling		
desired detection level	< 25 ppb	PVC or SS
	< 1 ppm	PVC or SS
	> 1 ppm	PVC or SS or CS
b. health/risk assessment monitoring refined monitoring[2], phase II remedial action effectiveness monitoring		
desired detection level	< 25 ppb	SS
	< 1 ppm	PVC or SS
	> 1 ppm	PVC or SS or CS

4. What are the known conditions at the site/sampling location?

Conditions		Acceptable Materials
- organics concentration	> 1 ppm	SS or CS
- chloride concentration	> 1000 ppm	PVC or SS 316
	< 1000 ppm	PVC or SS 304 or CS
- pH	< 4.5	PVC or SS 316
	> 4.5	PVC or SS 304 or CS
- inorganics concentration	< 25 ppb	PVC
	> 25 ppb	PVC or SS

5. Are there other relevant considerations? (Refer to References and state other considerations which must be addressed at this site/sampling location on the summary form.)

*NOTE: Where more than one material is acceptable, see Consideration 4 for further selection

1. Investigative - a qualitative or gross estimation of contaminants and their concentration level.

2. Refined Monitoring - a quantitative assessment of contaminant concentration with specified detection levels and specified levels of precision and accuracy.

Date: 12/15/86
SOP No. HW-6
Revision No. 0

Title: SUMMARY FORM - Selection of Well Construction Material

Site Name: _____

Geologic Setting: (Name aquifers to be penetrated/screened; give approximate depth/length)

1. _____

2. _____

3. _____

4. _____

n. (describe on separate sheets and attach to form) _____

Intended Use of Data:	Material Selected		
	Screen	Casing	
		Above W.T.*	Below W.T.*
1. Geohydrologic Conditions Only	____	____	____
2. Long term monitoring (5 to 30 + years)	____	____	____
3. Gross monitoring			
a. investigative	____	____	____
b. phase I sampling	____	____	____
c. remedial action effectiveness	____	____	____
d. plume definition	____	____	____
4. Refined monitoring			
a. health/risk	____	____	____
b. standards compliance	____	____	____
c. remedial action effectiveness	____	____	____
d. plume definition	____	____	____
e. phase II sampling	____	____	____

*W.T. = Water Table

Concurrences: RPM: _____ Date: _____

Supervisor: _____ Date: _____

Geohydrologist: _____ Date: _____

ATTACHMENT B

SUMMARY TABLE

FOR

COMPARING FEATURES OF VARIOUS GROUND WATER WELL CONSTRUCTION MATERIALS

SUMMARY TABLE

GROUND WATER MONITORING WELLS CONSTRUCTION MATERIALS FEATURES

Criteria	Teflon	Stainless Steel (304,316)	PVC	Galvanized Steel	Carbon Steel
1. Leaching	None	Chromium or nickel leaching after long exposure to very corrosive (pH <4.5) conditions. Type 316 preferred in pharmaceutical industry where excessive metal contamination must be advoided.	Residual vinyl chloride monomer (RVCM) leaching is < 2 ppb. Residual waxes and fatty acids and esters may be coated on PVC pipe and can be leached if not cleaned. Only NSF (National Sanita-Foundation) listed PVC pipe should be used which is leach-tested (under neutral pH with water) for antimony, arsenic, barium, cadmium, chromium, lead, mercury, phenolic substances, RVCM, selenium, and tin. NSF, PVC will leach when in contact with organics. Solvent cementing is not permitted due to release of high concentrations >100 ppb) of methylethyl ketone (2-butanone) methylbutyl ketone, cyclohexanone, tetrahydrofuran, & dimethyl formamide.	Leaches iron, manganese and zinc under all conditions but especially acidic.	Leaches iron, manganese, copper, zinc, cadmium, cobalt, nickel, and molybdenum under all conditions but especially acidic.

Criteria	Teflon	Stainless Steel (304,316)	PVC	Galvanized Steel	Carbon Steel
2. Chemical/ physical interactions w/ environment.	None	Corroded by hydrochloric and nitric acids (SS-304) and high chloride content (seawater) greater than 1,000 ppm.	Reacts with aqueous organic mixtures of benzene, butyl alcohol, carbon tetrachloride, chlorobenzene, cresol, methylene chloride, naphtha, phenol, toluene, trichloroethylene, xylenes Exposure to ketones (acetone), aldehydes acids, amides, chlorinated alkenes or alkanes cause PVC degradation and/or release of pipe ingredient (organotins, $CaCO_3$, clay, TiO_2, metallic oxides). Slotted PVC exposes large surface area of PVC and thereby increases risk of releasing compounding ingredients. Reaction with organics increases the likelihood of adsorption interaction with medium.	Same as carbon steel after coating of zinc is removed.	Reacts to form oxides of iron and manganese, as well as various metal sulfides. The iron oxides are converted to ferric hydroxide (a colloidal gel) which absorbs organics. The oxides can alter metals and organic concentrations through dissolution coprecipitation, and chemical reactions. Under reducing conditions metallic corrosion products will be introduced into ground water samples. Corrosion particles accumulate in a pile on the bottom of the well and are resistant to purging efforts.

Criteria	Teflon	Stainless Steel (304,316)	PVC	Galvinized Steel	Carbon Steel
• Corrosion resistance	Does not corrode.	316 is resistant to caustic/ basic solutions of hydroxides, carbonates, and bicarbonates. Type 306 resistant to sulfates and sulfuric acid. 304 has low resistance to hydrochloric and nictric acids, metallic chlorides, and sea-water or high chloride concentrations.	Non-corrosive, except in organic or aqueous organic media.	Greater resistance to corrosion than carbon steel. However, corrosion occurs in media of high chloride, carbonate, and nitrate with a pH between 5 and 7. Sulfur compounds, organic compounds and dissolved copper can contribute to rapid deterioration under saturated conditions. Galvanized pipe used in wetlands and bog environments show high leaching of zinc (10 ppm) into media with a deterioration of zinc coating on pipe.	Poor corrosion resistance. High humidity in monitoring wells causes condensation of water droplets which leads to corrosion. Water droplets carry oxidized particles into ground water. Sampling techniques necessarily involves scraping of casing wall causing corrosion particles to be sloughed off into ground water. Corrosion is accelerated in media containing chloride, carbonate, and nitrates.
• Structural durability	High for casing. Screens are structurally unstable.	High tensile strength and durability. Schedules greater than #5 are recommended for depths greater than 150 ft.	Schedule 80 recommended over schedule 40 at depths greater than 150 ft. Can be bent, cracked, or warped in unstable geologic formations.	Good, except for corrosive environments, such as chloride, carbonate nitrate, and as cited in #3.	Low durability due to poor corrosion resistance.

Criteria	Teflon	Stainless Steel (304,316)	PVC	Galvinized Steel	Carbon Steel
5. Best usage condition	Only in rare occa-ssions due to cost.	Good for refined monitoring and long term work.	All except organic media. Good for investigative short term work and piezometric measurements.	Should be used for short-term moni-toring and where a neutral pH con-dition exists.	Good for gross monitoring and pinpointing ground water flow and routes of transport.

ATTACHMENT C

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