

IMPLEMENTATION PROCEDURES  
TO COMPLY WITH  
RCRA INTERIM STATUS STANDARDS  
FOR  
GROUNDWATER IMPACT ASSESSMENT AND MONITORING

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## SUMMARY

Owners and operators of hazardous waste (HW),<sup>1</sup> surface impoundments, landfills, and landfarms are required by RCRA<sup>2</sup> to implement one of three alternate groundwater monitoring programs no later than November 19, 1981 (45 FR 33239). These alternate programs are:

1. Demonstrate a low potential for migration of HW to water supply wells or surface water; or
2. Implement a groundwater monitoring program to determine impact on groundwater quality; or
3. Implement an expanded groundwater monitoring program if it is assumed or known that HW has significantly affected groundwater quality.

Dr. W. J. Ganus' Hydrology Department will inspect each Kerr-McGee site to determine the proper location of monitoring wells, help coordinate well drilling, and supervise well installation. Your groundwater monitoring programs should then be implemented in accordance with Figure 1. A description of each item of Figure 1 and designation of responsibilities is provided in the text which follows.

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<sup>1</sup>Hazardous waste as defined in 40 CFR Part 261.

<sup>2</sup>Resource Conservation and Recovery Act, PL 94-580 dated October 21, 1976.

## IMPLEMENTATION PROCEDURES

### FOR COMPLIANCE WITH

### RCRA GROUNDWATER IMPACT ASSESSMENT AND MONITORING PROGRAMS

Figure 1 is a schematic flow sheet for guidance in establishing and conducting groundwater impact assessment and monitoring programs required by RCRA.

Item 1: Submit Part A RCRA Permit Application.

These applications were submitted to EPA prior to November 19, 1980, for existing operating facilities.

Responsibility: Submitted by Operating Facility.  
Approved by Environmental Affairs.

Item 2: Perform First Site Visit.

A reconnaissance visit by Hydrology and Environmental Affairs people will be made to learn of past and present practices, compile hydrologic and geologic data and make a preliminary judgement whether groundwater degradation has occurred.

Responsibility: Hydrology and Environmental Affairs.

Item 3: Prepare Preliminary Site Evaluation Report.

Existing information will be summarized and recommendations made for obtaining any additional data which may be required.

Responsibility: Hydrology and Environmental Affairs.

Item 4: Perform Site Soil/Water Testing (If Existing Data Insufficient).

Soil borings, permeability tests, groundwater quality tests, etc., may be required to further establish a data base.

Responsibility: Operating Facility. Drilling by outside contractor supervised by Hydrology.  
Concurrence by Environmental Affairs.

Item 5: Prepare Final Site Evaluation Report and Recommendations.

Preliminary report (Item 3) will be revised to include results of Item 4. One of three groundwater programs will be recommended. A waiver demonstration is preferable, but may not always be possible.

Responsibility: Hydrology, Environmental Affairs, and Operating Facility.

Item 6: Select a Course of Action.

A groundwater program will be selected.

Responsibility: Hydrology. Concurrence by Environmental Affairs and Operating Facility.

Item 7: Prepare Waiver Demonstration Report.

All or part of the monitoring requirements may be waived if low potential for migration of HW to water supply wells or surface water can be demonstrated. ~~A written report, certified by a qualified~~ geologist or geotechnical engineer, must be prepared by November 19, 1981 and kept at the facility.

Responsibility: Hydrology. Concurrence by Environmental Affairs and Operating Facility.

Item 8: Design Groundwater Monitoring System.

A minimum of four groundwater monitoring wells are required. At least one must be upgradient (in the direction of increasing static head) and at least three downgradient (in the direction of decreasing static head).

Separate monitoring systems for each surface impoundment, landfill, or landfarm are not required as long as HW migration can be detected.

The well casing must be screened or perforated and packed with gravel or sand to allow sample collection at proper depths. The casing must also be sealed with cement grout or bentonite clay to prevent contamination of sampling zone.

Responsibility: Hydrology. Concurrence by Environmental Affairs and Operating Facility.

Item 9: Install Monitoring Wells.

Wells installed per Item 8. Dr. W. J. Ganus of the Hydrology Department is scheduling installation. A *Comp about* target date of September 1, 1981, has been set for *26 Oct 81* installing all wells.

Responsibility: Operating Facility. Installation by outside contractor supervised by Hydrology. Concurrence by Environmental Affairs.

Item 10: Review Annually.

Groundwater surface elevations must be reviewed annually to insure that the wells are located properly. If not, the number, location, or depth of wells must be modified.

Responsibility: Hydrology and Environmental Affairs.

Item 11: Prepare Groundwater Sampling and Analysis Plan.

A written plan must be prepared by November 19, 1981, and kept at the facility. This plan must include procedures and techniques for:

1. Sample Collection;
2. Sample Preservation and Shipment;
3. Analytical Procedures; and
4. Chain of Custody Control.

The plan must require:

1. Monitoring wells to be sampled and analyzed quarterly for the parameters in Table I for the first year to establish a baseline. After the first year, groundwater quality parameters must be analyzed annually, indicator parameters semi-annually, and analysis of drinking water parameters can be discontinued. See Appendix I for instructions concerning sampling and analysis techniques.
2. Four replicate measurements of each of the indicator parameters to be obtained for up-gradient wells the first year. After the

first year, four replicate measurements of each of the indicator parameters must be obtained for all wells.

3. Groundwater surface elevations to be determined each time a sample is obtained.
4. Sample analysis to be continued during the active life of HW facilities and during the post-closure care period of HW disposal facilities (normally 30 years).

Responsibility: Operating Facility and Environmental Affairs.

TABLE I  
REQUIRED ANALYSES  
GROUNDWATER MONITORING WELLS

Drinking Water Parameters:

Arsenic	Methoxychlor
Barium	Toxaphene
Cadmium	2,4-D
Chromium	2,4,5-TPSilvex
Fluoride	Radium
Lead	Gross Alpha
Mercury	Gross Beta
Nitrate (as N)	Turbidity
Selenium	Coliform Bacteria
Silver	
Endrin	
Lindane	

Groundwater Quality Parameters:

Chloride	Phenols
Iron	Sodium
Manganese	Sulfate

Contamination Indicator Parameters:

pH  
Specific Conductance  
Total Organic Carbon<sup>1</sup>  
Total Organic Halogen<sup>1</sup>

<sup>1</sup>There is no standard accepted procedure for the determination of Total Organic Halogen. Environmental Affairs has requested clarification from EPA and will advise.

Item 12: Prepare Outline of Groundwater Quality Assessment Plan.

An outline of a more comprehensive groundwater program than the one implemented the first year (Refer to Item 8) must be prepared by November 19, 1981, and kept at the facility: The program must be capable of determining:

1. Whether HW or HW constituents have entered the groundwater.
2. Rate and extent of migration of HW or constituents.
3. Concentration of HW or constituents in the groundwater.

Responsibility: Hydrology and Environmental Affairs.

Item 13: Implement Sampling and Analysis Program.

Implement program described in Item 11.

Responsibility: Operating Facility. Approved by Environmental Affairs.

Item 14: Establish Initial Background Values During First Year.

Quarterly analyses performed the first year must be recorded and summarized to establish a baseline.

Responsibility: Hydrology and Environmental Affairs.

Item 15: Report Results to EPA.

Results obtained the first year must be sent to Environmental Affairs and Hydrology immediately after they are available to allow time for review prior to submitting to EPA. Results of the drinking water analyses for each well must be submitted to the EPA Regional Administrator within 15 days after receipt, or to the State if it has obtained RCRA interim authorization. Concentrations or values which exceed the Interim Primary Drinking Water standards must be identified.

Reporting of groundwater quality parameters is not



required. Indicator parameters must be reported in the Annual Report (Refer to Item 17).

Responsibility: Reported by Operating Facility after approval by Environmental Affairs.

Item 16: Continue Sampling and Analysis During Active Life of the Facility.

Continue the program identified in Item 11.

Responsibility: Operating Facility. Approved by Environmental Affairs.

Item 17: Submit Results in Annual Report to EPA.

An Annual Report must be submitted to the EPA Regional Administrator, or to the State, if it has obtained RCRA interim authorization, by March 1 of each year. This report must include:

1. Concentrations or values of indicator parameters for each well.
2. Statistical evaluations of indicator parameters (Refer to Item 18).
3. Results of the evaluation of groundwater surface elevations performed in Item 10 and modifications required to the monitoring system.

Responsibility: Submitted by Operating Facility. Approved by Environmental Affairs.

Item 18: Perform Statistical Analyses on Indicator Parameters.

First year indicator parameter measurements must be pooled for each upgradient well and the initial background arithmetic mean and variance of each parameter calculated. After the first year, the arithmetic mean and variance of each indicator parameter must be calculated semi-annually for each upgradient and downgradient well using the four replicate measurements taken on each sample.

Responsibility: Hydrology and Environmental Affairs.

Item 19: Compare Semi-Annual Indicator Results to Initial Background Values.

Each semi-annual arithmetic mean calculated for a specific parameter must be compared with its background arithmetic mean using the student's t-test (statistical test) at the 0.01 level of significance to establish whether a "statistically significant" change has occurred. The calculation for the student's t-test is as follows:

$$t = \frac{\bar{x} - \bar{y}}{s} \sqrt{\frac{nm}{n+m}}$$

where,  $\bar{x}$  = average of four replicate measurements obtained during semiannual testing.

$\bar{y}$  = average of sixteen (four replicate measurements per quarter) measurements establishing initial background.

s = overall standard deviation for all measurements under examination.

~~m = 4~~

n = 16

therefore,  $t = \frac{\bar{x} - \bar{y}}{s}$  (1.79)

A "t" value exceeding 2.84 represents a "statistically significant" change.

Responsibility: Hydrology and Environmental Affairs.

Item 20: Has Degradation Occurred? (Upgradient Wells)

Student's t-test results must be evaluated for upgradient wells. Groundwater sampling and analysis must continue.

Responsibility: Hydrology and Environmental Affairs.

Item 21: Submit Results in Annual Report to EPA.

Significant increases (or pH decreases) in upgradient wells must be submitted in the Annual Report due March 1 of each year. Groundwater sampling and analysis must continue.

Responsibility: Submitted by Operating Facility.  
Concurrence by Environmental Affairs  
and Hydrology.

Item 22: Has Degradation Occurred? (Downgradient Wells)

Student's t-test results must be evaluated for down-gradient wells: If degradation has not occurred, the original sampling and analysis program must be continued.

Responsibility: Hydrology and Environmental Affairs.

Item 23: Prepare Assessment Plan from Outline (See Item 12).

If comparisons for the downgradient wells show significant increases (or pH decreases), a specific plan for a groundwater quality assessment program must be prepared. It must be certified by a qualified geologist or geotechnical engineer and specify.

1. The number, location, and depths of wells.
2. Sampling and analytical methods for those HW constituents in the facility.
3. Evaluation procedures, including any use of previously gathered information.
4. An implementation schedule.

Responsibility: Hydrology. Concurrence by  
Environmental Affairs.

Item 24: Obtain Additional Samples and Analyze.

Additional samples must be obtained immediately from downgradient wells where significant increases (or pH decreases) were detected. Samples must be split in two and four replicate measurements of each split sample taken for indicator(s) showing significant differences.

Responsibility: Operating Facility. Approved by  
Environmental Affairs.

Item 25: Were Results Due to Lab Error?

Measurements must be compared to background data to determine if results were due to laboratory error. If they were, the original sampling and analysis program must be continued.

Responsibility: Environmental Affairs and Operating Facility.

Item 26: Notify EPA.

The EPA Regional Administrator, or the State if it has obtained RCRA interim authorization, must be notified in writing within seven days if degradation has occurred.

Responsibility: Notification by Operating Facility.  
Approved by Environmental Affairs.

Item 27: Submit Assessment Plan to EPA.

The assessment plan must be submitted within 15 days after the notification of Item 26.

Responsibility: Submitted by Operating Facility.  
Approved by Environmental Affairs.

Item 28: Implement Assessment Plan.

The assessment plan must be implemented as soon as technically feasible and determine:

1. Rate and extent of HW migration in the groundwater.
2. Concentrations of HW constituents in the groundwater.

Responsibility: Operating Facility, Hydrology, and Environmental Affairs.

Item 29: Submit Assessment Report to EPA.

A written report assessing the groundwater quality must be submitted within 15 days after the first determination of Item 28. It must be submitted to the EPA Regional Administrator, or State if it has obtained RCRA interim authorization.

Responsibility: Submitted by Operating Facility.  
Prepared by Hydrology. Approved  
by Environmental Affairs.

Item 30: Has Degradation Occurred?

If the first determination shows that HW has not entered the groundwater, the original sampling and analysis program must be continued. If HW has entered the groundwater, proceed to Item 31.

Responsibility: Hydrology and Environmental Affairs.

Item 31: Determine Closure Status.

Was the assessment made before or after final closure of the facility?

Responsibility: Operating Facility and Environmental Affairs.

Item 32: Make Quarterly Assessments Until Final Closure.

Determinations of Item 28 must be continued quarterly until final closure. Results must be submitted in the Annual Report due March 1 of each year.

Responsibility: Submitted by Operating Facility.  
Prepared by Hydrology.  
Approved by Environmental Affairs.

Item 33: Cease Determination.

Assessments may be discontinued if the assessment plan was implemented during the post-closure care period.

Responsibility: Operating Facility and Environmental Affairs.

Item 34: Design Expanded Groundwater Monitoring System.

An expanded groundwater monitoring program may be implemented if it is assumed or known that groundwater quality has been significantly affected.

Responsibility: Hydrology. Concurrence by Environmental Affairs and Operating Facility.

Item 35: Install Monitoring Wells.

Wells installed per Item 34. Dr. W. J. Ganus of the Hydrology Department is scheduling installation. A target date of September 1, 1981 has been set for installing all wells.

Responsibility: Operating Facility. Installation by outside contractor supervised by Hydrology. Concurrence by Environmental Affairs.

Item 36: Submit Groundwater Quality Assessment Plan to EPA.

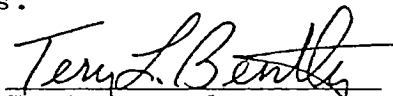
A specific plan for a groundwater quality assessment program must be submitted by November 19, 1981 to the EPA Regional Administrator, or to the State if it has obtained RCRA interim authorization. The plan must specify:

1. The number, location, and depth of wells.
2. Sampling and analytical methods for those HW constituents in the facility.
3. Evaluation procedures, including any use of previously gathered information.
4. An implementation schedule.

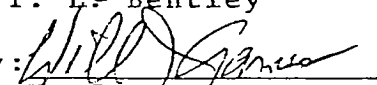
The first groundwater samples must be analyzed prior to November 19, 1981. Implementation must be in accordance with Items 28-33 with the exception of Item 30, which does not apply.

Responsibility: Submitted by Operating Facility. Prepared by Hydrology and Environmental Affairs.


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Concurred By:

  
W. J. Ganus

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APPENDIX I

SAMPLING AND ANALYSES TECHNIQUES

GROUNDWATER MONITORING PROGRAMS

## APPENDIX I

### SAMPLING AND ANALYSES TECHNIQUES GROUNDWATER MONITORING PROGRAMS

The following standard sampling and preservation techniques must be employed when monitor wells are sampled and analyzed.

#### Preparation for Sampling

1. Measure depth to water from the top of the well casing within 1/10 of an inch.
2. Clear standing water from the casing as specified below:
  - (a) Pumping: A pump should be used for sampling whenever possible. Three casing-volumes of water should be pumped from the well before sampling. For wells that have a slow recovery rate, the well should be evacuated and allowed to recover at least once prior to sampling.
  - (b) Bailing: When pumping is not possible (i.e. a 2" casing) the well casing must be bailed to dryness at least once then allowed to recover before sampling. If this is not possible due to a rapid recovery rate, one casing-volume should be bailed from the well before sampling.

#### Sampling Volumes, Containers, and Preservation Requirements

The attached Table I lists EPA recommended sample volumes, preservatives, containers, and holding times. For example, the following samples, preservatives, and containers would be required for RCRA groundwater monitoring.

<u>Container</u>	<u>Preservative</u>	<u>Parameter</u>
Plastic/Glass (polyethylene w/ polypropylene top recommended) 1 gallon	Filter on site using a 0.45 $\mu$ membrane filter and pressure apparatus. Add $\text{HNO}_3$ to pH <2	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Fe, Mn, Na, Ra Gross $\alpha$ , Gross $\beta$ .
Glass only 1 quart	Add $\text{H}_3\text{PO}_4$ to pH <4, 1.0 g $\text{CuSO}_4$ /l. Cool to 4°C.	Phenols



<u>Container</u>	<u>Preservative</u>	<u>Parameter</u>
Glass only 1 quart	Cool to 4°C.	Pesticides--must be extracted 7 days after sampling (Proposed in the 12/18/78 FR)
Plastic/Glass 1 gallon	Cool to 4°C.	F, Cl, SO <sub>4</sub> , NO <sub>3</sub> (N) turbidity, coliform bacteria, specific conductance*
Plastic/Glass 1 quart	Cool to 4°C. H <sub>2</sub> SO <sub>4</sub> or HCl to pH <2.	TOC*, TOK

\*ph must be determined on site.

\*For establishing baseline data, four replicate determinations must be obtained for each sample of the upgradient well for these parameters.

All glass containers should be cleaned thoroughly and rinsed with distilled water before sampling. Preferably new sterile plastic containers should be used when possible. Each container should be rinsed at least once with the sample before filling one sample container.

The RCRA regulations require total organic halogen analysis for which there is no standard procedure. Environmental Affairs is awaiting clarification from EPA on this requirement.

Analyses

All analyses must be conducted by using procedures found in "Standard Methods for the Examination of Water and Wastewater", 14th edition; "Methods for Chemical Analysis of Water and Wastes" (EPA 600/4-79-020, March, 1979); or the Annual Book of ASTM Standards, Part 31, "Water" (1976).

Environmental Affairs has prepared a list of certified laboratories. Except for those facilities that have complete in-house capability and routinely perform NPDES or equivalent analysis, it is imperative a competent State/EPA certified laboratory do the sampling and analyses at each facility.

Chain-of-Custody

Proper chain-of-custody records are essential to avoid any questions regarding sample integrity. A Kerr-McGee standard chain-of-custody form has been prepared which must accompany the sample from the time it is taken to the time it is analyzed. The complete chain-of-custody record must be kept by the K-M

site manager and a copy sent to Environmental Affairs with the analytical results.

References

1. "Methods for Chemical Analysis of Water and Wastes", (EPA 600/4-79-020) March, 1979.
2. "Handbook for Analytical Quality Control in Water and Wastewater Laboratories", (EPA 600/4-79-019) March, 1979.
3. "Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities", (EPA 530/SW-611) August, 1977.

**TABLE 1**

**RECOMMENDATION FOR SAMPLING AND PRESERVATION  
OF SAMPLES ACCORDING TO MEASUREMENT<sup>(1)</sup>**

<u>Measurement</u>	<u>Vol. Req. (ml)</u>	<u>Container<sup>(2)</sup></u>	<u>Preservative</u>	<u>Holding Time<sup>(3)</sup></u>
<b>100 <u>Physical Properties</u></b>				
Color	50	P,G	Cool, 4°C	24 Hrs.
Conductance	100	P,G	Cool, 4°C	24 Hrs. <sup>(9)</sup>
Hardness	100	P,G	Cool, 4°C HNO <sub>3</sub> to pH < 2	6 Mos. <sup>(9)</sup>
Odor	200	G only	Cool, 4°C	24 Hrs.
pH	25	P,G	Det. on site	6 Hrs.
<b>Residue</b>				
Filterable	100	P,G	Cool, 4°C	7 Days
Non- Filterable	100	P,G	Cool, 4°C	7 Days
Total	100	P,G	Cool, 4°C	7 Days
Volatile	100	P,G	Cool, 4°C	7 Days
Settleable Matter	1000	P,G	None Req.	24 Hrs.
Temperature	1000	P,G	Det. on site	No Holding
Turbidity	100	P,G	Cool, 4°C	7 Days
<b>200 <u>Metals</u></b>				
Dissolved	200	P,G	Filter on site HNO <sub>3</sub> to pH < 2	6 Mos. <sup>(9)</sup>
Suspended	200		Filter on site	6 Mos.
Total	100	P,G	HNO <sub>3</sub> to pH < 2	6 Mos. <sup>(9)</sup>

TABLE 1 (CONT)

<u>Measurement</u>	<u>Vol. Req. (ml)</u>	<u>Container<sup>(2)</sup></u>	<u>Preservative</u>	<u>Holding Time<sup>(3)</sup></u>
Mercury Dissolved	100	P,G	Filter on site HNO <sub>3</sub> to pH < 2	38 Days (Glass) 13 Days (Hard Plastic)
Total	100	P,G	HNO <sub>3</sub> to pH < 2	38 Days (Glass) 13 Days (Hard Plastic)
<u>300 Inorganics, Non-Metallics</u>				
Acidity	100	P,G	None Req	24 Hrs.
Alkalinity	100	P,G	Cool, 4°C	24 Hrs.
Bromide	100	P,G	Cool, 4°C	24 Hrs.
Chloride	50	P,G	None Req.	7 Days
Chlorine	200	P,G	Det. on site	No Holding
Cyanides	500	P,G	Cool, 4°C NaOH to pH 12	24 Hrs.
Fluoride	300	P,G	None Req.	7 Days
Iodide	100	P,G	Cool, 4°C	24 Hrs.
<u>Nitrogen</u>				
Ammonia	400	P,G	Cool, 4°C H <sub>2</sub> SO <sub>4</sub> to pH < 2	24 Hrs.
Kjeldahl, Total	500	P,G	Cool, 4°C H <sub>2</sub> SO <sub>4</sub> to pH < 2	24 Hrs. <sup>(6)</sup>
Nitrate plus Nitrite	100	P,G	Cool, 4°C H <sub>2</sub> SO <sub>4</sub> to pH < 2	24 Hrs. <sup>(6)</sup>
Nitrate	100	P,G	Cool, 4°C	24 Hrs.
Nitrite	50	P,G	Cool, 4°C	48 Hrs.

TABLE 1 (CONT)

<u>Measurement</u>	<u>Vol. Req. (ml)</u>	<u>Container<sup>(2)</sup></u>	<u>Preservative</u>	<u>Holding Time<sup>(3)</sup></u>
Dissolved Oxygen Probe	300	G only	Det. on site	No Holding
Winkler	300	G only	Fix on site	4-8 Hours
Phosphorus Ortho-phosphate, Dissolved	50	P,G	Filter on site Cool, 4°C	24 Hrs.
Hydrolyzable	50	P,G	Cool, 4°C H <sub>2</sub> SO <sub>4</sub> to pH < 2	24 Hrs. <sup>(6)</sup>
Total	50	P,G	Cool, 4°C H <sub>2</sub> SO <sub>4</sub> to pH < 2	24 Hrs. <sup>(6)</sup>
Total, Dissolved	50	P,G	Filter on site Cool, 4°C H <sub>2</sub> SO <sub>4</sub> to pH < 2	24 Hrs. <sup>(6)</sup>
Silica	50	P only	Cool, 4°C	7 Days
Sulfate	50	P,G	Cool, 4°C	7 Days
Sulfide	500	P,G	2 ml zinc acetate	24 Hrs.
Sulfite	50	P,G	Det. on site	No Holding
400 <u>Organics</u>				
BOD	1000	P,G	Cool, 4°C	24 Hrs.
COD	50	P,G	H <sub>2</sub> SO <sub>4</sub> to pH < 2	7 Days <sup>(6)</sup>
Oil & Grease	1000	G only	Cool, 4°C H <sub>2</sub> SO <sub>4</sub> or HCl to pH < 2	24 Hrs.
Organic carbon	25	P,G	Cool, 4°C H <sub>2</sub> SO <sub>4</sub> or HCl to pH < 2	24 Hrs.
Phenolics	500	G only	Cool, 4°C H <sub>3</sub> PO <sub>4</sub> to pH < 4 1.0 g CuSO <sub>4</sub> /l	24 Hrs.
MBAS	250	P,G	Cool, 4°C	24 Hrs.

TABLE 1 (CONT)

<u>Measurement</u>	<u>Vol. Req. (ml)</u>	<u>Container<sup>(2)</sup></u>	<u>Preservative</u>	<u>Holding Time<sup>(3)</sup></u>
NTA	50	P,G	Cool, 4°C	24 Hrs.

1. More specific instructions for preservation and sampling are found with each procedure as detailed in this manual. A general discussion on sampling water and industrial wastewater may be found in ASTM, Part 31, p. 72-82 (1976) Method D-3370.
2. Plastic (P) or Glass (G). For metals, polyethylene with a polypropylene cap (no liner) is preferred.
3. It should be pointed out that holding times listed above are recommended for properly preserved samples based on currently available data. It is recognized that for some sample types, extension of these times may be possible while for other types, these times may be too long. Where shipping regulations prevent the use of the proper preservation technique or the holding time is exceeded, such as the case of a 24-hour composite, the final reported data for these samples should indicate the specific variance.
4. ~~If the sample is stabilized by cooling, it should be warmed to 25°C for reading, or temperature correction made and results reported at 25°C.~~
5. Where HNO<sub>3</sub> cannot be used because of shipping restrictions, the sample may be initially preserved by icing and immediately shipped to the laboratory. Upon receipt in the laboratory, the sample must be acidified to a pH < 2 with HNO<sub>3</sub> (normally 3 ml 1:1 HNO<sub>3</sub>/liter is sufficient). At the time of analysis, the sample container should be thoroughly rinsed with 1:1 HNO<sub>3</sub> and the washings added to the sample (volume correction may be required).
6. Data obtained from National Enforcement Investigations Center-Denver, Colorado, support a four-week holding time for this parameter in Sewerage Systems. (SIC 4952).