BASIS AND BACKGROUND
FOR CRITERIA DERIVATION AND
PRACTICAL QUANTITATION LEVELS

GROUND WATER QUALITY STANDARDS
RULE RECODIFICATION AND READOPTION
WITH AMENDMENTS
N.J.A.C 7:9C

State of New Jersey
Department of Environmental Protection
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I. INTRODUCTION

The current New Jersey Ground Water Quality Standards (GWQS) (N.J.A.C. 7:9-6.1 et seq.) were adopted in January of 1993. The Standards were readopted without change in January of 1996 with the expiration date of January 18, 2001. The expiration date of this chapter has been extended and is now set to expire on February 5, 2006. The Department is readopting the GWQS and recodifying the GWQS at N.J.A.C 7:9C with amendments. This Basis and Background document is limited to discussions on the updates to the ground water quality criteria (GWQC) for Class IIA ground waters, and updates to the practical quantitation levels (PQLs) established in the proposed rule amendments.

Class II-A ground waters have been designated for potable water use. The GWQC criteria for Class II-A waters are developed to protect public health without consideration of analytical feasibility, treatability, and cost. The health-based criteria reflect the most recent toxicological information to ensure adequate protection. The Department is proposing to update and revise the existing specific criteria in Table 1 of the Appendix of N.J.A.C. 7:9-6.

In this Basis and Background document, the Department will describe how the specific criteria for Class II-A waters are derived and will note the changes to the information used to develop new criteria or revise existing criteria. In addition, the Department will describe how analytical constraints are incorporated into the GWQS as PQLs. The Basis and Background document includes Table A that lists all existing specific criteria based on human health concerns and identifies additions, revisions and deletions of individual criteria. Table B "Additional Specific Ground Water Quality Criteria" of this document includes criteria based upon Secondary Drinking Water Standards with organoleptic and welfare concerns such as objectionable taste. For the constituents listed in Table B, no change is proposed at this time because either the health information to develop a criterion in accordance with N.J.A.C. 7:9-6.7(c) (proposed N.J.A.C. 7:9C-1.7(c)) is lacking or the new criteria developed based on health concerns is less stringent than the existing criteria.

For those criteria that rely upon different assumptions for criteria derivation than those outlined in the rule, additional detail on individual constituents is provided in Section IV below.

II. DERIVATION OF THE GROUND WATER QUALITY CRITERIA

The Basis and Background document for the GWQS dated November 14, 1991 contains comprehensive discussions on different components of the health-based criteria development process. This document includes discussions on the exposure assumptions, carcinogenicity categorization and choice of risk level, toxicity factors, and equations for derivation of criteria for carcinogens and non-carcinogens (NJDEPE,

1991). Except as noted below, the Department continues to apply this general approach.

To derive a health-based criterion, the Department must determine whether the constituent is classified as a carcinogen or a non-carcinogen. The USEPA has developed a categorization system for constituents based upon overall weight of evidence for human carcinogenicity. Group A constituents are “human carcinogens”, Group B constituents are ”probable human carcinogens”, Group C constituents are “possible human carcinogens”, Group D constituents include those which are “not classifiable as to human carcinogenicity” and Group E includes constituents with “evidence of non-carcinogenicity for humans”.

The USEPA in an effort to update the carcinogenic risk assessment guidelines has proposed to replace the alphanumeric system of categorizing carcinogenic effects, i.e., Groups A, B, C, D and E, with descriptors (USEPA, 1999). Since the revisions are not yet finalized, the Department has continued to use the alphanumeric carcinogenicity categorization system for criteria development in this proposal. However, mention needs to be made regarding the USEPA’s ongoing undertaking since data recently retrieved from IRIS already incorporate a narrative description for a few constituents; such as “data are inadequate for an assessment of human carcinogenic potential” being assigned to acrolein on June 3, 2003 (USEPA, 2003). This descriptor is equivalent to the Group D designation.

In order to account for changes in the terminology that the USEPA is using to describe carcinogens and non-carcinogens, the Department has added definitions for these terms to the rule at N.J.A.C. 7:9C-1.4 as follows:

> "Carcinogen" means a constituent capable of inducing a cancer response, including Group A (Human Carcinogen), Group B (Probable Human Carcinogen) or Group C (Possible Human Carcinogen) categorized in accordance with the USEPA Guidelines for Carcinogen Risk Assessment, 51 Fed. Reg. 33992, 1986 as amended or supplemented and incorporated by reference.
>
> "Non-carcinogen" means a constituent not categorized as a carcinogen, including Group D (Not Classifiable as to Human Carcinogenicity) or Group E (Evidence of Non-Carcinogenicity for Humans) categorized in accordance with the USEPA Guidelines for Carcinogen Risk Assessment, 51 Fed. Reg. 33992, 1986 as amended or supplemented and incorporated by reference.

For each constituent the Department uses the equations, data sources and conventions as proposed at N.J.A.C. 7:9C-1.7(c)3 and 4 to develop criteria. (See Appendix A). Based on the available information, the criteria are derived by classifying the constituent as to human carcinogenicity and utilizing the appropriate toxicity factor (oral slope factor for carcinogens or oral reference dose (RfD) for non-carcinogens) and exposure assumptions for drinking water. The methodology is identical to that used for deriving the New Jersey health-based levels for drinking water (NJDWQI, 1987). The

terms “carcinogenic potency slope”, “potency factor” and “carcinogenic potency factor” in the existing rule are replaced uniformly with “slope factor” or “carcinogenic slope factor” in the proposal in conformance with the standard IRIS terminology. The Department is deleting the portion of the formula used to derive slope factors in the existing N.J.A.C 7:9-6.7(c)5i because this equation is out of date and no longer used by the Department.

For sources of toxicity information for developing health-based criteria, the Department utilized the United States Environmental Protection Agency (USEPA) Integrated Risk Information System (IRIS) database as the primary source. The USEPA has developed this database of human health effects to provide consistent information on toxic substances for use in risk assessments, decision making and regulatory activities. For the current proposal, IRIS data through July 31, 2003 were reviewed (USEPA, 2003). The Department recognizes that IRIS does not include toxicity factors for all constituents. For some constituents, the Department utilized toxicity information from others sources, such as USEPA’s Health Effects Assessment Summary Tables (HEAST) or recommendations from the New Jersey Drinking Water Quality Institute (See Section III-A below).

The Department proposes characterizing all of the values to be utilized in the equations proposed at N.J.A.C. 7:9C-1.7(c)4 as “default” values. (See Appendix A). However, there may be some constituents for which the Department may choose to use the weight of a child instead of the weight of an average adult when the risk posed by the constituent is greater for children than for adults. Where the Department has used values other than default values, the information used to develop individual criterion is provided in this Basis and Background document. When the Department develops criteria in the future, the Department will explain any variation from the equations and the basis for it in the supplemental information it will make available on the website for an interim specific criterion or in the rule proposal summary for a specific criterion.

The main change from the existing methodology lies in the implementation of the Department’s new approach for risk assessment for Group C carcinogens. (See Appendix B for details). In essence, unlike the existing Group C approach which specifies that non-carcinogenic-based criteria be developed preferentially and carcinogenic-based criteria, if developed, be at the 10^{-5} excess cancer risk level, the new Group C approach specifies that the health-based criteria for Group C carcinogens be developed with the use of a carcinogenic slope factor at a 10^{-6} excess cancer risk level, if such a slope factor is judged by the Department as technically sound and based on adequate toxicological data. If such a slope factor is not available, the risk assessment will then be based on non-carcinogenic effects with an additional uncertainty factor of ten as carried out previously. This approach is reflected in the proposed rule at N.J.A.C. 7:9C-1.7(c)4 which specifies the appropriate equations used to derive ground water quality criteria. (See Appendix A). This new approach is applied at this time to all Group C carcinogens except those addressed by the New Jersey Drinking Water Quality Institute (NJDWQI). (See Section III-A below). For this group of constituents, new criteria will be established after SDWA rules are updated.

Finally, to ensure consistency throughout the various programs, the Department has used the RfDs listed in IRIS directly for criteria derivation. In the past, RfDs used for criteria derivation were developed by the Department to two significant figures on the basis of IRIS data (See Section III-E below for detail). In addition, as in the existing rule, criteria derived from the final calculations are rounded to one significant figure. Rounding follows the general scientific practice of dropping digits that are not significant. If the digit 6, 7, 8, or 9 is dropped, the preceding digit is increased by one; if the digit 0, 1, 2, 3, or 4 is dropped, the preceding digit remains the same. If the digit 5 is dropped, then the preceding digit is rounded to the nearest even number (APHA, 1998; USEPA, 2000). For example, 2.5 would become 2, and 3.5 would become 4.

III. BASIS FOR PROPOSED CHANGES TO THE CRITERIA

A. REVISIONS BASED ON NEW JERSEY DRINKING WATER QUALITY INSTITUTE RECOMMENDATIONS

The proposed rule at N.J.A.C. 7:9C-1.7(c)3 specifies that the Department shall incorporate the health-based level used to establish the maximum contaminant level promulgated pursuant to the Safe Drinking Water Act (SDWA), N.J.S.A. 58:12A-13 as specific ground water quality criterion. Pursuant to N.J.S.A. 58:12-1 et. seq., the New Jersey Drinking Water Quality Institute (NJDWQI) was created to make recommendations on the development of maximum contaminant levels (MCLs) used by the Safe Drinking Water Program.

The existing criteria for chlorobenzene, 1,1-dichloroethane, cis-1,2-dichloroethylene, methylene chloride, 1,1,2,2-tetrachloroethane, 2,4,6-trichlorophenol and xylenes were revised based on the health-based levels recommended by the NJDWQI. The Department is proposing to add specific criteria for methyl tertiary-butyl ether (MTBE) and naphthalene based upon the health-based levels recommended by the NJDWQI. MCLs for these constituents were adopted in the 1996 revisions to the Safe Drinking Water Act Rule (NJDEP, 1996). The derivation of the health-based levels and related information are described in detail in the support documents prepared by the New Jersey Drinking Water Quality Institute (NJDWQI, 1987, 1994). All of the above constituents except 2,4,6-trichlorophenol have been listed as interim specific criteria on the Department's website. These constituents are noted in Table A under the heading of “Primary Basis for Proposed Revision” as “NJDWQI”. Toxicity factors and other information related to the derivation of ground water quality criteria (GWQC), if appropriate, are indicated in Table A.

B. REVISIONS BASED ON NATIONAL PRIMARY DRINKING WATER REGULATIONS

The Department has incorporated by reference the National Primary Drinking Water Regulations into the Safe Drinking Water Act Rules (N.J.A.C. 7:10) which establishes MCLs in accordance with the Safe Drinking Water Act (N.J.S.A. 58:12A-1 et. seq.). The MCLs for antimony, beryllium and copper were revised in the National Primary Drinking Water Regulations. The Department is revising the GWQC for antimony, beryllium and copper based on changes to the National Primary Drinking Water Regulations (USEPA, 1991) (USEPA, 1992). These constituents are noted in Table A under the heading of “Primary Basis for Proposed Revision” as "NPDWR".

C. REVISIONS BASED ON UPDATED TOXICITY INFORMATION

For existing GWQC not based on New Jersey Safe Drinking Water Regulations, the Department reviewed information retrieved from the USEPA IRIS data base through July 31, 2003 (USEPA, 2003). For constituents which have not been addressed in IRIS, the Department has reviewed the latest available update of HEAST (USEPA, 1997). The Department is proposing to update the GWQC for numerous constituents based upon updates to the toxicity factors and carcinogenic classifications currently listed in IRIS or HEAST. The new and/or revised criteria have been developed using the equations proposed at N.J.A.C. 7:9C-1.7(c)4 (See Appendix A) along with the new toxicity information. These criteria are based on the best available scientific information. The Department has listed “IRIS” or “HEAST” as the basis for the revision in Table A. Where appropriate, the Department has provided additional information on individual constituent criterion development in Section IV below.

D. REVISIONS TO GROUP C CONSTITUENTS

The Department has updated the existing GWQC for Group C constituents using the new approach for risk assessment. (See Appendix B). The criteria for nine constituents are affected as the result of the "New Group C approach" and are noted as such in the last column of Table A “Primary Basis for Proposed Revision”. Criteria for beta-BHC, gamma-BHC, dibromochloromethane, hexachlorobutadiene, hexachloroethane, isophorone, simazine, and 1,1,1,2-tetrachloroethane have been revised and a criterion for adipates has been added in accordance with the new policy. Atrazine, though designated as Group C in HEAST (USEPA, 1997), is not considered for revision at this time, as it is currently under EPA review.

In addition to those listed above, Group C constituents include 1,1-dichloroethylene, formaldehyde, MTBE, naphthalene, 1,1,2,2-tetrachloroethane, and 1,1,2-trichloroethane. These constituents are regulated under N.J.S.A. 58:12A-13 and will be reviewed later by the New Jersey Drinking Water Quality Institute (NJDWQI) in accordance with the new Group C risk assessment approach.

The following Group C constituents, beryllium, tertiary-butyl alcohol, butylbenzyl phthalate, diisodecyl phthalate, parathion, and tetrahydrofuran have no applicable slope factor available for criteria derivation. These criteria have been developed using the non-carcinogen equation with a reference dose and an additional uncertainty factor.

E. REVISIONS AS A RESULT OF USING RfDs DIRECTLY FROM IRIS AND OTHER ROUNDING ISSUES

The USEPA developed oral reference doses (RfDs) from toxicity data available in IRIS by dividing the experimental dose, such as the no-observed-adverse-effect-level, by the uncertainty factors and modifying factor. The resulting value was then rounded to yield an RfD of one significant figure for the vast majority of constituents.

Historically, the Department preferred using an RfD with two significant figures to develop a criterion for the existing GWQS and then the final calculated criterion was rounded to one significant figure. If the RfD was not already listed in IRIS with two significant figures, the Department recalculated the IRIS RfD to two significant figures from toxicity data and uncertainty factors given in IRIS. The recalculated RfD, termed NJRfD in Table C below, was used to calculate the health-based criterion, which was then rounded to one significant figure. The Department believed it was more appropriate to round at the end stage of the calculation.

However, for criteria development for this proposal, RfDs from IRIS were used directly to be consistent with other Department programs. A number of existing health-based criteria as well as several Interim Specific Criteria currently posted on the website are being revised solely as the result of using the RfDs directly from IRIS and are indicated as such in the basis of the criteria revision in Table A as “RfD rounding”. For clarification, the effect of RfD rounding on criteria development is listed in Table C.

Table A also shows other rounding changes as a result of rounding the final criterion to one significant figure. As discussed in Section II, this rounding follows the general scientific practice of dropping digits that are not significant. Although all criteria derivations are subjected to rounding if necessary, the proposed criteria revised solely because of rounding the final criteria to one significant figure are indicated as “Rounding” in Table A under the “Primary Basis for Proposed Revision”.

F. INTERIM CRITERIA

The Department has established interim criteria under the current rules at N.J.A.C. 7:9-6.7. The Department is proposing to incorporate 53 interim specific criteria (ISCs) as specific ground water quality criteria. These constituents are indicated in Table A with “ISC” as the “Primary Basis for Proposed Revision”. Documents in support of the criteria development are available from the Department upon request.

In accordance with the proposed N.J.A.C. 7:9C-1.7(c)6, where information is insufficient to derive a health-based criterion for a Synthetic Organic Chemical, the Department may regulate the constituent as an interim generic criterion. The Department reviewed the health-based criteria for hydrogen sulfide, methyl chloride, and 4-methyl-2-pentanone (MIBK) based on a review of IRIS. Based on this review, the Department is not including these specific criteria in proposed Appendix Table 1 because these criteria cannot be supported due to a lack of suitable health-based information. These constituents will be regulated as interim generic criteria. The Department will maintain a list of interim constituents on the web at http://www.state.nj.us/dep/wmm/sgwqt/is_text.html that have been reviewed but lack sufficient health-based information to be established as specific criteria.

In addition, a number of constituents listed in Table 1 of the existing rule had their criterion listed as "NA" (not available). The Department has reviewed available scientific information and has determined that there is not sufficient information available to develop a specific health-based criterion. These constituents will not be included in Appendix Table 1 of the proposed rule and will be regulated as interim generic criteria: acenaphthylene, benzo(ghi)perylene, 4-chloro-3-methylphenol (3-methyl-4-chlorophenol), dimethyl phthalate, 4,6-dinitro-o-cresol, and phenanthrene. These criteria are not listed in Table A below.

The Department is proposing to delete the following constituents also listed as "NA" in Table 1 of the existing rule: cis-1,3-dichloropropene, trans-1,3-dichloropropene, 2,6-dinitrotoluene, m- & p-xylenes, and o-xylene. These constituents are isomers of constituents listed in Table 1 and are therefore already being regulated. These criteria are not listed in Table A below.

IV. DESCRIPTION OF CRITERIA CHANGES

The Department has derived specific criteria as described above. The bases for these revisions are listed in Table A. Where warranted, the Department has provided additional information below for clarification or to explain the variations from the standard methodology, default assumptions and approaches used to develop individual specific ground water quality criteria (GWQC).

a. Acrolein: The USEPA recently updated the health assessment information for acrolein in IRIS on June 3, 2003 (USEPA, 2003). Carcinogenicity Assessment for acrolein was revised from Group C (a possible human carcinogen) to “data are inadequate for an assessment of human carcinogenic potential” which is equivalent to Group D. The RfD has been revised to 0.0005 mg/kg-day. Based on the new data, the criterion is revised to 4 μg/L (rounded from 3.5 μg/L).

b. Ammonia: The existing GWQC listed in N.J.A.C. 7:9-6.7 Table 1 is 500 μg/L. In 1998, the Department revised this criteria with an interim specific criteria of 50 μg/L based on health considerations available in the literature (NJDEP, 1998). The Department has reviewed available information in IRIS and determined that there is

no oral RfD available. Based upon the available information, the Department determined that the health-based criterion for ammonia should be set at 3,000 μg/L based on the adverse effect observed on the gastric mucosa. The effect appears to be related to the concentration of ammonia at the point of contact rather than the dose (NJDEP, 2003).

c. Antimony: The USEPA has recalculated the relative source contribution (RSC), which is the percentage of the total daily exposure expected to be contributed by drinking water, to be 40% in the Final Rule of the National Primary Drinking Water Regulations rather than the 20% used in deriving the existing criterion (USEPA, 1992). Based on the revised RSC, and as the result of rounding, the GWQC for antimony is revised from 2 μg/L to 6 μg/L. (See Section III-B above).

d. Beryllium: The existing criterion for beryllium is 0.008 μg/L based on the USEPA categorization of beryllium as a Group B2 carcinogen (USEPA, 1990). USEPA reclassified beryllium via the oral route equivalent to a Group C carcinogen in the Final Rule of the National Primary Drinking Water Regulations (USEPA, 1992). The Department is revising the health-based criterion to 1 μg/L for beryllium based on an oral reference dose (RfD) of 0.002 mg/kg-day from IRIS dated April, 3,1998 (USEPA, 2003) and the non-carcinogen equation since there is no oral slope factor available for beryllium in either IRIS or HEAST. (See Section III-B above).

e. Camphor: The Department has developed an oral RfD of 0.18 mg/kg-day based on a dermal dose developed from a National Toxicology Program dermal rat camphor study which showed adverse renal effect. Support documentation for the camphor criterion at 1000 μg/L is available from the Department upon request.

f. Chloroform: The USEPA has reviewed health assessment information for chloroform and published an update in IRIS on October 19, 2001 (USEPA, 2003). Chloroform is classified as a B2 carcinogen, but with no given oral slope factor. The mode of action indicates that cytotoxicity is the critical effect and chloroform-induced carcinogenicity is secondary to cytotoxicity. Thus, the USEPA has determined that the reference dose can be considered protective against cancer risk. Based on an RfD in IRIS of 0.01 mg/kg-day, the Department has derived a criterion for chloroform as a noncarcinogen. The existing health-based criterion of chloroform is revised from 6 μg/L to 70 μg/L.

g. Copper: The existing GWQC for copper is 1000 μg/L which was the Federal Secondary Drinking Water Standard included in the National Secondary Drinking Water Regulations established in 1979. However, since 1991 the USEPA has included copper in the National Primary Drinking Water Regulations for enforcement control. The promulgated health-based level, which is termed as Maximum Contaminant Level Goal (MCLG) by the USEPA, is at 1300 μg/L. This health-based level is based on gastrointestinal effects from human clinical studies (USEPA, 1991). The Department is revising the copper criterion to 1300 μg/L to be consistent with the drinking water regulations.

h. Cyanide: Cyanide will be regulated as free cyanide since the IRIS RfD dated February 1, 1993 which was used to derive the criterion was based on free cyanide (USEPA, 2003). The cyanide criterion is being revised to 100 μg/L based on the Department's policy of using the RfD directly from IRIS and rounding to one significant figure (as discussed in Section III-E above).

i. Ethylene glycol: The NJDWQI developed a health-based level for ethylene glycol at 300 μg/L but did not recommend an MCL because treatment technology data were not available (NJDWQI, 1994). The health-based level of this constituent has been listed as interim specific criteria on the Department's website.

j. Formaldehyde: The NJDWQI developed a health-based level for formaldehyde at 100 μg/L but did not recommend an MCL because treatment technology data were not available (NJDWQI, 1994). The health-based level of this constituent has been listed as interim specific criteria on the Department's website

k. n-Hexane: The NJDWQI developed a health-based level for n-hexane at 30 μg/L but did not recommend an MCL because treatment technology data were not available (NJDWQI, 1994). The health-based level of this constituent has been listed as interim specific criteria on the Department's website

l. Hydrogen sulfide: On July 28, 2003 the USEPA issued an IRIS reevaluation on the health assessment information on hydrogen sulfide (USEPA, 2003). IRIS has determined that the study used to derive the oral RfD for hydrogen sulfide is marginal in its characterization of exposure and effect on the test animals. Therefore, the RfD has been withdrawn from the IRIS database, and no new RfD is available for use in criterion derivation. The existing criterion of 20 μg/L is deleted from the GWQS. Hydrogen sulfide is being removed from the list of constituents, as there are no data available to derive a health-based criterion. Hydrogen sulfide will be regulated as an interim generic criterion until a health-based criterion can be established in accordance with N.J.A.C. 7:9-6.7(c) (proposed N.J.A.C. 7:9C-1.7(c)).

m. Lead: The Department is proposing to repeal the provision regarding the basis for the lead criterion at existing N.J.A.C. 7:9-6.7(c)4iv. The specific GWQC for lead of 5 ug/L is listed in Appendix Table 1 of the proposed rule. A comprehensive review of the recent literature on health effects of lead indicates that the correlation coefficient which correlates blood lead level with the lead level in drinking water remains current and does not reveal any information suggesting that the lead criterion should be revised (ATSDR, 1999).

n. Manganese: The Department reviewed health-based information available for all existing criteria based on secondary drinking water standards with organoleptic and welfare concerns. For manganese a health-based criterion at 1,000 μg/L can be derived from current toxicity data available on IRIS since May 1, 1996 (USEPA, 2003). However, this health-based criterion is much less stringent than the existing criterion at 50 μg/L based on secondary drinking water standard. Therefore, the

existing criterion of manganese remains unchanged at 50 μg/L and is listed in Table B.

o. Mercury: The current GWQC and the drinking water Maximum Contaminant Level (MCL) and Maximum Contaminant Level Goal (MCLG) for mercury are based on effects of inorganic mercury, since this is the form of mercury primarily found in drinking water (including ground water) (USEPA, 1989). The criterion, MCL and MCLG for mercury are all 2 μg/L. These standards are derived from a Reference Dose (RfD) of 0.0003 mg/kg/day, based on renal effects in rats (USEPA, 1995).

A carcinogenicity categorization for inorganic mercury (mercuric chloride) of Group C, possible human carcinogen, was accepted by the USEPA CRAVE Workgroup and incorporated into IRIS in May 1995 (USEPA, 1995). USEPA has not revised any of its water-related criteria or guidance for inorganic mercury to reflect this change in classification from Group D (not classifiable as to human carcinogenicity) to Group C, and does not anticipate doing so (USEPA, 2004).

The Department has reviewed the USEPA documentation for the Group C categorization both in IRIS (USEPA, 1995) and in the Mercury Study Report to Congress (USEPA, 1996b), as well as the National Toxicology Program study (NTP, 1993) which forms the basis for this classification. The positive tumor findings involve increases in papillomas of the forestomach in rats, increased incidence of follicular cell thyroid carcinomas in male rats, and increased incidence of renal tubular cell adenoma and adenocarcinoma in male mice. The Department decided to treat Mercury as a Group D constituent.

In the rat study, mortality was significantly increased in treated rats (both low and high dose), indicating the Maximum Tolerated Dose (MTD) was exceeded; this limits the interpretation of the study (USEPA, 1995). The forestomach papillomas were considered to be of limited relevance to humans because they appeared at point of contact to the test substance and did not progress to malignancy. IRIS (USEPA, 1995) states, "...this type of tumor is probably the result of irritation of the forestomach, cell death, and epithelial proliferation. Thus, the carcinogenic mechanism may be specific to effects of administration of high concentrations of the agent directly to the forestomach." The relevance of the thyroid tumors was questioned because they are usually seen in conjunction with increased thyroid hyperplasia and adenomas, and these did not occur.

The USEPA Guidelines for Carcinogen Risk Assessment (USEPA, 1986) were reviewed with respect to the mercury data. For cases in which the MTD is exceeded, the Guidelines state:

Positive studies at levels above the MTD should be carefully reviewed to ensure that the responses are not due to factors that do not operate at exposure levels below the MTD. Evidence indicating that high exposures alter tumor responses by

mechanisms that may be unrelated to effects at lower exposures should be dealt with on an individual basis.

The above paragraph allows room for scientific judgment, and does not require an automatic classification of Group C for positive responses at doses above the MTD.

In regard to the National Toxicology Program (NTP) mouse study, the severity of nephropathy was increased in a dose-related manner in male mice (NTP, 1993). Nephropathy is graded on a scale of "minimal", "mild", "moderate", and "marked". While 80% of control animals had nephropathy, it was primarily "minimal" (28/40). In the low dose group, the nephropathy was primarily "mild" (32/45), and in the high dose group it was primarily "moderate" (28/44). Cases of nephropathy graded "marked" were found only in the high dose group (5/44). These findings on nephropathy suggest that the renal tumors seen only in the high dose males may be secondary to toxicity to the kidney.

Additionally, the Reference Dose for inorganic mercury is based on very sensitive endpoints for kidney toxicity which are detected only by special studies. The Lowest Observed Effect Levels observed in subchronic studies used as the basis for the Reference Dose (0.226 mg/kg/day - 0.633 mg/kg/day) were approximately an order of magnitude lower than the lowest dose administered in the NTP chronic study (2.5 mg/kg/day and 5 mg/kg/day for rats and mice, respectively).

The Department concludes from the above discussion that a change in classification from Group D to Group C does not appear to be warranted, and, therefore, does not recommend a change in classification at this time. Thus, the Department is retaining the mercury criterion at 2 μg/L consistent with the NJ Safe Drinking Water Program.

p. Methyl chloride (Chloromethane): In an IRIS update of July 17, 2001 methyl chloride is classified as Group D (not classifiable as to human carcinogenicity) by inhalation (USEPA, 2003). The existing criterion was based on extrapolation of an inhalation cancer slope factor from HEAST. Therefore, the existing criterion of 30 μg/L is no longer appropriate and is being deleted from the GWQS. There is no reference dose available for this constituent. Because there is no data available to derive a health-based criterion, methyl chloride will be regulated as an interim generic criterion until a health-based criterion can be established in accordance with N.J.A.C. 7:9-6.7(c) (proposed N.J.A.C. 7:9C-1.7(c)).

q. 4-Methyl-2-pentanone (MIBK): On April 25, 2003, IRIS issued an update on MIBK that because no critical effect was identified after subchronic exposure and no chronic oral studies were available, an oral RfD can not be developed (USEPA, 2003). The existing criterion of 400 μg/L is being deleted. MIBK will be regulated as an interim generic criterion until a health-based criterion can be established in accordance with N.J.A.C. 7:9-6.7(c) (proposed N.J.A.C. 7:9C-1.7(c)).

r. Mirex: The criterion is revised from 0.01 μg/L to 0.1 μg/L, based on an RfD of 0.0002 mg/kg-day issued by IRIS on October 1, 1992 (USEPA, 2003). Mirex is classified as a Group B2 carcinogen in HEAST but a slope factor is not available. The Department has derived the health-based criterion using the equation at proposed N.J.A.C. 7:9C-1.7(c)4ii (noncarcinogen) with an uncertainty factor of 10.

s. PCBs: The existing criterion for PCBs is based on the toxicity factor developed by the NJDWQI. With the publication of the new USEPA risk assessment on PCBs (USEPA, 1996a), NJDWQI deferred to an NJDEP Workgroup on PCBs to review the new USEPA risk assessment. The Workgroup subsequently recommended criterion for PCBs be based on the new USEPA slope factor of 2.0 $(mg/kg\text{-}day)^{-1}$ as recorded in IRIS on June 1, 1997 (USEPA, 2003) instead of the NJDWQI slope factor of 1.4 $(mg/kg\text{-}day)^{-1}$. This resulted in a newly calculated criterion value of 0.0175 μg/L, however, after rounding to one significant figure, the existing health-based criterion remains unchanged at 0.02 μg/L.

t. Silver: The Department is adding a health-based criterion for silver of 40 μg/L. Silver is classified as a Group D constituent. The criterion for silver has been developed based on an oral RfD for silver available in IRIS since December 1, 1996 (USEPA, 2003). The existing criterion is based on the Federal Secondary Drinking Water Standards.

u. Zinc: The Department is adding a health-based criterion for zinc of 2000 μg/L. Zinc is classified as Group D constituent. The criterion was derived from the current IRIS RfD available since October 1, 1992 (USEPA, 2003). The existing criterion is based on the Federal Secondary Drinking Water Standards.

V. PRACTICAL QUANTITATION LEVELS

The Department has simplified the process used to derive Practical Quantitation Levels (PQLs). N.J.A.C. 7:9C-1.9(c)3ii has been amended to reflect the change in the methods used by the Department to derive PQLs. PQLs are the lowest concentration level of a constituent that can be reliably measured and reported during routine laboratory operating conditions. The Department has updated the existing PQLs and added PQLs for criteria for which no PQLs were previously available.

Over time, the accuracy of analytical methods improves and new analytical methods are developed. It is the Department's responsibility to select PQLs that are not only achievable by the certified laboratory community but will also more closely approach the established health-based criterion. The ground water quality criteria (GWQC) are human health-based and will sometimes result in a concentration that is lower than the lowest concentration that is measurable using approved analytical methods. In these circumstances, the Department uses PQLs to determine compliance with the health-based GWQC.

The PQL updates reflect the most recent information that has been tabulated and reviewed by the Department. Preference was given to method detection limit (MDL) data obtained from the New Jersey Department of Health and Senior Services Laboratory (DHSS). DHSS is the New Jersey primacy laboratory for drinking water analyses. The DHSS was considered the best source of data, because the Department's Bureau of Safe Drinking Water contracts with the DHSS laboratory on a continuous basis for many water quality parameters and there is an abundance of intra-laboratory precision and accuracy data for these methods. Accordingly, the DHSS MDL values multiplied by 5 are proposed as the default values for PQL calculations in this rule. If a PQL could not be established based on the DHSS MDLs or were determined to be inadequate for a particular constituent or analytical method, the Department has followed the method outlined by Sanders, Lippincott and Eaton in "Determining Quantitation Levels for Regulatory Purposes." J. Amer. Water Works Assoc., March 1996, pp. 104-114.

The Department is updating the existing PQLs in Appendix Table 1 of the GWQS, adding PQLs for existing criteria that did not have a PQL established in Appendix Table 1 and adding PQLs for the constituents being added to Appendix Table 1 through this rulemaking. Proposed updated PQLs, the associated analytical methods and the source of the methods are presented in Table D of this Basis and Background.

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APPENDIX A - EQUATIONS FOR THE DERIVATION OF HEALTH-BASED CRITERIA

For Carcinogens:

$$\text{Criterion } (\mu g/L) = \frac{\text{Upper Bound Lifetime Excess Cancer Risk} \times \text{Average Adult Weight} \times \text{Conversion Factor}}{\text{Carcinogenic Slope Factor} \times \text{Assumed Daily Water Consumption}}$$

Where the default values are:

Average Adult Weight	= 70 kg
Assumed Daily Water Consumption	= 2 liters per day
Upper Bound Lifetime Excess Cancer Risk	= 1×10^{-6}
Conversion Factor	= 1,000 μg/mg
Carcinogenic Slope Factor	= value from the United States Environmental Protection Agency (USEPA) Integrated Risk Information System (IRIS) data base, http://www.epa.gov/iris/ as $(mg/kg\text{-}day)^{-1}$

For constituents classified as non-carcinogens and for constituents classified as carcinogens for which no carcinogenic slope factor is applicable, the criterion shall be derived using the following equation:

$$\text{Criterion } (\mu g/L) = \frac{\text{Reference Dose} \times \text{Average Adult Weight} \times \text{Conversion Factor} \times \text{Relative Source Contribution}}{\text{Assumed Daily Water Consumption} \times \text{Uncertainty Factor}}$$

Where the default values are:

Average Adult Weight	= 70 kg
Relative Source Contribution	= 20 Percent
Assumed Daily Water Consumption	= 2 liters per day
Conversion Factor	= 1,000 μg/mg
Reference Dose	= value from the USEPA IRIS data base, http://www.epa.gov/iris/, as (mg/kg-day)
Uncertainty Factor	= 10 for carcinogens for which no carcinogenic slope factor is applicable; 1 for non-carcinogens

APPENDIX B - NJDEP RISK ASSESSMENT METHODOLOGY FOR GROUP C CARCINOGENS

Group C carcinogens are those agents categorized as possible human carcinogens because the evidence for carcinogenicity is not sufficient for them to be categorized as probable human carcinogens (Group B2). To develop health-based levels (standards/criteria) for Group C carcinogens with a consistent approach throughout its implementing programs, the Department has established a new single approach that is technically defensible as well as compatible with USEPA's various programs. The Department's new approach specifies that health-based levels for Group C carcinogens be developed through the use of a cancer slope factor at a 10^{-6} excess cancer risk over a lifetime of exposure, if such a slope factor is available and judged by the Department to be technically sound and based on adequate toxicological data. If such a slope factor is not available, the risk assessment will be based on non-carcinogenic effects using the Reference Dose (RfD) with an additional uncertainty factor of 10 to protect from possible carcinogenic effects.

This approach differs somewhat from the approaches used by the USEPA drinking water program and the USEPA Superfund program, but incorporates elements from both. The policy of the USEPA drinking water program for Group C carcinogens when no Reference Dose is available is to use a slope factor with a risk level of 10^{-5} to 10^{-6}. Therefore, the use of the 10^{-6} risk level would not be inconsistent with the policy of the USEPA Office of Ground Water and Drinking Water. The USEPA Superfund program specifies a 10^{-6} risk level for Group C carcinogens but does not incorporate an additional uncertainty factor into the Reference Dose when no slope factor is available. The Department has determined that an additional uncertainty factor of 10 is necessary when using the Reference Dose to provide sufficient protection from possible carcinogenic effects. The use of an additional uncertainty factor is consistent with USEPA's water programs as well as New Jersey's current standards and guidance for drinking water, surface water, ground water, and soil remediations.

The new approach for the risk assessment of Group C carcinogens will be applied at this time to all Group C carcinogens except those for which the risk assessment was recommended to the Department by the New Jersey Drinking Water Quality Institute (NJDWQI). NJDWQI is an advisory group established by the 1983 Amendments to the New Jersey Safe Drinking Water Act (P.L.1983, C.443), commonly known as Assembly Bill A-280, and is responsible for recommending New Jersey-specific drinking water standards to the Department. In order to ensure consistency in human health risk assessment within the Department, toxicity factors developed by NJDWQI are given the first priority in the hierarchy of sources as the basis for the ground water quality standards. For those Group C carcinogens regulated pursuant to A280, the new assessment will be done as part of the revision of the Safe Drinking Water Act rules.

TABLE A - SPECIFIC GROUND WATER QUALITY CRITERIA - DERIVATION FACTORS FOR HUMAN HEALTH CONCERNS

Constituent	CASRN	Oral RfD[1] (mg/kg-day)	Oral Slope Factor[1] $(mg/kg\text{-}day)^{-1}$	Carcinogen Group[1]	RSC[2] (%)	Criterion[3] (µg/L)		Primary Basis for Proposed Revision
						Existing	Proposed	
Acenaphthene	83-32-9	0.06			20	400	No Change	
Acetone	67-64-1	0.9		D	20	700	6,000	IRIS
Acetophenone	98-86-2	0.1		D	20	-	700	ISC/RfD rounding
Acrolein	107-02-8	0.0005		**	20	NA	4	ISC/IRIS/See B&B Text
Acrylamide	79-06-1		4.5	B2		0.008	No Change	
Acrylonitrile	107-13-1		0.54	B1		0.06	No Change	
Adipates [Di(2-ethylhexyl)adipate] (DEHA)	103-23-1		0.0012	C		NA	30	ISC/New Group C approach
Alachlor	15972-60-8		0.08[a]	B2[a]		0.43	0.4	Rounding
Aldicarb Sulfone	1646-88-4	0.001			20	2	7	IRIS
Aldrin	309-00-2		17	B2		0.002	No Change	
Ammonia	7664-41-7					500	3,000	ISC/See B&B text
Aniline	62-53-3		0.0057	B2		-	6	ISC
Anthracene	120-12-7	0.3		D	20	2,000	No Change	
Antimony (Total)	7440-36-0	0.0004			40	2	6	NPDWR/See B&B Text
Arsenic (Total)	7440-38-2		1.5[d]	A[d]		0.02	No Change	
Asbestos	1332-21-4			A		$7X10^6$f/L >10µm[b]	No Change	
Atrazine	1912-24-9			C[a]		3[b]	No Change	Pending USEPA review/See B&B text
Barium (Total)	7440-39-3	0.07		D	100	2,000	No Change	
Benz(a)anthracene	56-55-3		0.73[e]	B2		NA	0.05	ISC
Benzene[4]	71-43-2		0.23	A		0.2	No Change	
Benzidine	92-87-5		230	A		0.0002	No Change	
Benzo(a)pyrene (BaP)	50-32-8		7.3	B2		NA	0.005	ISC
Benzo(b)fluoranthene (3,4-Benzofluoranthene)	205-99-2		0.73[e]	B2		NA	0.05	ISC

TABLE A - SPECIFIC GROUND WATER QUALITY CRITERIA - DERIVATION FACTORS FOR HUMAN HEALTH CONCERNS

Constituent	CASRN	Oral RfD[1] (mg/kg-day)	Oral Slope Factor[1] (mg/kg-day)$^{-1}$	Carcinogen Group[1]	RSC[2] (%)	Criterion[3] (µg/L)		Primary Basis for Proposed Revision
						Existing	Proposed	
Benzo(k)fluoranthene	207-08-9		0.073[e]	B2		NA	0.5	ISC
Benzoic Acid	65-85-0	4		D	20	-	30,000	ISC
Benzyl Alcohol	100-51-6	0.3[a]			20	2,000	No Change	
Beryllium (Total)	7440-41-7	0.002		C[b]	20	0.008	1	IRIS/NPDWR/See B&B Text
alpha-BHC (alpha-HCH)	319-84-6		6.3	B2		0.006	No Change	
beta-BHC (beta-HCH)	319-85-7		1.8	C		0.2	0.02	New Group C approach
gamma-BHC (gamma-HCH/Lindane)	58-89-9		1.3[a]	B2-C		0.2	0.03	HEAST/New Group C approach
1,1-Biphenyl (Diphenyl)	92-52-4	0.05		D	20	-	400	ISC
Bis(2-chloroethyl) Ether	111-44-4		1.1	B2		0.03	No Change	
Bis(2-chloroisopropyl) Ether	108-60-1	0.04			20	300	No Change	CASRN changed in IRIS from 39638-32-9 on 6/06/00
Bis(2-ethylhexyl) Phthalate (DEHP)	117-81-7		0.014	B2		3	2	Rounding
Bromodichloromethane (Dichlorobromomethane)	75-27-4		0.062	B2		0.3	0.6	IRIS
Bromoform	75-25-2		0.0079	B2		4	No Change	
n-Butanol (n-Butyl Alcohol)	71-36-3	0.1		D	20	-	700	ISC/RfD rounding
tertiary-Butyl Alcohol (TBA)	75-65-0	0.18[c]		C[c]	20	-	100	ISC/See B&B text
Butylbenzyl Phthalate	85-68-7	0.2		C	20	100	No Change	See B&B text
Cadmium (Total)	7440-43-9	0.0005			25	4	No Change	
Camphor	76-22-2	0.18[c]		D[c]	20	-	1,000	See B&B text
Carbofuran	1563-66-2	0.005			20	40	No Change	
Carbon Disulfide	75-15-0	0.1		D[c]	20	-	700	ISC/ RfD rounding
Carbon Tetrachloride[4]	56-23-5		0.091	B2		0.4	No Change	
Chlordane[4]	57-74-9		2.7	B2		0.01	No Change	
4-Chloroaniline (p-Chloroaniline)	106-47-8	0.004		D[c]	20	-	30	ISC

TABLE A - SPECIFIC GROUND WATER QUALITY CRITERIA - DERIVATION FACTORS FOR HUMAN HEALTH CONCERNS

Constituent	CASRN	Oral RfD[1] (mg/kg-day)	Oral Slope Factor[1] (mg/kg-day)$^{-1}$	Carcinogen Group[1]	RSC[2] (%)	Criterion[3] (µg/L)		Primary Basis for Proposed Revision
						Existing	Proposed	
Chlorobenzene (Monochlorobenzene)[4]	108-90-7	0.0065		D	20	4	50	NJDWQI/ISC
Chloroform	67-66-3	0.01		B2	20	6	70	RfD considered protective/See B&B text
2-Chloronaphthalene	91-58-7	0.08			20	-	600	ISC
2-Chlorophenol	95-57-8	0.005			20	40	No Change	
Chlorpyrifos	2921-88-2	0.003			20	20	No Change	
Chromium (Total)	7440-47-3	0.003[d]		D	70	100	70	IRIS
Chrysene	218-01-9		0.0073[e]	B2		NA	5	ISC
Copper	7440-50-8					1,000	1,300	NPDWR/See B&B text
Cumene (Isopropylbenzene)	98-82-8	0.1		D	20	-	700	ISC/ RfD rounding
Cyanide (free cyanide)	57-12-5	0.02		D	20	200	100	RfD rounding /See B&B text
2,4-D (2,4-Dichlorophenoxyacetic Acid)	94-75-7	0.01			20	70	No Change	
Dalapon (2,2-Dichloropropionic Acid)	75-99-0	0.03			20	200	No Change	
4,4'-DDD (p,p'-TDE)	72-54-8		0.24	B2		0.1	No Change	
4,4'-DDE	72-55-9		0.34	B2		0.1	No Change	
4,4'-DDT	50-29-3		0.34	B2		0.1	No Change	
Demeton	8065-48-3	0.00004			20	0.3	No Change	
Dibenz(a,h)anthracene	53-70-3		7.3 [e]	B2		NA	0.005	ISC
Dibromochloromethane (Chlorodibromomethane)	124-48-1		0.084	C		10	0.4	IRIS/New Group C approach
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8		1.4[a]	B2[a]		NA	0.02	HEAST/ISC/Rounding
Di-n-butyl Phthalate	84-74-2	0.1		D	20	900	700	RfD rounding
1,2-Dichlorobenzene[4]	95-50-1	0.086		D	20	600	No Change	
1,3-Dichlorobenzene[4]	541-73-1			D	20	600	No Change	
1,4-Dichlorobenzene[4]	106-46-7					75[b]	No Change	
3,3'-Dichlorobenzidine	91-94-1		0.45	B2		0.08	No Change	

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Constituent	CASRN	Oral RfD[1] (mg/kg-day)	Oral Slope Factor[1] $(mg/kg\text{-}day)^{-1}$	Carcinogen Group[1]	RSC[2] (%)	Criterion[3] (µg/L)		Primary Basis for Proposed Revision
						Existing	Proposed	
Dichlorodifluoromethane (Freon 12)	75-71-8	0.2		D[c]	20	-	1,000	ISC
1,1-Dichloroethane[4]	75-34-3	0.0065		D	20	70	50	NJDWQI/ISC
1,2-Dichloroethane[4]	107-06-2		0.12	B2		0.3	No Change	
1,1-Dichloroethylene (1,1-DCE)[4]	75-35-4	0.0014		C	20	1	No Change	See B&B text
cis-1,2-Dichloroethylene[4]	156-59-2			D	20	10	70[b]	NJDWQI/ISC
trans-1,2-Dichloroethylene[4]	156-60-5	0.017			20	100	No Change	
2,4-Dichlorophenol (DCP)	120-83-2	0.003			20	20	No Change	
1,2-Dichloropropane	78-87-5		0.068[a]	B2[a]		0.5	No Change	
1,3-Dichloropropene (cis- and trans-)	542-75-6		0.1	B2		0.2	0.4	IRIS
Dieldrin	60-57-1		16	B2		0.002	No Change	
Diethyl Phthalate	84-66-2	0.8		D	20	5,000	6,000	RfD rounding
Diisodecyl Phthalate (DIDP)	26761-40-0	0.18[c]		C[c]	20	-	100	ISC/See B&B text
Diisopropyl Ether (DIPE)	108-20-3	2.5[c]		D[c]	20	-	20,000	ISC
2,4-Dimethylphenol	105-67-9	0.02			20	100	No Change	
2,4-Dinitrophenol	51-28-5	0.002			20	10	No Change	
2,4-Dinitrotoluene/2,6-Dinitrotoluene mixture	25321-14-6		0.68	B2		0.05	No Change	
Di-n-octyl Phthalate	117-84-0	0.02[a]			20	100	No Change	
Dinoseb	88-85-7	0.001		D	20	7	No Change	
Diphenylamine	122-39-4	0.025		D[c]	20	-	200	ISC
1,2-Diphenylhydrazine	122-66-7		0.8	B2		0.04	No Change	
Diquat	85-00-7	0.0022			20	20	No Change	
Endosulfan (alpha and beta)	115-29-7	0.006			20	0.4	40	IRIS
alpha-Endosulfan (Endosulfan I)	959-98-8					0.4	40	see Endosulfan
beta-Endosulfan (Endosulfan II)	33213-65-9					0.4	40	see Endosulfan
Endosulfan Sulfate	1031-07-8					0.4	40	see Endosulfan

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						Existing	Proposed	
Endothall	145-73-3	0.02			20	100	No Change	
Endrin	72-20-8	0.0003		D	20	2	No Change	
Epichlorohydrin	106-89-8		0.0099	B2		4	No Change	
Ethion	563-12-2	0.0005		D[c]	20	-	4	ISC
Ethyl Acetate	141-78-6	0.9		D[c]	20	-	6,000	ISC
Ethylbenzene	100-41-4	0.1		D	20	700	No Change	
Ethylene Dibromide (EDB)	106-93-4		85	B2		0.0004	No Change	
Ethylene Glycol[4]	107-21-1	0.042			20	-	300	NJDWQI/ISC/ See B&B text
Ethylene Glycol Monomethyl Ether	109-86-4	0.001[a]		D[c]	20	-	7	ISC
Ethyl Ether	60-29-7	0.2		D[c]	20	-	1,000	ISC
Fluoranthene	206-44-0	0.04		D	20	300	No Change	
Fluorene	86-73-7	0.04		D	20	300	No Change	
Formaldehyde[4]	50-00-0	0.15		C	20	-	100	NJDWQI/ISC/See B&B text
Glyphosate	1071-83-6	0.1		D	20	700	No Change	
Heptachlor	76-44-8		4.5	B2		0.008	No Change	
Heptachlor Epoxide	1024-57-3		9.1	B2		0.004	No Change	
Hexachlorobenzene	118-74-1		1.6	B2		0.02	No Change	
Hexachlorobutadiene	87-68-3		0.078	C		1	0.4	IRIS/New Group C approach
Hexachlorocyclopentadiene	77-47-4	0.006		D	20	50	40	IRIS
Hexachloroethane	67-72-1		0.014	C		0.7	2	IRIS/New Group C approach
n-Hexane[4]	110-54-3	0.0047			20	-	30	NJDWQI/ISC/ See B&B text
Hydrogen Sulfide	7783-06-4					20	No Criterion	RfD withdrawn by IRIS/See B&B text
Indeno(1,2,3-c,d)pyrene	193-39-5		0.073[e]	B2		NA	0.05	ISC
Isophorone	78-59-1		0.00095	C		100	40	IRIS/New Group C approach
Lead (Total)	7439-92-1			B2		5	No Change	See B&B text

TABLE A - SPECIFIC GROUND WATER QUALITY CRITERIA - DERIVATION FACTORS FOR HUMAN HEALTH CONCERNS

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						Existing	Proposed	
Malathion	121-75-5	0.02			20	200	100	RfD rounding
Mercury (Total)	7439-97-6	0.0003[d]		D[f]	20	2	No Change	See B&B text
Methanol	67-56-1	0.5		D[c]	20	-	4,000	ISC
Methoxychlor	72-43-5	0.005		D	20	40	No Change	
Methyl Acetate	79-20-9	1[a]		D[c]	20	-	7,000	ISC
Methyl Bromide (Bromomethane)	74-83-9	0.0014		D	20	10	No Change	
Methyl Chloride (Chloromethane)	74-87-3		0.013[a]	D		30	No Criterion	Available data unusable/See B&B text
Methylene Chloride[4]	75-09-2		0.014	B2		2	3	NJDWQI/ISC
Methyl Ethyl Ketone (MEK) (2-Butanone)[4]	78-93-3	0.039		D	20	300	No Change	
4-Methyl-2-pentanone (MIBK)	108-10-1					400	No Criterion	IRIS/ See B&B text
Methyl Salicylate	119-36-8	0.5[c]		D[c]	20	-	4,000	ISC
Methyl tertiary-Butyl Ether (MTBE)[4]	1634-04-4	0.1		C	20	-	70	NJDWQI/ISC/See B&B text
Mirex	2385-85-5	0.0002		B2[a]	20	0.01	0.1	IRIS/HEAST/See B&B text
Molybdenum (Total)	7439-98-7	0.005		D[c]	20	-	40	ISC/ RfD rounding
Naphthalene[4]	91-20-3	0.41		C	20	-	300	NJDWQI/ISC/See B&B text
Nickel (Soluble salts)	7440-02-0	0.02[d]			20	100	No Change	
Nitrate (as N)	14797-55-8	1.6			100	10,000	No Change	
Nitrite (as N)	14797-65-0	0.1			100	1,000	No Change	
Nitrate and Nitrite (as Total N)						10,000	No Change	
Nitrobenzene	98-95-3	0.0005		D	20	3	4	RfD rounding
N-Nitrosodimethylamine	62-75-9		51	B2		0.0007	No Change	
N-Nitrosodiphenylamine	86-30-6		0.0049	B2		7	No Change	
N-Nitrosodi-n-propylamine	621-64-7		7.0	B2		0.005	No Change	
Oxamyl	23135-22-0	0.025			20	200	No Change	
Parathion	56-38-2	0.006[a]		C	20	-	4	ISC/See B&B text

TABLE A - SPECIFIC GROUND WATER QUALITY CRITERIA - DERIVATION FACTORS FOR HUMAN HEALTH CONCERNS

Constituent	CASRN	Oral RfD[1] (mg/kg-day)	Oral Slope Factor[1] (mg/kg-day)$^{-1}$	Carcinogen Group[1]	RSC[2] (%)	Criterion[3] (µg/L)		Primary Basis for Proposed Revision
						Existing	Proposed	
PBBs (Polybrominated biphenyls)	67774-32-7		8.9[a]	B2[a]		-	0.004	ISC
PCBs[4] (Polychlorinated biphenyls)	1336-36-3		2.0	B2		0.02	No Change	IRIS/See B&B text
Pentachlorophenol	87-86-5		0.12	B2		0.3	No Change	
Phenol	108-95-2	0.3		D	20	4,000	2,000	IRIS
Picloram	1918-02-1	0.07			20	500	No Change	
Pyrene	129-00-0	0.03		D	20	200	No Change	
Salicylic Acid	69-72-7	0.013[c]		D[c]	20	-	80	ISC
Selenium (Total)	7782-49-2	0.005		D	20	50	40	IRIS
Silver (Total)	7440-22-4	0.005		D	20	NA	40	ISC/ RfD rounding /See B&B Text
Simazine	122-34-9		0.12[a]	C[a]		1	0.3	HEAST/New Group C approach
Styrene	100-42-5	0.2			20	100[b]	No Change	
2,3,7,8-Tetrachloro-dibenzo-p-dioxin (TCDD)	1746-01-6		150000[a]	B2[a]		0.0000002	No Change	
1,1,1,2-Tetrachloroethane	630-20-6		0.026	C		10	1	IRIS/New Group C approach
1,1,2,2-Tetrachloroethane[4]	79-34-5			C		2	1	NJDWQI/ISC/See B&B text
Tetrachloroethylene (PCE)[4]	127-18-4		0.082	B2		0.4	No Change	
2,3,4,6-Tetrachlorophenol	58-90-2	0.03			20	NA	200	IRIS
Tetrahydrofuran	109-99-9	0.02[c]		C[c]	20	-	10	ISC/See B&B text
Thallium (Total)	7440-28-0	0.00007[d]		D	20	0.5	No Change	
Toluene	108-88-3	0.2		D	20	1,000	No Change	
Toxaphene	8001-35-2		1.1	B2		0.03	No Change	
2,4,5-TP (Silvex) (2-(2,4,5-Trichlorophenoxy)propionic Acid)	93-72-1	0.008		D	20	50	60	RfD rounding

TABLE A - SPECIFIC GROUND WATER QUALITY CRITERIA - DERIVATION FACTORS FOR HUMAN HEALTH CONCERNS

Constituent	CASRN	Oral RfD[1] (mg/kg-day)	Oral Slope Factor[1] (mg/kg-day)$^{-1}$	Carcinogen Group[1]	RSC[2] (%)	Criterion[3] (μg/L)		Primary Basis for Proposed Revision
						Existing	Proposed	
1,2,4-Trichlorobenzene[4]	120-82-1	0.0012		D	20	9	No Change	
1,1,1-Trichloroethane[4]	71-55-6	0.0037		D	20	30	No Change	
1,1,2-Trichloroethane[4]	79-00-5	0.0039		C	20	3	No Change	See B&B text
Trichloroethylene (TCE)[4]	79-01-6		0.031	B2		1	No Change	
Trichlorofluoromethane (Freon 11)	75-69-4	0.3		D[c]	20	-	2,000	ISC
2,4,5-Trichlorophenol	95-95-4	0.1			20	700	No Change	
2,4,6-Trichlorophenol[4]	88-06-2		0.026	B2		3	1	NJDWQI
1,2,3-Trichloropropane	96-18-4		7[a]	B2[a]	20	-	0.005	ISC
Vanadium Pentoxide	1314-62-1	0.009		D[c]	20	-	60	ISC
Vinyl Acetate	108-05-4	1[a]		D[c]	20	-	7,000	ISC
Vinyl Chloride[4]	75-01-4		0.42	A		0.08	No Change	
Xylenes (Total)[4]	1330-20-7	0.15		D	20	40	1,000	NJDWQI/ISC
Zinc (Total)	7440-66-6	0.3		D	20	5,000	2,000	IRIS/See B&B Text

Abbreviations

kg = kilograms mg = milligrams μg = micrograms L = liter f = fibers

Acronyms

HEAST = Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
ISC = Interim Specific Criterion
NJDWQI = New Jersey Drinking Water Quality Institute
NPDWR = National Primary Drinking Water Regulations (CFR-Part 141)

Table A Footnotes

1 = Based on data retrieved from USEPA IRIS through July 31, 2003 unless footnoted by a, b, c, e or f and except for certain NJDWQI constituents. (See footnote 4). Where the NJDWQI or IRIS information was not available, appropriate data listed in the USEPA HEAST were used. (See footnote a).

2 = 20% drinking water contribution for non-carcinogens used as the default value for criterion development purposes unless other data are recommended in 50 FR 46880, November 13, 1985; or 50 FR 47142, November 14, 1985; 52 FR 25690, July 8, 1987; 56 FR 3526, January 30, 1991; 56 FR 30266, July 1, 1991; 57 FR 22178, May 27, 1992; 57 FR 31776, July 17, 1992.

3 = Criteria excluding criterion for lead and those footnoted with a "b" (see footnote "b" below) were derived based on standard methodology, using exposure parameters specified by the USEPA. The drinking water exposure is specified as two liters per day except 0.64 liter per day for nitrate, and one liter per day for nitrite. Body weight was assumed to be 70 kg (average human adult) except 4 kg (infant) for nitrate and 10 kg (child) for nitrite and 62 kg (adult female) for salicylic acid. For criteria development for lead, additional information is available in the Basis & Background document (November 14, 1991) prepared for the prior proposal of the Ground Water Quality Standards, N.J.A.C. 7:9-6.1 et seq.

Unless otherwise noted, for Groups A & B carcinogens, criteria were calculated using the carcinogenic equation and slope factors to correspond to lifetime incremental cancer risk of 10^{-6}. For constituents categorized as Groups D, or E and for constituents whose carcinogen categorization is not indicated, criteria were calculated based on the non-carcinogenic equation and RfDs modified by relative source contribution. For Group C carcinogens criteria were developed through the use of a slope factor at a 10^{-6} incremental cancer risk level, if such a slope factor is available and judged by the Department to be technically sound and based on adequate toxicological data. If such a slope factor is not available, the risk assessment will be based on non-carcinogenic effects using the RfD with an additional uncertainty factor of 10 to protect from possible carcinogenic effects.

4 = NJDWQI constituent (N.J.S.A. 58:12A-1 et seq.). The oral RfD or slope factor and carcinogen group equivalent to USEPA categorization were developed pursuant to the requirements of NJSDWA (N.J.S.A. 58:12A-1 et seq.). Criteria are the health-based levels cited in New Jersey Drinking Water Quality Institute (NJDWQI), Maximum Contaminant Level Recommendations for Hazardous Contaminants in Drinking Water, Appendix B, Health-Based Maximum Contaminant Level Support Documents, March 26, 1987, submitted to New Jersey Department of Environmental Protection, and in Maximum Contaminant Level Recommendations for Hazardous Contaminants in Drinking Water, Appendix A, Health-

Based Maximum Contaminant Level Support Documents and Addenda, September 26, 1994, submitted to State of New Jersey, Department of Environmental Protection.

Table A Footnotes Continued

a = from USEPA, Health Effects Assessment Summary Tables, FY 1997 Update, OSWER 9200.6.303 (97-1), EPA-540-R-97-036, PB97-921199, July 1997.

b = existing drinking water Maximum Contaminant Level Goal (MCLG) (CFR Part 141 - National Primary Drinking Water Regulations). For beryllium see Section IV-d of the Basis and Background.

c = developed by the Department for calculating ISCs. For details on developing specific RfD, slope factor, or carcinogen class equivalent to USEPA categorization, see support document available by request to the Department.

d = Slope factor and carcinogen group of arsenic are those listed in IRIS under arsenic (inorganic); RfDs of chromium, mercury, and nickel are those listed in IRIS under chromium (VI), mercuric chloride, and nickel (soluble salts), respectively. The RfD for thallium was developed by the Department based on the RfD of thallium(I) sulfate in IRIS.

e = derived by multiplying the IRIS slope factor of B(a)P of 7.3 $(mg/kg\text{-}day)^{-1}$ with the "estimated order of potential potency" for the individual Group B2 PAHs recommended in USEPA "Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons", Office of Research and Development, EPA/600/R-93/089. The relative potencies based on that of benzo(a)pyrene as 1.0 are as follows: benz(a)anthracene, 0.1; benzo(b)fluoranthene, 0.1; benzo((k)fluoranthene, 0.01; chrysene, 0.001; dibenz(a, h)anthracene, 1.0; indeno(1,2,3-c,d)pyrene, 0.1.

f = Group D categorization of mercury based on USEPA National Primary Drinking Water Regulations; Final Rule. 56 FR 3537, Jan 30, 1991. For detailed discussion on Group D categorization of mercury, see Section IV-o in this Basis and Background.

** = The carcinogen group assigned to acrolein in IRIS is the descriptor, "data are inadequate for an assessment of human carcinogenic potential" which is equivalent to Group D.

TABLE B - ADDITIONAL SPECIFIC GROUND WATER QUALITY CRITERIA			
Constituent	CASRN	Existing Criterion (μg/L)	Proposed Criterion (μg/L)
Aluminum	7429-90-5	200	No Change
Chloride	16887-00-6	250,000	No Change
Color		10 Color Units (CU)	No Change
Fluoride	7782-41-4	2,000	No Change
Foaming Agents (ABS/LAS)		500	No Change
Hardness (as CaCO3)		250,000	No Change
Iron	7439-89-6	300	No Change
Manganese	7439-96-5	50	No Change
Odor		3 Odor Threshold Number	No Change
Oil & Grease & Petroleum Hydrocarbons		None Noticeable	No Change
pH		6.5-8.5	No Change
Sodium	7440-23-5	50,000	No Change
Sulfate	14808-79-8	250,000	No Change
Taste		None Objectionable	No Change
Total Dissolved Solids (TDS)		500,000	No Change
Microbiological criteria, Radionuclides & Turbidity	Prevailing Safe Drinking Water Act Regulations (N.J.A.C. 7:10-1 et seq.)		

TABLE C - CRITERIA CHANGES DUE TO RfD AND ROUNDING						
Constituent	**NJRfD** (mg/kg-day)	**Criterion before rounding** (μg/L)	**Existing Criteria** (μg/L)	**IRIS RfD** (mg/kg-day)	**Criterion before rounding** (μg/L)	**Proposed Criteria** (μg/L)
SPECIFIC GWQC:						
Cyanide	0.022	150	200	0.02	140	100
Di-n-butyl Phthalate	0.13	910	900	0.1	700	700
Di-ethyl Phthalate	0.75	5,200	5,000	0.8	5,600	6,000
Malathion	0.023	160	200	0.02	140	100
Nitrobenzene	0.00046	3.2	3	0.0005	3.5	4
2,4,5-TP	0.0075	52	50	0.008	56	60
INTERIM SPECIFIC CRITERIA:						
Acetophenone	0.14	980	1,000	0.1	700	700
n-Butanol	0.13	910	900	0.1	700	700
Carbon Disulfide	0.11	770	800	0.1	700	700
Cumene	0.11	770	800	0.1	700	700
Molybdenum	0.0047	33	30	0.005	35	40
Silver	0.0047	33	30	0.005	35	40

TABLE D - PRACTICAL QUANTITATION LEVELS, ANALYTICAL METHODS AND SOURCES

Constituent	CASRN	Current PQL[1] (ppb)	New PQL[2] (ppb)	Source of Method	Analytical Method
Acenaphthene	83-32-9	10	10	DHSS	625
Acetone	67-64-1	NA	10	CRQL	524.2
Acetophenone	98-86-2	10	10	ML	625
Acrolein	107-02-8	5	5*	EQL	8260B
Acrylamide	79-06-1	NA	0.2*	MDLx5	8032
Acrylonitrile	107-13-1	50	2*	DHSS	524.2
Adipates (Di(2-ethylhexyl)adipate) (DEHA)	103-23-1	3	3	MDLx5	525.2
Alachlor	15972-60-8	2	0.1	DHSS	525.2
Aldicarb sulfone	1646-88-4	3	0.3	DHSS	531.1
Aldrin	309-00-2	0.04	0.04*	CRQL	608
Aluminum	7429-90-5	200	30	DHSS	200.7
Ammonia (Total)	7664-41-7	200	200	MDLx5	350.1 (b)
Aniline	62-53-3	2	2	ML	1665
Anthracene	120-12-7	10	10	DHSS	525.2
Antimony (Total)	7440-36-0	20	3	DHSS	200.9
Arsenic (Total)	7440-38-2	8	3*	MDLx5 Recheck	206.2
Asbestos	1332-21-4	10^5f/L>10um	10^6f/L>10um	PQL	100.2(b)
Atrazine	1912-24-9	1	0.1	DHSS	525.2
Barium	7440-39-3	200	200	DHSS	200.7
Benz(a)anthracene	56-55-3	0.2	0.1*	DHSS	525.2
Benzene	71-43-2	1	1*	DHSS	524.2
Benzidine	92-87-5	50	20*	MDLx5	625
Benzo(a)pyrene (BaP)	50-32-8	0.2	0.1*	DHSS	525.2
Benzo(b)fluoranthene (3,4-	205-99-2	10	0.2*	DHSS	525.2
Benzo(k)fluoranthene	207-08-9	1	0.3	DHSS	525.2
Benzoic Acid	65-85-0	50	50	ML	8270B
Benzyl Alcohol	100-51-6	NA	20	MDLx5	8250A
Beryllium	7440-41-7	20	1	DHSS	200.7
alpha-BHC (alpha-HCH)	319-84-6	0.02	0.02*	DHSS	608
beta-BHC (beta-HCH)	319-85-7	0.04	0.04*	CRQL	608
gamma-BHC (gamma-HCH/Lindane)	58-89-9	0.2	0.02	DHSS	608
Biphenyl (Diphenyl) (1,1-Biphenyl)	92-52-4	10	10	MDLx5	1625

TABLE D - PRACTICAL QUANTITATION LEVELS, ANALYTICAL METHODS AND SOURCES

Constituent	CASRN	Current PQL[1] (ppb)	New PQL[2] (ppb)	Source of Method	Analytical Method
Bis(2-chloroethyl) ether	111-44-4	10	7*	DHSS	625
Bis(2-chloroisopropyl) ether	108-60-1	10	10	DHSS	625
Bis(2-ethylhexyl) phthalate (DEHP)	117-81-7	30	3*	MDLx5	525.2
Bromodichloromethane	75-27-4	1	1*	DHSS	524.2
Bromoform	75-25-2	0.8	0.8	DHSS	524.2
n-Butanol (n-Butyl alcohol)	71-36-3	20	20	CRQL	1666
tertiary-Butyl alcohol (TBA)	75-65-0	100	2	DHSS	524.2
Butylbenzyl phthalate	85-68-7	20	1	DHSS	525.2
Cadmium	7440-43-9	2	0.5	DHSS	200.7
Camphor	76-22-2		0.5	MRL	1433
Carbofuran	1563-66-2	7	0.5	DHSS	531.1(b)
Carbon Disulfide	75-15-0	10	1	DHSS	524.2
Carbon Tetrachloride	56-23-5	2	1*	QL	524.2
Chlordane	57-74-9	0.5	0.5*	DHSS	505
Chloride	16887-00-6	2000	2000	DHSS	4500
4-Chloroaniline (p-Chloroaniline)	106-47-8	10	10	CRQL	1625
Chlorobenzene (Monochlorobenzene)	108-90-7	1	1	DHSS	524.2
Chloroform	67-66-3	1	1	DHSS	524.2
2-Chloronaphthalene	91-58-7	10	10	DHSS	625
2-Chlorophenol	95-57-8	20	20	DHSS	625
Chlorpyrifos	2921-88-2	0.2	0.1	MDLx5	508
Chromium (Total)	7440-47-3	10	1	DHSS	200.7
Chrysene	218-01-9	0.2	0.2	MDLx5	525.2
Color		20 CU	5 CU	MDLx5	110.3(b)
Copper	7440-50-8	1000	4	MDLx5	200.7
Cumene (Isopropyl benzene)	98-82-8	0.8	1	DHSS	524.2
Cyanide (free cyanide)	57-12-5	40	6	DHSS	4500
2,4-D (2,4-Dichlorophenoxyacetic acid)	94-75-7	5	2	DHSS	515.3
Dalapon (2,2-Dichloropropionic acid)	75-99-0	10	0.1	QL	515.3
4,4'-DDD (p,p'-TDE)	72-54-8	0.04	0.02	MDLx5	508
4,4'-DDE	72-55-9	0.04	0.01	MDLx5	508
4,4'-DDT	50-29-3	0.06	0.1	CRQL	508
Demeton	8065-48-3	NA	1*	MDLx5	622

TABLE D - PRACTICAL QUANTITATION LEVELS, ANALYTICAL METHODS AND SOURCES

Constituent	CASRN	Current PQL[1] (ppb)	New PQL[2] (ppb)	Source of Method	Analytical Method
Dibenz(a,h)anthracene	53-70-3	0.5	0.3*	DHSS	525.2
Dibromochloromethane	124-48-1	1	1*	DHSS	524.2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	1	0.02	DHSS	504.1
Di-n-butyl phthalate	84-74-2	20	1	DHSS	525.2
1,2-Dichlorobenzene (ortho)	95-50-1	5	5	DHSS	625
1,3-Dichlorobenzene (meta)	541-73-1	5	5	DHSS	625
1,4-Dichlorobenzene (para)	106-46-7	5	5	DHSS	625
3,3-Dichlorobenzidine	91-94-1	60	30*	DHSS	625
Dichlorodifluoromethane (Freon 12)	75-71-8	0.5	2	DHSS	524.2
1,1-Dichloroethane (1,1-DCA)	75-34-3	1	1	DHSS	524.2
1,2-Dichloroethane	107-06-2	2	2*	DHSS	524.2
1,1-Dichloroethylene (1,1-DCE)	75-35-4	2	1	DHSS	524.2
cis-1,2-Dichloroethylene	156-59-2	2	1	DHSS	524.2
trans-1,2-Dichloroethylene	156-60-5	2	1	DHSS	524.2
2,4-Dichlorophenol (DCP)	120-83-2	10	10	DHSS	625
1,2-Dichloropropane	78-87-5	1	1*	DHSS	524.2
1,3-Dichloropropene (cis and trans)	542-75-6	NA	1*	DHSS	524.2
Dieldrin	60-57-1	0.03	0.03*	DHSS	505
Diethyl phthalate	84-66-2	10	1	DHSS	525.2
Diisodecyl phthalate (DIDP)	26761-40-0	3	3	MDLx5	606
Diisopropyl ether (DIPE)	108-20-3	5	5	MDLx5	1666
2,4-Dimethyl phenol	105-67-9	20	20	DHSS	625
2,4-Dinitrophenol	51-28-5	40	40*	DHSS	625
2,4-Dinitrotoluene/2,6-Dinitrotoluene Mix	25321-14-6	10	10*	DHSS	625
Di-n-octyl phthalate	117-84-0	NA	10	CRQL	625
Dinoseb	88-85-7	2	2	DHSS	515.3
Diphenylamine	122-39-4	20	20	ML	1625
1,2-Diphenylhydrazine	122-66-7	NA	20*	ML	1625
Diquat	85-00-7	NA	2	MDLx5	549
Endosulfan (alpha and beta)	115-29-7	NA	0.1	CRQL	508.1
alpha-Endosulfan (Endosulfan I)	959-98-8	0.02	0.02	CRQL	608
beta-Endosulfan (Endosulfan II)	33213-65-9	0.04	0.04	CRQL	608
Endosulfan Sulfate	1031-07-8	0.03	0.02	DHSS	608

TABLE D - PRACTICAL QUANTITATION LEVELS, ANALYTICAL METHODS AND SOURCES

Constituent	CASRN	Current PQL[1] (ppb)	New PQL[2] (ppb)	Source of Method	Analytical Method
Endothall	145-73-3	NA	60	MDLx5	548
Endrin	72-20-8	0.04	0.03	CRQL	505
Epichlorohydrin	106-89-8	NA	5*	MDLx5	8260B
Ethion	563-12-2	0.5	0.5	MDLx5	614.1
Ethyl acetate	141-78-6	10	10	ML	1666
Ethylbenzene	100-41-4	5	2	DHSS	524.2
Ethylene dibromide (1,2-Dibromomethane)	106-93-4	0.05	0.03*	DHSS	504.1
Ethylene glycol	107-21-1	200	200	ML	1666
Ethylene glycol monomethyl ether	109-86-4	20000	20000*	ML	1671
Ethyl ether	60-29-7	50	50	ML	1624
Fluoranthene	206-44-0	10	10	DHSS	625
Fluorene	86-73-7	10	1	DHSS	525.2
Fluoride	7782-41-4	500	500	DHSS	4500
Foaming agents (ABS/LAS)		0.5	0.5	DHSS	512A
Formaldehyde	50-00-0	30	30	MDLx5	554
Glyphosate	1071-83-6	NA	30	MDLx5	547
Hardness (as CaCO3)		10000	10000	DHSS	130.1
Heptachlor	76-44-8	0.4	0.05*	CRQL	505
Heptachlor epoxide	1024-57-3	0.2	0.2*	CRQL	505
Hexachlorobenzene	118-74-1	10	0.02	DHSS	505
Hexachlorobutadiene	87-68-3	1	1*	DHSS	524.2
Hexachlorocyclopentadiene	77-47-4	10	0.5	DHSS	525.2
Hexachloroethane	67-72-1	10	7*	DHSS	625
Hexane (n-Hexane)	110-54-3	5	5	A-280	524.2(i)
Indeno(1,2,3-cd)pyrene	193-39-5	10	0.2*	DHSS	525.2
Iron	7439-89-6	100	20	DHSS	200.7
Isophorone	78-59-1	10	10	DHSS	625
Lead (Total)	7439-92-1	10	5	DHSS	200.9
Malathion	121-75-5	5	0.6	MDLx5	614
Manganese	7439-96-5	6	0.4	DHSS	200.7
Mercury (Total)	7439-97-6	0.5	0.05	DHSS	245.2
Methanol	67-56-1	50000	70	ML	8015B
Methoxychlor	72-43-5	10	0.1	DHSS	505

TABLE D - PRACTICAL QUANTITATION LEVELS, ANALYTICAL METHODS AND SOURCES

Constituent	CASRN	Current PQL[1] (ppb)	New PQL[2] (ppb)	Source of Method	Analytical Method
Methyl acetate	79-20-9	5000	0.5	CRQL	OLCO3.2
Methyl bromide (Bromomethane)	74-83-9	2	1	DHSS	524.2
Methylene chloride	75-09-2	2	1	DHSS	524.2
Methyl ethyl ketone (2-Butanone) (MEK)	78-93-3	NA	2	DHSS	524.2
Methyl Salicylate	119-36-8	50	50	Lit. Method	Lit. Method
Methyl tertiary butyl ether (MTBE)	1634-04-4	1	1	DHSS	524.2
Mirex	2385-85-5	NA	0.08	MDLx5	617
Molybdenum	7439-98-7	10	2	DHSS	200.7
Naphthalene	91-20-3	2	2	DHSS	524.2
Nickel (Soluble salts)	7440-02-0	10	4	DHSS	200.7
Nitrate	14797-55-8	400	100	DHSS	353.2
Nitrite	14797-65-0	400	10	MDL(e)	353.2
Nitrate and Nitrite		NA	10	MDL(e)	353.3
Nitrobenzene	98-95-3	10	6*	DHSS	625
N-Nitrosodimethylamine	62-75-9	20	0.8*	MDLx5	608
N-Nitrosodiphenylamine	86-30-6	20	10*	DHSS	625
N-Nitrosodi-n-propylamine	621-64-7	20	10*	DHSS	625
Odor (measure by Threshold Odor Number)		NA	NA	NA	NA
Oil & Grease & Petroleum Hydrocarbons		NA	NA	DHSS	413.1
Oxamyl	23135-22-0	20	1	DHSS	531.1
Parathion	56-38-2	0.08	0.08	MDLx5	614
PBBs (Polybrominated biphenyls)	67774-32-7	0.001	0.001	MM	MM
PCBs (Polychlorinated biphenyls)	1336-36-3	0.5	0.5*	A-280	608
Pentachlorophenol	87-86-5	1	0.1	QL	515.3
pH		NA	NA	DHSS	4500
Phenol	108-95-2	10	10	DHSS	625
Picloram	1918-02-1	1	1	DHSS	515.3
Pyrene	129-00-0	20	0.1	DHSS	525.2
Salicylic acid	69-72-7	25	30	MDLx5	D4763(g)
Selenium (Total)	7782-49-2	10	4	DHSS	200.9
Silver	7440-22-4	10	1	DHSS	200.7
Simazine	122-34-9	0.8	0.8*	QL	507
Sodium	7440-23-5	400	400	DHSS	200.7

TABLE D - PRACTICAL QUANTITATION LEVELS, ANALYTICAL METHODS AND SOURCES

Constituent	CASRN	Current PQL[1] (ppb)	New PQL[2] (ppb)	Source of Method	Analytical Method
Styrene	100-42-5	5	2	DHSS	524.2
Sulfate	14808-79-8	5000	5000	DHSS	4500
Taste		NA	NA	NA	NA
TDS (Total Dissolved Solids)		10000	10000	DHSS	2540C
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6	0.01	0.00001*	ML	1613
1,1,1,2-Tetrachloroethane	630-20-6	NA	1	DHSS	524.2
1,1,2,2-Tetrachloroethane	79-34-5	1	1	A-280	524.2
Tetrachloroethylene (PCE)	127-18-4	1	1*	DHSS	524.2
2,3,4,6-Tetrachlorophenol	58-90-2	10	3	MDLx5	1653
Tetrahydrofuran	109-99-9	20	10	DHSS	524.2
Thallium	7440-28-0	10	2*	DHSS	200.9
Toluene	108-88-3	5	1	CRQL	624
Toxaphene	8001-35-2	3	2*	DHSS	608
2,4,5-TP (2-(2,4,5-Trichlorophenoxy)propionic acid)	93-72-1	5	0.6	QL	515.3
1,2,4-Trichlorobenzene	120-82-1	1	1	DHSS	524.2
1,1,1-Trichloroethane (TCA)	71-55-6	1	1	DHSS	624
1,1,2-Trichloroethane	79-00-5	2	2	DHSS	524.2
Trichloroethene (TCE)	79-01-6	1	1	DHSS	524.2
Trichlorofluoromethane (Freon 11)	75-69-4	10	1	DHSS	624
2,4,5-Trichlorophenol	95-95-4	10	10	DHSS	625
2,4,6-Trichlorophenol	88-06-2	20	20*	DHSS	625
1,2,3-Trichloropropane	96-18-4	2	0.03*	DHSS	504.1
Vanadium Pentoxide	1314-62-1	20	1	DHSS	200.7
Vinyl Acetate	108-05-4	5	5	CRQL	1624
Vinyl Chloride	75-01-4	5	1*	DHSS	524.2
Xylenes (Total)	1330-20-7	2	2	DHSS	624
Zinc	7440-66-6	30	10	DHSS	200.7
Microbiological criteria	Standards Promulgated in Safe Drinking Water Act Regulations				
Radionuclides					
Turbidity					

Table D, Footnotes

1. Current PQL column represents the PQL promulgated in Table 1 of the GWQS or the PQL developed as part of the interim specific process.
2. New PQLs marked with an (*) represent that the ground water standard for the constituent is PQL driven, i.e., PQL > criterion.

Table D, Source of Method Footnotes

A-280 = NJ Drinking Water Quality Institute. Maximum Contaminant Level Recommendations for Hazardous Contaminants in Drinking Water.
APHA = American Public Health Association (Standard Methods)
CRQL = Contractor Required Quantitation Level (EPA's Contract Laboratory Program)
DHSS = Method Detection Limit (MDL) data obtained from the New Jersey Department of Health and Senior Services Laboratory (DHSS)
EQL = Estimated Quantitation Level (EPA's Office of Solid Waste)
Lit. Method = Literature Performance Method Obtained Based on High Performance Liquid Chromatographic (HPLC) Analysis, Contact Div. Science, Research and Technology for More Information
MDL = Method Detection Limit
MDLx5 = Method Detection Limit multiplied by 5
ML = Minimum Level (from EPA's Engineering and Analysis Division, Office of Water)
MM = Multiple Methods, Depending on Cogeners, Based on Gas Chromatography (GC) and Electron Capture Detectors (ECD)
MRL = Minimum Reporting Level
NA = Not applicable
QL = Quantitation Level (Sanders & Lippincott)

Table D, Analytical Method Footnotes

(b) This method selected due to common use
(e) Set at MDL because method quantitative at this level
(g) ASTM method selected because no Federal method was available
(i) Method 524.2 was modified to include this analyte