April 12, 2000

MEMORANDUM

TO: Jill E. Burton, Acting Chief, HW Section
Peter L. Doorn, Acting Head, FMB
Kathleen Z. Lawson, Unit Supervisor, FMB
Robert Glaser, Acting Unit Supervisor, FMB

FROM: Groundwater Protection Standards (GPS) Committee

THROUGH: FMB Technical Committee

RE: Final Policy
Establishing Groundwater Protection Standards in RCRA
Permits per 264.92 & 264.94.

A final policy for establishing groundwater protection standards in RCRA permits has been developed by the GPS Committee and is attached. This memo outlines the issues considered by the GPS Committee while developing the policy. The final policy will provide consistency between the Hazardous Waste Section (HW) and the Solid Waste (SW) Section, the Superfund (SF) Section, and the Groundwater (GW) Section in regard to groundwater remediation goals.

BACKGROUND:

Members of the GPS committee: Sandra Moore, PB, Larry Stanley, FMB, Bill Miller, AG's Office, Surabhi Shah, FMB, Rob McDaniel, FMB, Mark Wilkins, FMB.

The GPS committee was formed to explore current and past policies regarding the establishment of groundwater protection standards in RCRA permits and to address some of the questions and concerns that were raised during Technical Forum discussions. The major goal of the committee was to establish a consistent approach for FMB project managers to follow when setting groundwater protection standards (GPSs) in RCRA permits. A draft policy was developed and circulated to the Branch for review and comment. A final policy was written after incorporating comments and discussing the final policy in the FMB Technical Forum. FMB management and the Technical Committee have also reviewed and approved the final policy.

Below is a summary of some of the major questions and issues that were considered by the Committee.

1. How are groundwater protection standards specified in the hazardous waste rules?

Per 264.92, the groundwater protection standard is a concentration limit specified in the permit to protect groundwater underlying a *regulated* unit. Per 264.94, the concentration of a hazardous constituent:

- Must not exceed the background level of that constituent in the groundwater at the time that limit is specified in the permit, or
- For any constituents in Table 1, must not exceed the respective value given in that Table if the background level is below the value given in the Table, or
- Must not exceed an alternate limit (ACL) established by the Regional Administrator under paragraph (b) of this section.

The Committee noted that the rules do not specifically mention or reference EPA's primary drinking water standards (a.k.a. maximum contaminant levels or MCLs), practical quantitation limits, or any other established health-based concentrations. While the use of maximum contaminant levels (MCLs) is not specified, the concentrations in Table 1 of 264.94 are consistent with MCLs that were in effect at the time the rule was promulgated. When Table 1 concentrations are compared to the most recently published MCLs, six of the standards have increased, six of the standards have decreased, and two have remained unchanged.

The establishment of an alternate concentration limit (ACL) under 264.94 (b) is allowed as long as a number of factors are considered and the alternate limit will not pose a substantial present or potential hazard to human health or the environment. The rule can be interpreted to mean that any concentration, which meets the criteria for an ACL, can be enforced. The committee believes that the NC 2L Groundwater Standards meet the criteria for the establishment of an alternate limit under paragraph (b) and are appropriate health-based GPSs. Some states are currently using their own state s groundwater standards as GPSs.

2. What was the basis for the historical use of maximum contaminant levels (MCLs) as the GPS?

The use of MCLs as a health-based GPS is not specifically addressed in our rules. However, Table 1 in 264.94 lists maximum concentrations of constituents for groundwater protection for eight metals and six pesticides. These concentrations were EPA's primary or interim drinking water standards, or MCLs, at the time the rule was published. In addition, 40 CFR 265, Appendix III concentrations, which were used as clean-up standards for interim status facilities, appear to be consistent with MCLs established at the time the rule was published as well.

While there is no formal written policy, the HW Section interpreted the use of MCLs in Table 1 and Appendix III to mean that it was EPA's intent that MCLs be used as a health-based clean-up goal for groundwater (even though MCLs are not specified in the rules). Further, as additional MCLs were developed, or updated, they were added by default to the Table 1 list and used as the clean-up goal (although EPA has never updated Table 1). It appears that a general unwritten policy to use MCLs as health-based groundwater protection standards evolved over the years.

3. Where did the use of 2Ls as the GPS originate?

The NC Groundwater Section has established and adopted by rule NC groundwater standards (15A NCAC 2L .0202) or 2Ls. Since these standards are enforceable under the Groundwater (GW) Section statutes, a note was placed in many RCRA permits stating that a facility was subject to further clean-up under the 2L rules if the GPS was greater than the 2L standard (many MCLs are greater than 2Ls). Some facilities agreed to use the 2L as the GPS since they would eventually have to meet 2L under the Groundwater Section even after MCLs were achieved. Also, some project managers began using 2L standards as the health-based standard when there was no MCL.

The NC 2L groundwater standards, which are not specifically addressed in the HW Management rules, were not previously considered enforceable as GPSs when there was a higher MCL (see Item # 4). However, 2Ls, like MCLs, are also health-based standards (2Ls are $\leq$ MCLs) and are enforceable under the NC 2L rules. HWS policy could dictate the use of 2Ls as the health-based GPS in lieu of MCLs. The use of 2Ls as the GPS would provide consistency between the HW Section and the GW Section, as well as with many other DENR programs (see Item #6). The use of the 2L standard as the GPS appears to be consistent with the establishment of an alternate concentration limit as specified in 264.94 (b).

4. What regulatory authority does RCRA have to use and enforce health-based standards other than MCLs (such as 2L standards)?

Under 264.94 (b), the Regional Administrator can establish an ACL for any constituent as long as it "will not pose a substantial present or potential hazard to human health or the environment as long as the alternate concentration limit is not exceeded". Human health risk is specifically cited in 265.94 (b) (vii). Previously, an ACL was thought of as a level requested by the facility that is greater than an MCL. However, based on discussions with the HW Section Attorney, the ACL regulation is sufficiently broad as to allow the ACL to be proposed by the agency or the permittee, and to be greater or less than other standards. Hence, the NC HW Section can use the ACL regulation to introduce and enforce GPSs that are more stringent than MCLs or those concentrations listed in 40 CFR 264.94 Table 1.

Furthermore, 40 CFR 270.32(b)(2) as adopted by 15A NCAC .0113, also known as the "omnibus authority" provides additional regulatory support. This rule states that "Each permit issued under this act shall contain terms and conditions as the …State Director determines necessary to protect human health and the environment".

In addition to being enforceable, it appears that the use of 2L standards (rather than MCLs) has several advantages. 2L standards are primarily health-based, whereas the MCLs also reflect technical and economic limitations of public water supplies that may not be relevant to site clean-ups. More importantly, the 2L standards are required to be updated on a biennial basis using the most recent toxicological information available, whereas the MCLs are not. The use of 2Ls also provides consistency between the HW Section and the GW Section, as well as with many other DENR programs.

5. Why were Appendix IX practical quantitation limits (PQLs) used as the GPS?

Appendix IX PQLs are technology-based analytical levels that are considered achievable using the referenced analytical method. The PQL is considered the lowest concentration of a contaminant that the lab can accurately detect and quantitate. The Section began using PQLs since they were contained in our 40 CFR rules and provided a source of consistent and available numbers that were achievable by the given analytical method. However, they are not health-based and analytical instruments have improved over the years resulting in lower achievable PQLs for many of the analytes listed in Appendix IX. PQLs were also used as the GPS when there was no health-based number, such as the MCL or 2L, or when the MCL or 2L was lower than the PQL for a given constituent. The Committee believes that PQLs should not be used as default GPSs since they may not provide adequate protection of human health.

The Committee does acknowledge that in some cases a GPS for a chemical may be so low that it is not possible to detect the chemical at that level by ordinary analytical methods. When the current achievable practical quantitation limit (PQL) is higher than the GPS, a facility may request an Alternate Concentration Limit (ACL) at the current PQL. Note that according to 15A NCAC 2L .0202, Groundwater Quality Standards, where the standard for a substance is less than the practical quantitation limit (PQL), the detection of that substance at or above the PQL constitutes a violation of the standard.

6. What groundwater clean-up goals do other North Carolina Department of the Environment and Natural Resources (NC DENR) programs use?

NC Superfund Section: Use 2L or interim maximum allowable concentration (IMAC) as the primary clean-up goal. If there is not a 2L standard or IMAC, the clean-up hierarchy is the MCL, followed by the EPA Region 3 tap water risk-based concentration.

NC Solid Waste Section: Use 2L or IMAC. If there is not a 2L or IMAC then they request the OEEB (Luanne Williams, State Toxicologist) to calculate one.

NC Underground Storage Tank Section: The UST risk-based rule provides a mechanism to clean up to risk-based concentrations for discharges and releases from petroleum underground storage tanks only. Clean-up levels above the 2L may be approved but will never exceed the lower of 1000 times the 2L or 50% of the solubility of a contaminant. However, the 2L standard is the clean-up goal when the groundwater is being used as a drinking water source or is a potential future drinking water source.

NC Groundwater Section: Use and enforce the 2L standards and IMACs.

NC Hazardous Waste Section: Use the 2L standard for releases at solid waste management units (SWMUs) but historically used the MCL as the GPS for regulated units.

NC Occupational and Environmental Epidemiology Branch: Strongly advocates the use of the 2L standard and IMACs as the clean-up goal for groundwater.

NC Public Water Supply: Use the current Federal Drinking Water Standards or MCLs.

NC DENR/ Remediation Process Plan/NC Risk Analysis Framework: The Department has been working on a clean-up policy and a framework to be used by all department programs to determine appropriate soil and groundwater clean-up levels. The groundwater clean-up goal is the 2L standard or IMAC.

7. When permits are renewed, can groundwater protection concentrations be changed (e.g., lowered or raised)?

One hundred and eighty days prior to the expiration of the existing hazardous waste management permit, the permitted facility must submit a permit renewal application to the Facility Management Branch, as per 40 CFR 270.10 (h). The permit renewal application must include informational requirements found in 40 CFR 270.13 and applicable sections of 40 CFR 270.14 through 270.29. The application must include information and data on the existing conditions at the site at the time of the permit renewal application.

Any new regulations, policies, or groundwater protection standards in effect at the time of issuance of the new permit are applicable to the facility. The groundwater protection standard listed in the new permit may differ from the groundwater protection standard in the previous permit. The groundwater protection standard for various constituents in the new permit may be more stringent or less stringent than the protection standard included in the previous permit. For post-closure permits, the GPS may also be revised at the five-year review period.

April 12, 2000

MEMORANDUM

To: Facility Management Branch

From: Robert C. McDaniel, FMB Remediation Technical Advisor

Through: Pete L. Doorn, FMB Acting Head

Re: FMB policy on establishing groundwater protection standards in RCRA permits

Policy

In the facility permit, the Groundwater Protection Standard (GPS) for each hazardous constituent should be set at one of the following:

- The background level of that constituent in the groundwater, or
- The NC 2L Groundwater Quality Standard or interim maximum allowable concentration (IMAC) as established in 15A NCAC 2L .0202, or
- An alternate concentration level (ACL) established or approved by the Section.

Policy Guidelines

The following guidelines should be used by FMB project managers when establishing GPS in facility permits.

Background

Once site-specific background levels have been appropriately established the GPS may be set at the background level. The 2L standard or IMAC may be used as the GPS if background levels for the site have not been established or if these standards are higher than background. If background levels for any groundwater constituents are higher than the risk-based 2L or IMAC and the groundwater is being used as a drinking water source, the County Health Department and the Programs Branch environmental toxicologist should be notified. The number and location of background samples, as

well as the analytical method detection limits and quantitation limits, should be reviewed and determined to be appropriate before background levels are established.

2L Standard or IMAC

The Hazardous Waste Section's (HWS) corrective action clean-up goal for groundwater is clean-up to a level protective of human health and the environment without any conditions (e.g. institutional and/or engineering controls). The HWS considers the state's groundwater quality standards, specified in 15A NCAC 2L .0202, to be protective of groundwater that is being used or may be used as drinking water source. Therefore, the current 2L standard or IMAC should be used as the risk-based groundwater protection standard. The concentrations listed in Table 1 of 40 CFR 264.94 should *not* be used as default GPSs since they are not based on the most recent toxicological information. NC Groundwater standards and IMACs can be found on the Internet at

http://h2o.ehnr.state.nc.us/

When there is not a 2L standard or IMAC, the GPS should be set to background concentrations, where appropriate. Alternately, either the facility or the Branch may petition the DWQ Director to establish an interim maximum allowable concentration (IMAC) for a substance. Facilities requesting an IMAC should contact David Hance (919/715-6189) in the GW Section for procedural information. Members of the HWS requesting an IMAC should contact the Programs Branch environmental toxicologist, Sandra Moore, at 919/733-2178, ext. 231.

- ***IMAC Process***

  An interim maximum allowable concentration or IMAC can only be established for a substance when there is *not* already a 2L standard. Once a written request is received for an IMAC, the GW Section will review the request and then send it to the Department of Health and Human Services/ Occupational and Environmental Epidemiology Branch (OEEB) for review. The OEEB will make a recommendation to the GW Section for an IMAC based on the criteria established in 2L .0202 (c) and (d). Once this recommended IMAC is reviewed, approved, and signed by the DWQ Director, it will become an enforceable interim standard. Within three months after an IMAC is established, the Director must initiate action (rulemaking process) to consider adoption of a standard for that substance. The rulemaking process involves a public notice, an economic analysis, and approval by the Environmental Management Commission and the Legislature. It can take two or more years before an interim standard becomes a 2L standard. In the meantime, an interim standard is enforceable under the 2L rules.

Alternate Concentration Levels (ACLs)

A facility may request that an ACL be established as the GPS. The facility must submit a written ACL request along with supporting documentation showing that the ACL will not pose a substantial present or potential hazard to human health or the environment as long as the ACL is not exceeded. The factors listed in 15A NCAC 13A .0109 Part 264.94 (b) (1) & (2) must be

considered and addressed before an ACL can be established or approved by the HWS. A site specific risk assessment or the NC Risk Analysis Framework, once finalized, may be used to support an ACL request. Institutional controls and/or engineering controls may be required upon approval of an ACL greater than the 2L standard or IMAC.

The ACL provision in the GPS policy and the rules can also be used to establish a GPS lower than a 2L or IMAC when necessary to protect human health and the environment. For example, the GPS may be set lower than the 2L or IMAC when contaminated groundwater is impacting, or has the potential to impact, surface water, indoor air, or ecological receptors above health-based levels or regulatory standards.

Additional Considerations

Practical Quantitation Limits

The GPS established in the permit should be based on protection of human health and the environment even if this results in a GPS that is below the Appendix IX or current achievable practical quantitation limits (PQLs). PQLs should not be used as default GPSs. However, to address situations in which it is not possible to quantitate at the health-based GPS, the facility may use the flexibility provided by the ACL provision in 40 CFR 264.94 (b) and as follows.

If the GPS for a given constituent is below an achievable PQL, then the facility may request an ACL at the currently achievable PQL level when remediation is nearing conclusion and has progressed such that, for at least three (3) consecutive years:

- the given constituent has not been detected and
- other constituents have not been detected above the respective GPSs.

The facility must provide documentation to demonstrate that the requested ACL is the lowest achievable PQL. The laboratory must also report **any** detection of a constituent even if it is detected below the PQL (e.g., J values where the constituent was detected above the detection limit but below the quantitation limit). Special analytical services may need to be employed to achieve the lowest possible PQL. The results of a laboratory's method detection limit study (using an appropriate analyte level for the study) and the calculated PQL must be submitted with the ACL request. Institutional controls and/or engineering controls may be required upon approval of a PQL greater than the GPS.

Other factors that should be taken into consideration include:

- Whether the source of groundwater contamination has been removed or stabilized.
- The magnitude of difference between the PQL and the 2L or IMAC.
- The risk posed to potential receptors at the PQL concentration.
- The persistence, potential for bioaccumulation and toxicity of the constituent.
- The permit status of the facility.

DHHS/OEEB Recommended Standards

The state's 2L standards and IMACs are required to be reviewed on a biennial basis (every two years) per 15A NCAC 2L .0202 (f); however, the Environmental Management Commission is currently proposing to change this requirement from every two years to every three years. Every two years, the GW Section requests OEEB to review the 2L standards and IMACs and make appropriate modifications to the established standards in accordance with the procedure in .0202(d). After review, the OEEB makes a recommendation to increase, decrease, or leave a 2L or IMAC unchanged based on current and relevant toxicological and epidemiological data. If a change is recommended, these "recommended" standards must then go through the entire rulemaking process before they become the new 2L standard. OEEB-recommended 2Ls and IMACs are not considered enforceable by the GW Section until they have been through the rulemaking process and are formally adopted.

Therefore, OEEB-recommended 2L standards or IMACs should *not* be routinely used as the GPS. The current promulgated 2L standard or IMAC should be used as the GPS even if the OEEB has recommended a revised 2L standard or IMAC that is lower or higher than the current one. However, since recommended standards are likely to be adopted and become the enforceable 2L or IMAC, GPSs should be reviewed and updated if necessary at the five-year review and at permit renewal. A standard note should be added to permits to indicate that the GPS must be revised at the five-year review or at permit renewal to reflect any new 2L standards or new IMACs that have been adopted after permit issuance.

If a new 2L standard or IMAC is established before a site is closed, regardless of how far along a facility is in the corrective action process, they may be required to meet the current 2L standard. For example, the 2L for MTBE is currently 200 ppb. After an OEEB review, a recommended standard was established at 70 ppb. If the recommended standard goes through the rulemaking process and becomes the new 2L standard before a site is closed then the facility must clean up to the new 2L standard of 70 ppb.