A REVIEW OF THE DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT, U.S. ROUTE 29 BYPASS - CITY OF CHARLOTTESVILLE & ALBEMARLE COUNTY

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INTRODUCTION

Community & Environmental Defense Services (CEDS) was retained by the Piedmont Environmental Council and the Southern Environmental Law Center (SELC) to review the "Draft Supplemental Environmental Impact Statement (SEIS), U.S. Route 29 Bypass - City of Charlottesville & Albemarle County," (FHWA-VA-EIS-90-02-DS). The Council and SELC asked CEDS to determine if the SEIS fully and accurately assessed all potential adverse aquatic resource impacts along with reasonable alternatives to mitigate negative effects.

Dr. Everett C. Carter reviewed portions of the SEIS relevant to the probability of an accident involving a truck transporting hazardous material within the South Fork Rivanna River Reservoir watershed.

Dr. Roy R. Gu, P.E., reviewed text from the SEIS relevant to how a spill of hazardous materials would affect the quality of the South Fork Rivanna River Reservoir.

Richard Klein, the president of CE DS, visited the proposed bypass right-of- way and the South Fork Rivanna River Reservoir. He also spoke with various local, state and federal officials regarding this project, and reviewed the entirety of the SEIS along with the following documents plus the references cited at the end of these comments:

Comments on the Proposed Route 29 Bypass on South Fork Rivanna Watershed, dated November 1, 2001, prepared by Mr. Thomas R. Schueler, of the Center for Watershed Protection (CWP).

Analysis of Water Quality & Quantity Impacts of Proposed Route 29 Bypass, dated April 2001, prepared by Black and Veatch Corporation (BV).

Resumes for all three reviewers appear in Appendix A of these comments..

EROSION & SEDIMENT CONTROL

Construction activity strips protective vegetation away exposing soil to the erosive effects of rainfall and runoff. Because soil is exposed to erosive forces for a longer period of time, the rate of erosion on a construction site can be 10- to 20-times greater than on a cropfield and a hundred to a thousand times that of forest lands (EPA 1999). In SEIS Table 4-1 bypass construction phase impacts are described as: "Increased turbidity could increase the level of treatment effort and cost. Increased sediment deposits would cause additional loss of Reservoir storage capacity." In addition to reservoir impacts, bypass construction will release eroded soil - sediment pollution - into reservoir tributaries, such as Ivy Creek. Stream dwelling organisms will suffer as well as downstream property owners.

Without effective control, the eroded soil released from a typical construction site, which is about 20-acres in area, can damage three miles of waterway below the site with recovery taking a decade to a century (Fox 1975). The bypass would disturb 330 acres.

Erosion and sediment control is the technology used to protect streams, reservoirs and other aquatic resources from the impact of construction phase soil loss. The technology is most effective in preventing aquatic resource damage when:

- the proposed construction site does not drain to highly sensitive aquatic resources and lacks an abundance of steep slopes or highly-erodible soils;

- site development is scheduled so that soils are exposed to erosive forces for no more than one or two weeks prior to the use of erosion control measures such as straw mulch and grass seeding;

- sediment control measures are installed along the downslope perimeter before full site clearance occurs; and

- an inspection-enforcement program is in-place which has a proven history of achieving a high level compliance with erosion and sediment control requirements.

SEIS Section 4.7.1 presents the measures which will be used to reduce soil erosion and sediment pollution on the bypass construction site. In this section it is stated that during the construction phase, soil erosion rates would increase by 160- to 450-fold compared to existing rates within the 330-acre area of disturbance. It is also stated in the SEIS that without application of erosion and sediment control measures the quantity of sediment pollution released from bypass construction would reduce reservoir storage capacity by 10.5 million gallons. Also, sediment pollution would increase reservoir cloudiness (turbidity), which would interfere with water treatment processes.

In SEIS Table 4-17 reservoir sediment loads are compared using two models: the RUSLE model presented in the Black & Veatch report and the AnnAGNPS model used in a poorly referenced University of Virginia study. Reservoir sediment loads predicted by the two models differ by a factor of a hundred. Nothing is provided in the SEIS to explain this difference. At a minimum, a table should have been included in the SEIS showing the input variables assumed in both models for each cell, each subwatershed, each reach, etc. Without this information it is impossible to determine which model more accurately estimates reservoir sediment inputs.

In 1998, the U.S. Fish & Wildlife Service (USFWS) issued a "Biological Opinion" on the potential effect of the proposed bypass on the James spinymussel, which is on the federal endangered species list. In the opinion USFWS determined that the siltation (sediment pollution) released from the proposed bypass would adversely affect James spinymussel populations located in Ivy Creek downstream of the project site.

SEIS Section 4.3.7 Aquatic Biota, presents the following assessment of potential effects upon the James spinymussel.

> "During formal Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS), FHWA recommended that the project would have no adverse effect on the mussel populations and would not pose a threat of extinction to the James spinymussel, based on the following points:
>
> 1. The 14 surveyed tributaries in the Ivy Creek drainage area that would be crossed by the project had no mussels and were unsuitable for mussels because of small size and insufficient flow.
>
> 2. Although live individuals were found in Ivy Creek, the proposed project involves no work in Ivy Creek and the nearest site of road work on the project would be more than 1,000 feet from Ivy Creek.
>
> 3. Few mussels, no snails, and evidence of allocthonous silt in Ivy Creek are indicative of some ongoing environmental degradation in the watershed.
>
> 4. There are documented occurrences of 11 other populations of James spiny mussel outside the Ivy Creek watershed.
>
> 5. Extensive stormwater management provisions and erosion and sediment control measures are incorporated into the project design to reduce impacts from highway runoff and construction.
>
> USFWS issued its Biological Opinion that the proposed Bypass was 'not likely to jeopardize the continued existence of the James spinymussel and is not likely to destroy or adversely modify its critical habitat because no critical habitat exists for this species.' VDOT will impose several protective conditions during Bypass construction, including time-of-year restrictions on construction and specific erosion and sedimentation control measures."

There are serious flaws in all five points presented above and the assertion of no significant adverse impacts to the James spinymussel. James spinymussels do occur downstream of where the bypass will cross Ivy Creek tributaries. The sediment pollution released from the bypass will impact waters further than 1,000 feet downstream of the bypass. The thrust of the third point seems to be that since the Ivy Creek spinymussel population is already stressed, then more stress will not matter. In fact, this argument flies in the face of good environmental management principles. If this same logic were applied to the other 11 spinymussel populations, then eventually no mussels would remain. The proposed erosion and sediment control measures will not be sufficient to protect spinymussels downstream of the bypass. Again, the USFWS Biological Opinion concluded that mussels would be harmed by siltation from bypass construction.

HIGHWAY RUNOFF

In the context of the proposed Route 29 bypass, highway runoff is of concern due to the pollutants washed by stormwater from roadways and other impervious surfaces. Runoff pollution is also generated on the pervious surfaces along a highway, especially grass areas managed with fertilizers and herbicides. Highway runoff pollutants include obvious substances such as oil-grease and road salt along with a number of metals which are highly toxic to aquatic organisms, nutrients, sediment, pesticides, a long list of volatile and semi-volatile organic compounds, and other contaminants.

The potential impact of bypass runoff is analyzed in Section 4 - Environmental Consequences, of the SEIS. The analysis begins by presenting the following highway runoff related issues in SEIS Table 4-1:

> "Pollutant loads in highway runoff: Pollutant inputs could affect quality of water in Reservoir, with implications for levels of water treatment effort and expense. Loss of Reservoir storage capacity also could occur over time.
>
> Length of project in watershed: Greater encroachment into watershed is perceived as resulting in greater potential for water pollution from sedimentation and highway runoff.
>
> Proximity of project to Reservoir and water treatment plant intake: Affects potential for pollutants to reach intake before being dissipated. Affects time available to identify and react to hazmat spills.
>
> Public health: Potential for greater variety and quantity of pollutants entering water supply poses concerns for greater risk of toxicity or other ill health effects for consumers."

After presenting these four issues, SEIS Table 4-6 then provides a partial listing of the pollutants likely to be present in highway runoff. For most of the pollutants listed in the table, loading rates, in pounds per acre per year, are provided for 11 land use types. This table shows that highways generate the greatest stormwater loads for three of ten runoff pollutants. Construction, which would include highway construction, generates the highest load for a fourth pollutant - sediment. Highways are listed in Table 4-6 as generating the second highest amount of ammonia and zinc, and the third highest cadmium load.

SEIS Table 4-7 presents an estimate of loadings from the bypass for 18 pollutants using three different references as the basis for the estimates. Subsequently in the SEIS highway loads are compared with existing loads for just one of these 18 pollutants - phosphorus. This is a serious shortcoming which prevents the reader from assessing how the bypass will change loads for the other 17 pollutants. The absence of a thorough load analysis hampers an assessment of full project impacts to the reservoir and tributary streams.

In their comments on the Black & Veatch report, the Center for Watershed Protection cited this same shortcoming by stating:

> "The load analysis is extremely limited with respect to the highway pollutants of greatest concern to the drinking water utility. These pollutants include soluble metals (Cu, Pb, Zn) the family of PAHs compounds, MTBE, chloride, turbidity, pesticides, and total organic carbon. According to research, each of these pollutants is typically produced at higher levels in highway runoff (usually because of direct emissions from vehicles to the road surface). In addition, acceptable levels of these pollutants in drinking water are very low, and will become even lower in response to recent and future drinking water rules issued under the Safe Drinking Water Act. Third, the current mix of watershed land use is not expected to produce significant loads of these pollutants, given their highway origin. Lastly, nearly all of the pollutants in this list are extremely difficult to treat with conventional stormwater treatment practices."

On SEIS page 4-11, MTBE is dismissed as a concern based upon two unsupported assumptions: 1) the possibility that EPA will ban this gasoline additive, and 2) that MTBE use is limited in the Charlottesville area. As of this date EPA has not banned MTBE and it is not clear when (if) this will happen. So the bypass could be built and in use while MTBE continues in use. According to the most recent analysis by EPA (1998), 100% of the gasoline tested in the Richmond area contained MTBE. Of the gasoline tested in the Washington, D.C. area, 98% contained MTBE. Richmond is, of course, just east of Charlottesville on I-64 and Washington, D.C. is to the north on Route 29. It seems logical that a substantial portion of the vehicles traveling to the Charlottesville area are from Richmond and Washington, D.C. and would contain gasoline with MTBE. It is also logical to assume that gas stations in the greater Richmond and Washington, D.C. regions receive shipments of gasoline with MTBE. Hence tanker-trucks delivering MTBE gasoline could pass through the Charlottesville area. Neither factor is mentioned in the SEIS. Therefore, the potential for MTBE reservoir contamination was dismissed without adequate consideration.

Cyanide, a deicing compound additive, is also addressed in the SEIS (p. 4-11). Like MTBE, cyanide was dismissed as a significant concern. The reasons given in the SEIS for dismissing cyanide were: it is not persistent, does not bioaccumulate, and can be broken down by microbes. The scientific literature does not support the conclusion that cyanide derived from deicing compounds and snowmelt is benign. Novotny et al. (1998) showed that the concentration of cyanide in roadway snowmelt is sufficient to harm water quality and aquatic life. Therefore, cyanide does persist long enough to pose a threat to water quality.

In the last paragraph on page 4-11 it is asserted that lead poses the greatest threat to water quality. This assertion is based upon Table 1-6, in the Black & Veatch report, which shows that of 14 pollutants listed in the table, the bypass causes lead loads to increase to the greatest degree. The SEIS then goes on to impeach the Black & Veatch report with the following assumptions:

> "With the exception of copper and zinc, less than 1 % of the total loads of all other pollutants to the Reservoir could be attributed to operation of the Bypass. These predictions were based on data from the Nationwide Urban Runoff Program (NURP) collected between 1978 and 1983,

> before the advent and widespread use of unleaded gasoline in automobiles. Since that time, concentrations of lead in urban and highway runoff have decreased dramatically. Due to this decrease, it is unlikely that the proposed Bypass would contribute more than 1% of the total lead load to the Reservoir."

There are several problems with these assumptions.

1. The bypass may not be the only road added to the reservoir watershed. As explained in the SELC overall comments, new highways, such as the bypass, induce growth to occur. Each new road increases reservoir lead inputs. If this same analytical approach were applied to all future watershed roads, then each would also seem insignificant. Project by "insignificant" project, lead loads to the reservoir would increase until water quality standards are exceeded. It is for this reason that prudent watershed management dictates setting resource based targets for lead loads, as well as all other pollutants, and examining a range of alternatives for meeting each target.

2. The assumptions ignore the impact of lead to the organisms inhabiting the streams which will receive bypass runoff. The increase in lead loads to these streams will be dramatically higher than for the reservoir watershed as a whole. Lead is quite toxic and can cause severe damage to aquatic communities in the receiving streams, including the federally endangered James spinymussel.

3. After dismissing lead, the SEIS fails to consider any other pollutant. Copper and zinc were mentioned, but no analysis was provided. This is a serious flaw in the SEIS for two reasons. First, the Nationwide Urban Runoff Program (NURP) cited in the SEIS found that no other runoff pollutant exceeded water quality criteria more frequently than copper (EPA 1983). Second, as will be shown later in these comments, copper is a very serious threat to the James spinymussel and other organisms inhabiting the receiving waters.

SECTION 4.3.4 WATER QUALITY IN TRIBUTARY STREAMS

This section provides very limited background data on water quality conditions in several reservoir tributaries. In this section it is also stated that runoff could impact Ivy Creek, but this issue is not taken any further - no analysis is provided.

As stated above, copper and lead are two of many toxic pollutants entrained in highway runoff. SEIS Table 4-5 indicates that the bypass will cross 24 streams. A number of these are small, headwater streams in which bypass runoff volume will greatly exceed stream volume. Thus dilution will not be sufficient to lower metal concentrations to meet aquatic life protection criteria.

Aquatic life protection criteria for toxics, such as copper, lead and zinc, are based upon the maximum concentration (EPA 1985). Specifically, EPA guidance establishs a maximum (acute) concentration which must not be exceeded more frequently than once every three years. For copper the maximum would be 18 micrograms per liter (µg/l) (EPA 1985 and 9 VAC 25-260-140B).

NURP data shows that the maximum three-year copper concentration in runoff from impervious surfaces is 114 µg/l (Table 1.3 and Appendix A in Schueler 1987). Yu and Langan (1999) reported a maximum copper concentration of 194 µg/l in ponds receiving runoff from the Route 17 Bypass near Warrenton, Virginia. This "maximum" was based upon two measurements. Thus the three-year maximum would be higher. To fully protect sensitive aquatic resources from toxic effects, the copper concentration in impervious surface runoff must be reduced from 194 µg/l to 18 µg/l. In other words, measures must be in place to reduce the copper entrained in impervious surface runoff by a minimum of 91%.

Later in the SEIS, a number of wet-retention pond control measures are proposed (Section 4.8.1 and Appendix D). These measures will only reduce the copper concentration by 57% (Winer 2000). Thus runoff discharged from the bypass, even after treatment, will contain copper at a concentration injurious to the organisms inhabiting downstream waters. The SEIS did not analyze this issue nor alternatives for resolving this impact. This is a very serious flaw in the SEIS.

SECTION 4.3.6 GROUNDWATER QUALITY & RECHARGE

This section focuses on the impact of the bypass on regional aquifer conditions and ignores the impact to headwater streams and wetlands. The water entering the wetlands and carried by these streams during dry-weather is composed of groundwater inflow. This inflowing water originates as precipitation falling upon the watershed. The precipitation soaks into the soil, travels through the earth and emerges as seepage or spring flow into a nearby wetland or stream.

Covering portions of a watershed with impervious surfaces eliminates groundwater recharge and reduces dry-weather stream flow (Klein 1979; EPA 1999). As watershed imperviousness increases, dry-weather stream flow becomes increasingly more depleted. Recharge and inflow depletion alone will severely degrade a headwater stream as well as affected wetlands. The failure of the SEIS to address this issue is a serious shortcoming.

SECTION 4.3.7 AQUATIC BIOTA

This section begins by stating that the federally endangered James spinymussel occurs in Ivy Creek downstream of the proposed bypass. The SEIS then presents the following assessment of potential effects upon the James spinymussel.

> "During formal Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS), FHWA recommended that the project would have no adverse effect on the mussel populations and would not pose a threat of extinction to the James spinymussel, based on the following points:
>
> 1. The 14 surveyed tributaries in the Ivy Creek drainage area that would be crossed by the project had no mussels and were unsuitable for mussels because of small size and insufficient flow.

2. Although live individuals were found in Ivy Creek, the proposed project involves no work in Ivy Creek and the nearest site of road work on the project would be more than 1,000 feet from Ivy Creek.

3. Few mussels, no snails, and evidence of allocthonous silt in Ivy Creek are indicative of some ongoing environmental degradation in the watershed.

4. There are documented occurrences of 11 other populations of James spiny mussel outside the Ivy Creek watershed.

5. Extensive stormwater management provisions and erosion and sediment control measures are incorporated into the project design to reduce impacts from highway runoff and construction.

USFWS issued its Biological Opinion that the proposed Bypass was ‘not likely to jeopardize the continued existence of the James spinymussel and is not likely to destroy or adversely modify its critical habitat because no critical habitat exists for this species.’ VDOT will impose several protective conditions during Bypass construction, including time-of-year restrictions on construction and specific erosion and sedimentation control measures.”

There are serious flaws in all five points presented above and the assertion of no significant adverse impacts to the James spinymussel. While the first two points may be true, James spinymussels do occur downstream of where the bypass will cross Ivy Creek tributaries. The impact of bypass pollutants and loss of recharge will extend further than 1,000 feet downstream of the bypass. The thrust of the third point seems to be that since the Ivy Creek spinymussel population is already stressed, then more stress will not matter. In fact, this argument flies in the face of good environmental management principles. If this same logic were applied to the other 11 spinymussel populations, then eventually no mussels would remain. The proposed stormwater and sediment control measures will not be sufficient to protect spinymussels downstream of the bypass. In fact, the USFWS Biological Opinion concluded that mussels would be harmed by siltation from bypass construction.

The Biological Opinion did not consider other highway impacts which could be equally harmful to the James spinymussel. The Biological Opinion cited the sensitivity of this species to the elevated water temperature caused by impoundments (USFWS 1998). Specifically, the fish which serve as hosts for spinymussel larvae are harmed by elevated water temperature. But neither the Biological Opinion nor the SEIS looked at how the bypass might affect water temperatures in areas inhabited by spinymussels.

Several studies have shown that stormwater management ponds, identical to those proposed for the bypass, elevate runoff to a temperature in the high 80°F to 90°F range (Bahr 1996; Galli 1990 and 1992). The SEIS does address this impact. Furthermore, neither the SEIS nor the USFWS Biological Opinion addressed the loss of groundwater recharge and streamflow depletion on spinymussel populations. Finally, all discussion of hazardous waste spills in the SEIS focused on reservoir impacts and ignored how such a catastrophic event would impact James spinymussel populations.

The effects of copper, lead, zinc and other runoff toxics to the spinymussel was not considered in the Biological Opinion or the SEIS. Virginia water quality standards and EPA guidance (9 VAC 25-260-5B; EPA 1985) set the freshwater acute standard for copper at 18 µg/l. EPA guidance for copper and other toxic metals states that the freshwater acute standard should not be exceeded more frequently than once every three years (EPA 1985). The data gathered through the Nationwide Urban Runoff Program (EPA 1983) show that the three-year maximum copper concentration is at least 114 µg/l (Table 1.3 and Appendix A in Schueler 1987). Yu and Langan (1999) showed that the copper concentration in ponds receiving highway runoff from the Route 17 Bypass, near Warrenton, VA, was 194 µg/l.

The safe copper level for molluscs, such as the James spinymussel, may be lower than the Virginia and EPA standard. Table 1, in Ambient Water Quality Criteria for Copper (EPA 1985), shows that mussels and other molluscs were harmed by a copper concentration as low as 5.3 µg/l. Although the mussels affected by lower copper concentrations are marine, this does point to the need for a thorough review of the scientific literature for data on the effect of copper (and other stressors) on the James spinymussel. This review is essential to accurately establishing target values for the protection of this species.

If a copper concentration of 5.3 µg/l were determined to be the safe level for protection of the James spinymussel, then the control measures serving the bypass would need to reduce the runoff concentration of 194 µg/l by 98% to reach this target. The wet-retention ponds presented in the SEIS will only reduce copper by 57% (SEIS Section 4.8.1 and Appendix D; Winer 2000). Again, the failure to analyze this issue is a serious flaw in the SEIS.

SECTION 4.3.8 WETLANDS

In this section the SEIS describes how the bypass will impact 43 wetlands. The SEIS states that these wetlands play an important role in groundwater discharge and the maintenance of dry-weather stream flow. The SEIS is unclear as to how the bypass will affect these wetlands. It appears that direct, physical effects are the only impacts considered. Discussion is not provided with respect to a reduction in wetland inflow due to recharge lost by rendering portions of each wetland watershed impervious. Also, no reference is made to runoff pollution damage to wetlands.

A number of studies have documented substantial damage when impervious surface runoff enters a wetland (Vedagiri 1989; Vedagiri and Ehrenfeld 1991; Ehrenfeld and Schneider 1991; Wilcox 1986). The SEIS fails to consider the impact of runoff to the wetlands. Because of this serious shortcoming, it is not clear how many of these wetlands will be lost or how VDOT will compensate for this loss.

SECTION 4.3.9
CHEMICAL USAGE DURING HIGHWAY OPERATIONS & MAINTENANCE

This section begins with a listing of the following herbicides which would be applied along the right-of-way: Roundup Pro (isopropalin), Vanquish (dicamba), Garlon 3A (triclopyr), and Krenite S (fosamine ammonium). Potential adverse effects are dismissed based upon reservoir dilution. No discussion is provided as to anticipated in-stream concentrations and toxicity thresholds for these herbicides. Furthermore, the SEIS should have included an analysis of potential herbicide effects upon reservoir submerged aquatic vegetation, particularly in the small coves which would first receive bypass runoff and where herbicide concentrations would be highest.

This section also contains a discussion of deicing compounds, such as road salt and sand. This portion of the SEIS concluded that deicing compounds would not adversely affect reservoir quality due to infrequent use, removal in stormwater facilities and dilution within the reservoir. However, no analysis was presented to quantify and substantiate these claims of no adverse effects.

Deicing compounds can adversely affect receiving water quality by elevating the concentration of chloride, cyanide or sodium (Cherkauer and Ostenso, 1976; Crowther and Hynes 1977; Ehrenfeld and Schneider 1991; Novotny et al. 1998;Rosenberry et al. 1999; Vedagiri 1989; Vedagiri and Ehrenfeld 1991; Wilcox 1986). Novotny et al. found that the cyanide concentration in snowmelt exceeded EPA criteria for the protection of aquatic life.

Most of the research into deicing compound effects has focused on chloride. Cherkauer and Ostenso reported on contamination of artificial lakes in Wisconsin. Road salt from the intensely developed watersheds collected at the bottom of the lakes due to the greater density of chloride-rich runoff. Rosenberry et al. reported on road salt contamination of a New Hampshire lake. Crowther and Hynes found that road salt runoff contains sufficient chloride to adversely affect sunfish. Several studies have documented an adverse impact when road salt contaminated runoff enters a wetland (Vedagiri; Vedagiri and Ehrenfeld; Ehrenfeld and Schneider; Wilcox).

Again, despite the well documented impact of road salt upon lake quality, stream biota, and wetlands, the SEIS did not contain any analysis of potential effects upon the reservoir, receiving streams or wetlands. This is a serious flaw in the SEIS. The claim that proposed stormwater facilities will resolve road salt impacts is unsupported in both the SEIS and the scientific literature (Novotny). Chloride is in a dissolved state when transported in runoff. Stormwater facilities are generally poor at removing dissolved pollutants (Schueler 1987; EPA 1999).

In their comments on the Black & Veatch report, the Center for Watershed Protection cited many of these same shortcomings by stating:

> “The BV load comparison makes no reference to the generation of pollutants as a result of snowmelt or application of deicing compounds. The EA, RE and 106 reports do not indicate

> how VDOT will manage the bypass in response to snow or ice. While it is acknowledged that the region does not get much snow or ice every year, the frequency of snow/ice events is likely to be much greater than the predicted spill risk of 2 to 4% per year. Recent studies indicate that pollutant concentrations generated by even a few lane miles of treated highway can be significant from the standpoint of drinking water quality, particularly for pollutants such as cyanide, lead, chloride, and total organic carbon (Novotny et al, 1999). Road salt (chloride) contains impurities such as cyanide, and as might be expected, the drinking water regulations for cyanide levels are extremely low. In addition, chloride levels affect the taste and odor of drinking water, and are regulated as such. Novotny et al (1999) also noted that performance of stormwater ponds declines dramatically during winter conditions, which suggests that control of highway snowmelt will be problematic so close to the reservoir."

SECTION 4.4.2 RUNOFF CONTAMINANTS
In this section of the SEIS it is contended that:

> "According to Reed & Associates (1990), FHWA research suggests that runoff from highways with low to medium traffic volumes (less than 30,000 Average Daily Traffic [ADT]) does not have a serious effect on receiving waters, whereas highways with high traffic volumes (greater than 30,000 ADT) do have the potential to cause adverse 'first flush' effects. First flush is the acute pollutant concentrations experienced in the initial runoff at the start of a storm, when the highway contaminants are washed off. The segment of the proposed Bypass alignment that is within the Reservoir watershed has an estimated ADT of 24,400 for the year 2020. Given this maximum ADT, it is not anticipated that runoff from the proposed Bypass would greatly affect the water quality in the Reservoir."

Barrett et al. (1995) showed that the relationship between ADT and pollutant concentration is a continuum lacking specific thresholds. In other words, as traffic volume increases pollutant loads tend to increase as well. For example, Driscoll et al. (1990) initially reported that pollutant concentrations were higher from roads with an ADT >30,000, but further analysis of this same data used failed to yield a "strong or definitive" relationship between ADT and pollutant concentration (Barrett et al.). Hence, the SEIS is without foundation in dismissing concerns about bypass runoff effects because ADT may be less than 30,000.

As shown previously in these comments, the pollutant concentration from impervious surfaces, including highways, does exceed water quality protection criteria by a wide margin. Thus bypass runoff poses a substantial threat to water quality in the reservoir, the tributary streams and wetlands.

SECTION 4.4.3 EUTROPHICATION
Eutrophication occurs when excessive nutrient inputs to a water body cause algal growth to attain levels interfering with water treatment and aquatic life. This section of the SEIS begins by acknowledging that the Reservoir has been eutrophic and focuses upon phosphorus as the key nutrient. The SEIS then

analyzes how the bypass would affect phosphorus loads to the reservoir. In the SEIS it is contended that the analysis shows the by pass will not increase phosphorus inputs to the reservoir.

The SEIS analysis suffers from a serious flaw. The analysis is based upon the erroneous assumption that the phosphorus loading rate from the bypass is comparable to that of other watershed land uses, such as forest and cropfields. This assumption is counter to modern watershed management science. In fact, SEIS Table 4-6 shows that the phosphorus loading rate from highways is 30 times higher than the rate from forest (park).

In their comments on the Black & Veatch report, the Center for Watershed Protection cited this same shortcoming by stating:

> "The methods used to characterize the total load of pollutants from the watershed as a whole are seriously flawed. The method uses pollutant concentrations in watershed runoff that are essentially the same as used for highway runoff, despite the fact the watershed is 73% forested."

To develop a more accurate assessment of how the bypass would affect reservoir phosphorus inputs, I used the U.S. Environmental Protection Agency phosphorus loading rates for the James River watershed. These loading rates appeared in Tables 4.34 and 4.35 of "Chesapeake Bay Program Watershed Model Application To Calculate Bay Nutrient Loadings" (EPA 1994). The reservoir is, of course, located in the James River watershed.

SEIS Tables 4-3 and 4-4 provide existing and proposed land use within the 330-acre bypass right-of-way. I applied the Chesapeake Bay Program - James River loading rates to these land uses to compute phosphorus loads with and without the bypass. The results of this analysis are presented in Table 1, below, and show that the existing right-of-way generates 81 pounds of phosphorus per year. The phosphorus load will increase nearly four-fold to 271 pounds once the bypass is completed. Clearly phosphorus loadings from the proposed highway are not comparable to other land uses, as put forth in the SEIS. Clearly, SEIS Table 4-16 is incorrect and misleading. By increasing phosphorus inputs, the bypass will add to the eutrophication problem in the reservoir.

Table 1: Comparison of Phosphorus Loading Rates

LAND USE [1]		Acres	Phosphorus [2] Loading Rate (lb/ac/yr)	Phosphorus Load (lb/yr)
EXISTING LAND USE				
Forest & ungrazed pasture		249.62	0.09	22.47
5+-acre residences in woodlands:	Forest	10.41	0.09	0.94
	Impervious	0.32	1.22	0.39
Mowed lawns		0.51	0.68	0.35
1-acre residences:	Pervious	40.60	0.68	27.61
	Impervious	4.51	1.22	5.50
Grazed pasture lands:	Pasture	18.76	0.91	17.07
	Impervious	3.31	1.22	4.04
Mixed townhouses - 1/4 ac resid:	Pervious	0.18	0.68	0.12
	Impervious	0.14	1.22	0.18
Townhouses:	Pervious	0.21	0.68	0.14
	Impervious	0.21	1.22	0.26
Heavy commercial/industrial:	Pervious	0.12	0.68	0.08
	Impervious	1.12	1.22	1.36
	Total	330.02		**80.50**
WITH BYPASS				
Pervious (grass)		244.21	0.68	166.07
Impervious (paved)		85.81	1.22	104.68
	Total	330.02		**270.75**

1. Existing land use was obtained from SEIS Table 4-3. Pervious and impervious area with the bypass was obtained from SEIS Table 4-4.
2. Phosphorus loading rates were obtained from Tables 4.34 and 4.35 in EPA 1994

SECTION 4.5.2
WATER TREATMENT & DISTRIBUTION FACILITIES - EFFECTS OF HIGHWAY RUNOFF

In this section of the SEIS it is again contended that phosphorus loads will not change once the bypass is built. As shown in Table 1, above, this contention is false. It is also stated in Section 4.5.2 that a minor increase in eutrophication is within water treatment plant capabilities. This rationale ignores the fact that the bypass is one of a number of development projects that may take place in the reservoir watershed, particularly given the growth-inducing impacts of new highways. If each project cause a "minor" increase in phosphorus inputs and eutrophication, then the cumulative impact will be a very large increase nutrient loads and eutrophic conditions. Sound watershed management principles dictate that these cumulative impacts are best avoided by minimizing phosphorus releases from each land use change. To do this a specific phosphorus target must be established then various alternatives considered to meet the target. The SEIS contains neither a specific phosphorus target nor an analysis of how alternatives compare in meeting the target.

In their comments on the Black & Veatch report, the Center for Watershed Protection cited this same shortcoming by stating:

> "The proposed VDOT design for the stormwater treatment system [EA p.24] contains no specific numerical targets for performance consistent with its close proximity to a water intake. An enhanced design would utilize greater treatment volumes and employ innovative and redundant stormwater technologies to meet reliable treatment benchmarks, as described in recommendations 6 and 7 at the end of this memo."

SECTION 4.8.1
COMMITTED MITIGATION MEASURES - HIGHWAY RUNOFF CONTROL

In this section a description is provided of the facilities which will be used to control runoff pollution from the proposed bypass. Further detail is provided in SEIS Appendix D. The treatment facilities consist of six wet retention ponds sized to provide a water quality volume equivalent to 1.5-inches of runoff. Each pond will be preceded by a dry sump and a forebay. The dry sump will have a volume of 1,100 cubic feet, which is equivalent to the volume of a tanker-truck and was provided as part of the bypass spill control system. The forebay will have a volume equivalent to 10% of the volume of the wet pond each forebay serves.

On SEIS page 4-44 it is stated that:

> "In general, a higher level of nutrient removal and better stormwater quantity control can be achieved in wet detention ponds than with BMPs such as dry ponds, infiltration trenches, or sand filters."

Wet ponds are superior only to dry ponds (Winer 2000). Infiltration and sand filters are more effective than wet ponds in removing the pollutants entrained in runoff (NVPDC 1992; Winer 2000). Furthermore, recent studies have shown that infiltration and sand filters are more effective in preventing thermal impacts (Bahr 1996; Galli 1990; MDE 2000). Additionally, wet ponds can accelerate erosion of the stream channels which receive the pond discharge (MacRea 1996; DER 1997; MDE 2000). Finally, wet ponds provide minimal groundwater recharge whereas infiltration measures can maintain recharge and stream-wetland inflow at predevelopment levels (Klein 1979; DER 1997; MDE 2000)

The second paragraph on SEIS page 4-44 presents the following description of wet pond pollutant removal efficiencies:

> "Numerous studies have shown wet detention ponds to be effective in removing TSS, nutrients, metals, and BOD/COD from stormwater. The Northern Virginia Planning District Commission (as cited in FHWA 1996) indicates that 90% removal can be expected for TSS. The median long-term sediment removal rate cited in numerous literature sources for wet ponds is 70%. Much of the particulate nitrogen and phosphorous also would be removed as sediment settles out in the ponds; FHWA reports 48% removal for Total Nitrogen and 65% removal for Total Phosphorous. The same removal rates are reported for metals. FHWA also found that approximately 30% of stormwater BOD/COD was removed in wet detention ponds. Other researchers have found similar results. The Center for Watershed Protection has developed a stormwater BMP database that is an excellent source of case studies demonstrating the pollutant removal efficiency of stormwater retention ponds that incorporate different design elements and operate under different local conditions. A literature summary of pollutant removal rates from conventional wet detention ponds is provided in Appendix B."

The Center for Watershed Protection database cited in the SEIS shows that wet ponds remove lower percentages of pollutants than claimed above: total suspended solids (TSS) 80%, total phosphorus 51%, total nitrogen 33%, and copper 57%. It is crucial to keep in mind that these pollutant removal efficiencies only apply to runoff captured within the water quality volume of the stormwater facilities. While preparing these comments, CEDS downloaded Charlottesville precipitation data for the entire period of record - 1948 to 2002. An analysis of this data showed that facilities designed to treat 1.5 inches of runoff would capture 73% of the total volume of bypass runoff for this 54-year period. The remaining 27% of the runoff would flow into the reservoir and tributary streams without treatment. The CEDS precipitation analysis appears in Appendix B of these comments.

SEIS Table D-2 states that of the 219 acres of bypass right-of-way in the reservoir watershed, 150 acres will drain to the wet ponds. The SEIS does not state whether any of the uncontrolled 69 acres will be impervious or if all 69 acres will be grass.

In Table 2, below, an analysis is presented of the amount of phosphorus retained in the proposed dry sumps, forebay, and wet ponds. This analysis begins with the phosphorus loads computed in Table 1, which appeared earlier in these comments. The analysis then factors in the 69 acres of pervious area not treated, the 27% of runoff not accommodated in the 1.5-inch pond water quality volume, and the median 51% median phosphorus removal rate given in Winer (2000) for wet ponds. Table 2 shows that the bypass, with the control measures described in the SEIS, will double phosphorus loads to the reservoir.

As stated in the SEIS, the South Fork Rivanna River Reservoir has exhibited signs of eutrophication. Clearly, nutrient inputs are already excessive. The bypass will exacerbate this critical situation by doubling phosphorus loads from the right-of-way. The SEIS failed to document this impact and failed to examine alternatives which would have reduced phosphorus. This is a very serious flaw in the SEIS.

Table 2: Bypass Phosphorus Loading To The Reservoir

LAND USE		Acres	Pretreatment Phosphorus Load (lb/yr)	Fraction of Runoff Treated in Wet Ponds	Fraction Removed in Wet Ponds	Phosphorus Load To Reservoir (lb/yr)
EXISTING LAND USE			80.50	0.00		**80.50**
WITH BYPASS						
Pervious	Treated	174.72	100.03	0.73	0.51	62.79
	Untreated	69.49	66.04	0.00		66.04
Impervious		85.81	104.68	0.73	0.51	65.71
	Total	330.02	270.75			**194.54**

HAZARDOUS MATERIAL SPILL

This issue is described in SEIS Table 4.1 as:

> "Hazardous material spills generally are low-probability events, but are understood to have potentially high consequences in terms of human health, response and clean-up costs, water treatment plant contamination, and interruption of water supply. A number of citizens, as well as the Rivanna Water and Sewer Authority, Albemarle County officials, and others, have noted this as their greatest concern."

The analysis of the potential for a hazardous material spills and impacts to the South Fork Rivanna River Reservoir is contained in SEIS Section 4 Environmental Consequences. The detailed analysis begins in SEIS Section 4.3.10 Hazardous Material Spills. The variables used in the analysis and the results are presented in SEIS Table 4-13, which appears on pages 4-26 and 4-27. The last row in Table 4-13 states that without the bypass a hazmat spill within the reservoir watershed will occur once every 39.3 years. With the bypass spill frequency increases to once in 30.1 years. Table 4-13 also presents a spill frequency of once in 785 years for the "Critical Area", which is described on SEIS page 4-20 as:

> "a 0.28-mile Bypass segment...that poses the greatest concern for adverse effects of potential highway spills on water quality in the watershed and the Reservoir. "

Following are several questions and discrepancies regarding Table 4-13.

Truck Traffic Volume
The row in Table 4-13 labeled "trucks/day" presents the assumption that trucks will account for 7% of bypass traffic and 2% of the traffic on existing and "other" roads. The basis for these percentages is not presented in the SEIS. The basis is also absent in the Technical Memorandum, dated January 14, 2002, from Mr. James Salisbury, cited in the SEIS.

The existing roads are listed in the technical memorandum as Routes 250, 601, 676 and 743. Again, the basis for the 2% and 7% truck figures is not provided in the memorandum. According to figures provided by Mr. Gerald Utz, of the Virginia Department of Transportation (VDOT), trucks presently account for about 3.5% of the traffic on Routes 250, 601 and 743. Table 2-4, in the Black & Veatch report, shows that up to 15% of the traffic on Route 29 will be trucks by the year 2020.

Portion of Trucks Transporting Hazardous Waste
The next row in Table 4-13 is labeled "hazmat trucks per day (8% of total trucks)." The source for this figure (8% of total trucks) appears to be in the second paragraph on SEIS page 4-19. This paragraph states:

> "Hazmat shipments are only a small fraction (4-8%) of the total number of shipments nationwide (Federal Motor Carrier Safety Administration, March 2001)."

The Federal Motor Carrier Safety Administration study cited as the reference for the 4-8% figure does indeed show this range. But the 4-8% figure is based upon studies conducted along interstates and other major highways. The existing roads listed in the technical memorandum (Routes 250, 601, 676 and 743) are neither interstates nor major highways. Of course the bypass will be a major highway similar to an interstate. Dr. Carter noted that 4% to 8% is actually a rather broad range. He also questioned the rationale for focusing on a 47-mile area since hazmat shipments from more distant locations would likely pass through the area.

On page 16, of the April 9, 2002 comments prepared by the Charlottesville-Albemarle Transportation Coalition (CATCO), data gathered by the Virginia State Police is cited as showing that 18% of all truck traffic is transporting hazardous waste. Presumably, this data was gathered on multilane highways resembling Route 29; not more local road such as Routes 250, 601, 676 and 743.

Critical Area
The "Critical Area" referenced in Table 4-13 is defined in SEIS in the subsection labeled "Area of Concern for Spill on Bypass," on page 4-20, as:

> "...a 0.28-mile Bypass segment (referred to in this SEIS as the "critical segment") between Earlysville Road (Route 743) and Woodburn Road (Route 659) that poses the greatest concern for adverse effects of potential highway spills on water quality in the watershed and the Reservoir. The cross sections shown in Figures 4-4A through 4-4D illustrate the relationship between the proposed Bypass and the Reservoir, with the road being approximately 590 feet from the Reservoir at the closest point. This critical segment would drain into the Reservoir instead of draining into Ivy Creek, a tributary to the Reservoir."

The actual distance measured by CEDS between the two critical segment boundaries presented above is 0.95 miles, not the 0.28-miles stated above. Furthermore, the criteria used in the SEIS to define the critical segment was that the bypass would drain to the reservoir instead of to Ivy Creek. Approximately 1.12 miles of the bypass would drain directly into the reservoir, as opposed to flowing into Ivy Creek, then the reservoir.

The SEIS does not present a clear explanation for why a hazardous material spill within the "Critical Area" is of greater concern than a spill elsewhere along the 3.4 miles of bypass located within the reservoir watershed. According to Dr. Gu the reservoir is a "run-of-the-river" impoundment, pollutants would reach the intake fairly quickly. Furthermore, he pointed out that the slopes along the bypass down to the reservoir are very steep, which would allow a spill to travel relatively fast. Hence the entire length of the bypass within the reservoir watershed is a critical area. From a water quality protection perspective, there is no obvious distinction. A spill would be harmful when it occurs anywhere along the entire length of the 3.4-mile corridor.

Revised Hazmat Spill Frequency
Table 3, which follows this page, is based upon SEIS Table 4-13, with the following modifications.

1. The Critical Area column has been deleted since this adds nothing to the analysis of how the bypass would threaten reservoir quality.

2. The portion of total traffic which is trucks is corrected to the 3.5% figure provided by VDOT.

3. Route 29 percent truck traffic is corrected to 15% as recommended in the Black & Veatch report

4. The percentage of trucks transporting hazardous waste on Route 29 has been set to 18% based upon the results of the Virginia State Police study. For existing roads and other roads the lower end of the Federal Motor Carrier Safety Administration 4% range is applied.

Table 3
ESTIMATED TRUCK ACCIDENT RATES/RELEASE PROBABILITIES FOR HAZARDOUS MATERIALS IN THE RESERVOIR WATERSHED

	No Build	Selected Build Alternatives		
	Existing Roads	Bypass	Other Roads	Total Risk (Bypass + Other Roads)
BACKGROUND TRAFFIC DATA				
vehiles/day	27,000	24,400	18,740	n/a
percent of traffic which is trucks	3.5	15.0	3.5	
trucks/day	945	3,660	656	n/a
percent of trucks carrying hazmat	4	18	4	
hazmat trucks per day	38	659	26	n/a
Miles in Reservoir watershed	18.11	3.44	18.11	n/a
vehicle miles/day	124,370	83,936	339,381	423,317
vehicle miles/day - hazmat trucks only	685	2,266	475	2,741
Annual veh-miles	45,395,050	30,631,733	30,153,453	60,785,186
Annual veh-miles - hazmat trucks only	249,864	827,189	173,424	1,000,613
Annual veh-miles (millions)	45.395	30.632	30.153	60.785
Annual veh-miles (millions) - hazmat trucks only	0.250	0.827	0.173	1.001
ACCIDENT/RELEASE RISK DATA				
Hazmat Truck Accident Rate (Acc./million vehicle-miles)	0.32	0.32	0.32	0.32
Probability of Release from Hazmat Accidents	0.28	0.28	0.28	0.28
Calculated Hazmat Releasing Accident Rate (Acc./mill veh-miles)	0.09	0.09	0.09	0.09
RISK OF ACCIDENT/RELEASE				
Annual Predicted Occurrence of Hazmat Truck Accident	0.080	0.265	0.055	0.320
Return Frequency (years per event)	12.5	3.8	18.0	3.1
Annual Predicted Occurrence of Hazmat Releasing Accident	0.022	0.074	0.016	0.090
Return Frequency (years per event)	44.7	13.5	64.4	11.2

Table 3 shows that with these modifications a hazardous material spill would occur in the reservoir watershed once every 44.7 years under existing conditions. The bypass would cause a very large increase the volume of hazmat truck traffic entering the reservoir watershed. This change causes the probability of a spill into the reservoir to increase by four-fold. In other words, with the bypass the frequency of hazmat spills in the reservoir watershed would go from once every 45 years to once every 11 years.

Analysis of Spill Effects Upon the Reservoir

The SEIS focuses on a spill involving a 10,000 gallon tanker truck. Table 4, below, presents an analysis of how such a spill would affect reservoir quality. This analysis examines the impact of a tanker filled with 10,000 gallons of MTBE treated gasoline. MTBE is a pollutant of great concern to agencies responsible for providing safe drinking water to the public, such as the Rivanna Water & Sewer Authority with their 82,000 customers in the Charlottesville area.

Table 4 goes through each step in the calculation of in-reservoir MTBE concentration assuming complete mixing. The analysis also examines a three-day scenario, which is the maximum amount of time the Rivanna Water & Sewer Authority can go with the reservoir out-of-service. Tributary inflow to the reservoir during this three-day period is included in the dilution calculation.

The analysis presented in Table 4 computes an MTBE concentration of 688 micrograms per liter (µg/l) throughout the reservoir. Table 4 shows that the U.S. Environmental Protection Agency Drinking Water Advisory calls for no more than 20-40 µg/l MTBE. California drinking water standards limit MTBE to as little as 5 µg/l. In other words, if all 10,000 gallons of gasoline entered the reservoir, then applicable water quality standards would be exceeded by a factor of 23 to 138. Table 4 also shows that water quality standards would be exceeded if as little as 73 gallons of MTBE treated gasoline entered the reservoir.

Spill Prevention Measures

On SEIS page 4-28, the assertion is made that it is nearly impossible for the reservoir to be harmed by a spill on the bypass. In fact, the SEIS presents five conditions which it is claimed must be met for harm to occur. These conditions are:

SEIS Condition 1: The rollover protection devices installed on the tanker fail to prevent tanker rollover, and rollover occurs;

> During his review of this section of the SEIS, Dr. Carter noted that spills may occur from truck accidents even if rollover does not occur. For example, a truck may collide with another vehicle or a tree. According to an analysis by the Federal Motor Carrier Safety Administration, "Large Truck Crash Profile: The 1998 National Picture," 4.2% of fatal truck accidents involved rollover while 7.3% resulted from a truck striking a fixed object and 79% from striking another vehicle. A tractor-trailer jackknife is involved in 2.4% of all nonfatal truck accidents. In other

Table 4: Effect of a Gasoline Tanker Spill on South Fork Rivanna Reservoir MTBE Concentrations

VALUE	VARIABLE
	Volume of MtBE in Tanker Truck
10,000	Tanker truck volume (gallons) (Ref 1)
0.3	Weight in kilograms of MtBE in one gallon of gasoline. (Ref: 2)
3,000	Kilograms of MtBE in a 10,000 gallon tanker (10,000 x 0.3)
3,000,000,000,000	Kilograms of MtBE converted to micrograms (kg x 1,000,000,000 = micrograms)
	Reservoir Volume
1,150,000,000	South Fork Rivanna Reservoir volume (gallons) (Ref 3)
4,352,750,000	Reservoir volume converted to liters (one gallon = 3.785 liters)
	Three-Day Reservoir Inflow Volume
1.22	Average Reservoir Inflow in cubic feet/second (cfs) (Ref 3 Table 2)
316,224	Cubic feet of reservoir inflow during three days (1.22 x 60 seconds x 60 minutes x 24 hr x 3 days)
8,952,871	Three day inflow converted to liters (one cubic foot x 7.48 = gallons x 3.785 = liters)
	Reservoir Volume + Inflow Volume
4,361,702,871	Total volume (liters) available for MtBE dilution (inflow during 3 days at low-flow + reservoir volume)
	Micrograms/liter (ug/l) of MtBE Assuming Complete Mixing In Reservoir 3-Day Volume
688	ug/l MtBE (micrograms of MtBE in 10,000 gallons gasoline divided by liters in 3-day reservoir volume.)
	MtBE Standards in ug/l
20-40	US EPA MtBE advisory level for taste & odor. (Ref 4)
13	California MtBE Maximum Contaminant Level (Ref 5)
5	California MtBE Secondary Maximum Contaminant Level (Ref 5)
	MtBE Standards Divided By Predicted MtBE Concentration
23	US EPA MtBE advisory level for taste & odor.
53	California MtBE Maximum Contaminant Level
138	California MtBE Secondary Maximum Contaminant Level
	Gallons of Gasoline Which Could Enter Reservoir Without Exceeding Standards
436	US EPA MtBE advisory level for taste & odor.
189	California MtBE Maximum Contaminant Level
73	California MtBE Secondary Maximum Contaminant Level

REFERENCES

1. In the last paragraph on SEIS page 4-44, it is stated that the typical tanker truck volume would be 10,000 gallons.
2. Johnson et al., Environmental Science & Technology, May 1, 2000, p. 2A-9A.
3. DRAFT South Fork Rivanna Reservoir reflecting on 35 years anticipating 50 years. Rivanna Water and Sewer Authority
4. EPA Drinking Water Advisory: Consumer Acceptability Advice and Health Effects Analysis on MtBE.
5. California EPA, 1999. Public Health Goal for Methyl Tertiary Butyl Ether (MTBE) in Drinking Water.

words, a rollover is not the only way in which a truck accident may occur. In fact, it is not even the most likely.

SEIS Condition 2: Due to container damage or failure, the accident results in a substantial release of hazardous cargo;

Table 4 shows that "substantial" could be as little as 73 gallons. It is extremely difficult to prevent such an "insubstantial" quantity of hazardous material from entering the reservoir after a spill.

SEIS Condition 3: The immediate release from the tanker is not contained by local emergency response personnel arriving on-scene;

Beginning at the bottom of SEIS page 4-30, in the portion of the SEIS describing the "Local Hazardous Materials Spill Response Plan," the following text appeared:

> **SEIS Text:** "Spill containment procedures for a worst-case scenario - a tanker accident on a bridge over a tributary - are not listed in the EOP [Emergency Operations Plan]. Although hazardous material spill procedures are outlined clearly, there are no guidelines regarding chemical or oil spills over water. Also, guidelines for agency coordination in POL or toxic chemical cleanup are not mentioned in the plan, and information on the sorbent materials used is not mentioned."

This text indicates that local emergency response capabilities are not ready to handle a likely spill scenario along the proposed bypass.

Furthermore, comments attached to a letter dated March 29, 2002, from the Rivanna Water & Sewer Authority, addressed to Mr. J. Mark Wittkofski, stated that response units capable of dealing with a major spill are located 60 or more miles distant in Harrisonburg, Richmond and Fredericksburg. Thus it cannot be assumed that a major spill would be contained before a substantial quantity of hazardous materials escaped into the reservoir and tributary streams.

SEIS Condition 4: The series of mitigation measures built for spill containment on the Bypass fail;

The following excerpt from the November, 2001, Center for Watershed Protection comments show that there was good reason to believe that the containment measures described in the Black & Veatch report would not reliably prevent a spill from escaping into the reservoir. These same flaws apply to the measures described in the SEIS.

> "I am particularly concerned about the dual use of the stormwater treatment system for spill containment and/or control. Quite simply, the greatest risk of highway accidents will be during inclement weather, which is precisely when the highway is producing

> stormwater runoff to the ponds. It is hard to imagine how the ponds can serve for spill containment when they are also treating large volumes of stormwater. From an engineering standpoint, the spill containment system should be completely separate from the stormwater treatment system. The spill containment should be off-line and have no possibility of bypassing into the stormwater pond (where the spills will be extremely difficult to treat)."

According to Dr. Gu it is correct to assume that the ponds and sumps could be full of ice or runoff when a spill occurs. Thus little volume would remain to detain hazardous liquids before they began flowing down into the reservoir.

SEIS Condition 5: The spill continues to travel more than 500 feet from the Bypass to the Reservoir in a quantity that would cause contamination of the Reservoir, without dispersion into the air or soil.

As shown in Table 4, above, after just 1 % of a tanker load has entered the reservoir, MTBE concentrations would exceed standards for the protection of drinking water. Following is one of many realistic scenarios in which a bypass hazmat spill could cause severe contamination of the reservoir. The precipitation and reservoir conditions described below are based upon an actual rainfall event which occurred on December 15, 1999 and actual reservoir inflow patterns during December, 1999.

A Realistic Worse-Case Scenario

In "Large Truck Crash Profile: The 1998 National Picture," the Federal Motor Carrier Safety Administration states that 10% of all fatal truck accidents occurred while it was raining and 3% occurred during snow, sleet or hail. In this scenario a gasoline tanker truck is traveling along the 3.4-mile section of bypass located within the reservoir watershed. An inch and a half of rain has fallen during the previous 24 hours. Its been cold and presently the bypass is slippery. The 1.5-inch rain has filled the dry sumps, forebays, and the wet-retention ponds with runoff and ice. All three facility types are constantly discharging excess runoff.

The tanker truck hits a section of slippery road, jackknifes, strikes a bridge abutment or another truck, and the tank ruptures spilling 10% (a thousand gallons) of MTBE treated gasoline onto the bypass. The gasoline flows down to the full dry sumps and floats on the water surface as it drains down into the forebay then into the full wet-retention pond where it resides for a brief time before discharging into a reservoir tributary.

The gasoline then enters the reservoir where the MTBE it contains disperses at a concentration far in excess of EPA standards. Reservoir inflow is averaging about 220 cubic feet per second (as it did in December 1999). With this actual inflow rate it takes eight days to flush the reservoir. The maximum amount of time the Rivanna Water & Sewer Authority can go without the reservoir in service is three days. In conclusion, this very realistic scenario results in a period of severe hardship for the Authority's 82,000 Charlottesville area customers.

If the gasoline spill happens to take place in the Ivy Creek watershed, then the loss of endangered James spinymussel populations, and that of other aquatic organisms, will be added to degradation of reservoir water quality. A scenario such as that described above was not specifically addressed in the SEIS. Had it been the SEIS would have been forced to conclude that the probability of a spill is much higher than set forth and that the consequences to Charlottesville area residents would be disastrous.

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