WORK SESSION
Rich Henes – Plans for 8140 Main Street
6:00 p.m. – Dexter Senior Center

THE VILLAGE OF DEXTER
VILLAGE COUNCIL MEETING
Tuesday, May 26, 2009
**********7:30pm **********
Dexter Senior Center, 7720 Dexter Ann Arbor Road

A. CALL TO ORDER AND PLEDGE OF *ALLEGIANCE*

B. ROLL CALL: President Keough

J. Carson	P. Cousins
D. Fisher	J. Semifero
J. Smith	R. Tell

C. APPROVAL OF THE MINUTES

1. Regular Council Meeting Minutes – May 11, 2009

Page# 1-8

D. PRE-ARRANGED PARTICIPATION:

Pre-arranged participation will be limited to those who notify the Village office before 5:00 p.m. Tuesday of the week preceding the meeting, stating name, intent and time requirements. ***(10-minute limit per participant)***

E. APPROVAL OF AGENDA:

F. PUBLIC HEARINGS

Action on each public hearing will be taken immediately following the close of the hearing

Amendments to the Village of Dexter Code of Ordinances Article IV – Sewer Service and Article II – Water Service

Consideration of: Amendments to the Village of Dexter Code of Ordinances Article IV – Sewer Service and Article II – Water Service

Page# 9-14

G. NON-ARRANGED PARTICIPATION:

Non-arranged participation will include those in the audience not listed on the agenda that wish to speak. At the Village President's discretion, members of the audience may be called on to speak at any time. Those addressing the Council will state their name, and address. This section is limited to 5-minutes per participant or 10-minutes for group representatives

H. COMMUNICATIONS:

1. Upcoming Meeting List
2. Washtenaw County Community Forums

Page# 15-18

I. REPORTS:

1. Community Development Manager – Allison Bishop

Page# 19-26

2. Board, Commission, & Other Reports- "Bi-annual or as needed"
   Arts, Culture & Heritage Committee Representative
   Chelsea Area Planning Team / Dexter Area Regional Team
   Dexter Area Chamber
   Dexter Area Fire Department Representative – Joe Semifero
   Downtown Development Authority Chair
   Farmers Market Representative
   Gordon Hall Mgmt Team Representative
   Huron River Watershed Council Representative – Paul Cousins
   Library Board Representative
   Parks & Recreation Commission Chair
   Planning Commission Chair
   Tree Board Chair
   Washtenaw Area Transportation Study Policy Committee Rep
   Western Washtenaw Area Value Express Representative – Jim Carson

3. Subcommittee Reports

4. Village Manager Report **Page# 27-30**

5. President's Report **Page# 31-32**

J. CONSENT AGENDA

Bills & Payroll will be a standing item under consent agenda. Discussion of the Budget and Financial matters will be covered under the Presidents Report as a standing item. Items under consent agenda are considered routine and will be acted upon in one motion. There will be no separate discussion of these items unless a Council Member so requests, and the item will be removed from Consent and added to the regular agenda at the end of New Business.

1. Consideration of: Bills & Payroll in the amount of: $ 122,340.99
Page# 33-38

K. OLD BUSINESS- Consideration and Discussion of:

1. Discussion of: Main Street Bridge Project
Page# 55-56

2. Discussion of: Phase 2 Funding Updates

3. Discussion of: Facilities

L. NEW BUSINESS- Consideration and Discussion of:

1. Consideration of: Purchasing the Equipment and Materials Needed to Add Fluoride to the Village Water System to the ADA Recommended Level of 1.0 ppm in the first quarter of Fiscal Year 2009-2010
Page# 39-114

2. Discussion of: Review 2009/2010 Water & Sewer Budgets
Page# 115-122

3. Consideration of: Acceptance of Proposal from Ferguson Advisory Services LLC
Page# 123-130

4. Discussion of: Update on Ryan Drive Traffic Calming Project
Page# 131-134

5. Discussion of: Tree Management Plan & Tree Specifications Manual
Page# 135-176

6. Discussion of: 2009 Preventative Maintenance Program
Page# 177-178

M. COUNCIL COMMENTS

N. NON-ARRANGED PARTICIPATION

Same as item F. Those addressing the Council will state their name, and address. This section is limited to 5-minutes per participant or 10-minutes for group representatives.

Motion to go into closed session to discuss Village Manager Performance Review per MCL 15.268 section 8(a).

O. ADJOURNMENT

Town Hall Meeting Reminder
June 3rd – 6:30 p.m. to 8:30 p.m. at the Dexter District Library
Topic: 2009-2010 Budget, Cityhood and General Questions & Answers

"This meeting is open to all members of the public under Michigan Open Meetings Act."

www.villageofdexter.org

DEXTER VILLAGE COUNCIL
REGULAR MEETING
MONDAY, MAY 11, 2009

AGENDA 5-26-09
ITEM C-1

A. CALL TO ORDER AND PLEDGE OF ALLEGIANCE

The meeting was called to order at 7:30 by President Keough in the Dexter Senior Center located at 7720 Dexter Ann Arbor Rd. in Dexter, Michigan

B. ROLL CALL: President Keough

J. Carson	P. Cousins
D. Fisher-Absent	J. Semifero
J. Smith	R. Tell

C. APPROVAL OF THE MINUTES

Regular Council Meeting Minutes- April 27, 2009.

Motion Smith; support Carson to approve the Regular Council Minutes of April 27, 2009 and the Joint Meeting Minutes with the following corrections:

G. Alan Green's comments under non-arranged participation delete more frugal? and; N. Mary Fialkowski's comments under non-arranged participation change the and after exit to behind; and in the Joint Minutes, page 7 under C-3, capitalize Green.

Unanimous voice vote for approval

D. PREARRANGED PARTICIPATION

None

E. APPROVAL OF THE AGENDA

Motion Smith; support Carson to approve the agenda with the elimination of the motion to go into closed session to discuss the Village Manager Performance Review and the addition of L-4 under New Business for the discussion of Refuse Fees.

Unanimous voice vote for approval

F. PUBLIC HEARINGS

None

G. NON-ARRANGED PARTICIPATION

Sharon Libich of 7802 Winfield, Brighton MI, and Carol Schreck of 453 Sumac Way, Ann Arbor MI, dental hygienists, addressed Council regarding fluoridation of the Village water supply and its benefits. Their comments are attached to the minutes.

Jon Rush of 7930 Fifth Street, Dexter spoke on the subject of speeding on Fifth Street. Jon reported that 1900 cars travel from Edison to Central Street per day and inquired about the placement of a tracking vehicle for s aped study and patrol of Fifth Street.

Bonnie Bisson of 417 Cambridge Drive, Dexter commented that Dexter residents are not asking about fluoride in the water because they think that it is in the water. The information about the level of fluoride is misleading and asked that Council consider the addition of fluoride to bring it up to the recommended level.

J.D. Boydston of 6951 Wellington Drive, Dexter spoke of his children having cavities and the need for fluoride supplements. He mentioned the lack of information on the amount of fluoride in Village water and encouraged Council to look at the facts on fluoride.

H. COMMUNICATIONS:

1. Upcoming Meeting List
2. Comcast Channel Line-Up Changes effective 5-27-09
3. Comcast Channel Line-Up Changes effective 6-2-09

I. REPORTS

1. Washtenaw County Sheriff's Office – Sgt. Gieske

   Sgt. Gieske spoke on traffic enforcement and a traffic study on Central Street and Fifth Street to give more accurate data over a greater period of time to be provided by a grant through the Washtenaw County Road Commission. This would not be a quick fix but a comprehensive study and would also look at doing Baker Road and Dexter Ann Arbor Road. Sgt. Gieske also mentioned break-ins at strip malls and that the subjects involved are now in jail due to the collaboration of various agencies.

2. Community Development Manager – Allison Bishop

   Ms. Bishop submits her report as per packet. In addition Ms. Bishop highlighted the following: received the first site plan in over a year; recommendations for the Parks and Recreation Commission for budgeting over the next year include reinstating an ice rink for skating in Warrior Creek Park; and the Lions Club will be repairing the roof on the small gazebo and the Rotary Club are planting additional trees in the community. Mr. Cousins inquired about picnic tables which will be made of recycled plastic material.

3. Assistant Village Manager – Courtney Nicholls

   Ms. Nicholls submits her report as per packet. In addition Ms. Nicholls reported on attending the Police Services Steering Committee and that Scio will be increasing deputies from 5 to 8; the first two weeks of the Farmer's Market was a success as was the Mother's Day project and the Farmer's Market will be advertized on the WAVE bus; and 5 petitions (60 signatures) for cityhood have been turned in.

4. Boards, Commission, & Other Reports

   Arts, Culture & Heritage Committee Representative – Paul Cousins

Notes of the Arts, Culture & Heritage Committee are provided in Ms. Nicholls report. Mr. Cousins also reported that the committee is developing goals and objectives specific to Dexter; a project of placing a kiosk down by the Main Street Bridge highlighting Judge Dexter's mills; looking at displaying public art; and working in collaboration with the Dexter Library on a speaker series.

Farmers Market Representative – Ray Tell
Mr. Tell reported that the committee is looking at ways to bring people to the market on Tuesdays and coordinate with the Library to have a movie or other activities. Mr. Tell also suggested having a table at the market where visitors could 'ask the Council Person' questions.

5. Subcommittee Reports

No affected reports

6. Village Manager Report

Mrs. Dettling submits her report as per packet. In addition Mrs. Dettling reported on a meeting Friday morning with the Village, Dexter and Webster townships and the Sheriff's Department; handed out an update on the spring construction from Beckett & Raeder; updated Council regarding the Letter of Credit and looking at fixes required by Orchard, Hiltz & McCliment at Dexter Crossings; the safe routes to school group is putting together a work plan; and there is a need to rework the easement plan for the new well field.

7. President's Report

Mr. Keough submits his report as per packet. In addition Mr. Keough reported that the Washtenaw County Parks and Recreation letter reported on at the last Council meeting is detailed in Ms. Bishop's report; the project behind National City Bank is in the process of getting the proper easement in place before the pole comes down; and policy is now in place where by projects such as the DDA project are reviewed by Village staff.

J. CONSENT AGENDA

1. Consideration of: Bills and Payroll in the amount of $216,256.13

Motion Cousins; support Smith to approve item 1 of the consent agenda as presented.

Unanimous voice vote for approval

K. OLD BUSINESS-Consideration and Discussion of:

1. Discussion of: Main Street Bridge Project

Discussed the draft of a letter to Gerald Fulcher of the Michigan Department of Environmental Quality responding to comments from his April 1, 2009 letter. It

was reported that the curbs are in on the Mill Creek Sporting Goods side; Jeffords Street is going through a planning phase at present and will be worked on in the fall; working on Bridge aesthetics; question raised on the walkway under this Bridge (looking at the third or fourth week in May to do this); and where is the promised timeline.

2. Discussion of: Phase 2 Funding Updates

   No report at this time.

3. Discussion of: Facilities

   An update report is included in packet. Anticipate a detailed report at the next meeting. The question was raised about soil borings and the decision was to wait until the sketches and cost estimates are ready.

L. NEW BUSINESS-Consideration of and Discussion of:

1. Consideration of: Jolly Pumpkin (3115 Broad) Outdoor Seating and Bar/Tavern/ Lounge Special Land Use Request

   Motion Semifero; support Cousins based on the recommendation of the Planning Commission and pursuant to Section 8.03, Special Land Use review standards, the Village Council approves the Special Land Use application for a bar/tavern/lounge (café) and outdoor seating at Jolly Pumpkin Artesian Ales, 3115 Broad Street. The Special Land Use permit is granted with the following conditions: 1) the applicant should provide information on street furniture when available and to determine compatibility with the building and architecture; 2) provide information on required enclosure when available; 3) the applicant will be required to submit the outdoor seating permit, fee and Hold Harmless Agreement; and 4) the applicant is permitted to leave the furniture outdoors overnight, if properly secured.

   Ayes: Cousins, Smith, Semifero, Tell, Carson and Keough
   Nays: None
   Absent: Fisher
   Motion carries

2. Discussion of: Village Water Fluoridation

   Comments from Council members are as follows: need to correct misinformation on the level of fluoride in the Village water and look at more information on benefits or raising the levels from .3 to .7; the Village should allow residents the freedom of choice on additional fluoride in water; fluoride programs were done through the school system in the 1950's and 1960's and covered all children in the school district; need for more research in the difference between none and some present in the water supply; and low levels of fluoride is a health issue and what is the appropriate next step.

3. Discussion of: Water and Sewer Ordinance Amendments

Ms. Nicholls explained the need for the hearing on May 26 regarding the amendments.

4. Discussion of: Refuse Fees

Motion Semifero; support Carson to propose an increase in the residential refuse fee by $2.50 from $15 to $17.50 in the advertisement for the 2009-2010 water, sewer, & refuse rate public hearing.

Ayes: Semifero, Tell, Carson, Cousins and Keough
Nays: Smith
Absent: Fisher
Motion carries 5 to 1

M. COUNCIL COMMENTS

Tell	None
Smith	None
Jones	The Robert DeNiro movie filming in the area will be shooting at the Mast Farm homestead over the next 6 weeks.
Semifero	Can we find out about the cost of liquid salt applications on Village streets, is the parking on Alpine Street across from the Farmer's Market posted and Dexter is rated second in the state in Boy's Rugby and playing in the finals tournament.
Carson	Al Kaline was in the Village on Saturday, May 9 for the dedication of the Tyler Steffey Field.
Cousins	The Dexter Rotary's Art, Food and Wine fundraiser is Sunday, May 17 at North Point.

N. NON-ARRANGED PARTICIPATION

Walt Ross, 3659 Cushing Court, Dexter spoke about not being a big fan of fluoride and questioned the affects on animals and the watering of plants.

O. ADJOURNMENT

Motion Smith; support Semifero to adjourn at 10:10 pm.

Unanimous voice vote for approval

Respectfully submitted,

Carol J. Jones
Clerk, Village of Dexter

Approved for Filing:_____

Widespread use of fluoride has been a major factor in the decline in the prevalence and severity of dental caries (tooth decay) in the United States and other economically developed countries. When used appropriately, fluoride is both safe and effective in preventing and controlling dental caries.

Although dental caries is largely preventable, it remains the most common chronic disease of children aged 6 to 11 years (25%), and adolescents aged 12 to 19 years (59%). Tooth decay is four times more common than asthma among adolescents aged 14 to 17 years (15%).
Once established, the disease requires treatment. A cavity only grows larger and more expensive to repair the longer it remains untreated.

Community-based strategies prevent tooth decay, such as
Community Water Fluoridation

- CDC recognizes community water fluoridation as 1 of 10 great public health achievements of the 20th century
- Community water fluoridation still prevents tooth decay even though people now also get fluoride from other sources such as toothpaste, rinses, and other topical applications at the dental office
- Presently, 69% of individuals on public water systems, more than 184 million people are receiving the benefits of community water fluoridation

Community-based strategies to save money

- Every dollar spent for community water fluoridation saves from $8 to $49 in treatment costs depending on the size of the community. Savings are greatest in large communities
- Fluoridated water saves more than $4.6 billion annually in dental costs in the US

Cost Savings of Community Water Fluoridation
Two published studies conducted by CDC reaffirm the benefits of community water fluoridation. Together, the studies continue to show that widespread community water fluoridation prevents cavities and saves money, both for families and the health care system. In fact, the economic analysis found that for larger communities of more than 20,000 people where it costs about 50 cents per person to fluoridate the water, every $1 invested in this preventive measure yields approximately $38 savings in dental treatment costs.

What is community water fluoridation?
Community water fluoridation is the adjustment of the fluoride concentration in the community water supply to a level beneficial to reduce tooth decay and promote good oral health. The mineral fluoride is essential for strong healthy teeth that resist decay. Almost all waters contain some quantity of naturally occurring fluoride, but usually at levels insufficient to prevent decay. The optimum concentration of fluoride in water has been determined to be between 0.7 to 1.2 milligrams per liter depending on the air temperature in a given region.
Dexter, according to the Washtenaw County Health Department has about 0.1 of 1 part per million. Considerably less than ideal.

Simply stated, How does fluoride work
Tooth decay is caused by bacteria in the mouth. When a person eats sugar, or other refined carbohydrates, these bacteria produce acid that removes minerals from the surface of the tooth, a process known as demineralization. If demineralization goes on long enough, a cavity is formed. Fluoride can promote the remineralization of enamel, thereby preventing the cavity from continuing to form. In addition, fluoride reduces the ability of the oral bacteria to produce acid.

Tooth decay is a serious problem
More than two-thirds of US children and adolescents aged 19 years or younger, 91% of US adults, and 93% of Americans aged 60 years and older have experienced tooth decay.

Fluoride's action in preventing tooth decay benefits both children and adults throughout their lives. This fact is well documented. The health benefits of fluoridation are

- Fewer cavities and less severe cavities
- Less need for fillings and tooth extractions
- Less pain and suffering associated with tooth decay
- Better self-esteem from teeth that work well and look good

Independent studies initiated in 1945 and 1946 followed four communities and assessed the value of water fluoridation. By 1960, tooth decay rates in these communities declined, on average, 56% more than in demographically similar communities whose water supplies were not fluoridated.

Cost to the community for fluoridating the water:
The per person cost of fluoridation varies by the size of the community population. The average cost of providing fluoridated water to communities with more than 20,000 residents is about 50 cents per year. For communities of 10,000-20,000 residents, the cost is about $1, and for those living in communities of less than 5,000, the cost is about $3 per year.

Conclusion: Benefits
Since community water fluoridation began in 1945, it has been demonstrated to be a safe and cost-effective way to prevent tooth decay. Fluoridation protects teeth in two ways:

- When delivered through the water supply to children during the tooth forming years
- Through direct contact with teeth throughout life

AGENDA 5-26-09
ITEM F-1

ORDINANCE 1-2009

First Reading: April 27, 2009 Approved:
Public Hearing: May 26, 2009 Published & Effective:

AN AMENDMENT TO THE DEXTER VILLAGE CODE OF ORDINANCES

Article IV - Sewer Service

Sec. 58-128 User Rates and Charges for Wastewater Disposal Service
(b) FIXING RATES AND CHARGES

Commencing on the effective date of this ordinance, the user rates and charges for wastewater treatment shall be fixed by the Village by resolution.

New Section 58.143 - Uniformity of user charge rates
User charge rates for normal strength domestic wastewater shall be uniform to all users in the service area regardless of municipal boundaries.

Sec. 58-144. Sewer rates.
Charges for sewage disposal service shall be levied upon all premises having any sewer connection with the public sewers as established by Resolution.
(1) For service to properties within the village. For all water metered, the operation, maintenance and replacement charge shall be established by Resolution.

Sec. 58-145. Extra strength surcharges.
When approved by village for discharge and after completion of a control manhole, users shall be charged on the basis of the following quarterly strength determinations* as set by resolution:

Parameter	In Excess Of
BOD	300 mg/l
SS	275 mg/l
Phosphorus as P	16 mg/l

* The strength determination shall be computed from concentrations determined by 24-hour composite samples.

Sec. 58-146. Industrial cost recovery.
(a) As set forth in the sewer use ordinance, all industrial users, of the sewer use ordinance, shall be charged a rate as set by resolution for metered water used in excess of 22 gallons per employee per day (gpepd).
(b) In lieu of the flow charge, industrial users shall pay surcharges set by resolution where strength and flow data is available:
  (1) BOD in excess of 300 mg/l;
  (2) suspended solids in excess of 275 mg/l;
  (3) phosphorus as P in excess of 16 mg/l;
  (4) gallons in excess of 22 gpepd.

Sec. 58-147. Billing.
All meters shall be read at least quarterly. Bills for sewage disposal services shall be rendered under the supervision of the village, and such bills shall be due and payable on the date specified in the bill. For bills not paid within 30 days thereafter, a penalty shall be applied as set by resolution. The village may alter billing cycles as deemed necessary.

Article II - Water Service

Sec. 58-56. Establishment.
Water charges to each dwelling unit and/or business connected with the village's water supply system shall be established by council by resolution.

New Section 58-561. Uniformity of user charge rates
User charge rates for water shall be uniform to all users in the service area regardless of municipal boundaries.

Sec. 58-59. Billing; penalty for delinquent payment.
Charges for water will only be established in the name of the property owner and, or the name of the person responsible for paying property taxes. The owner of the property will be responsible for properly managing rental properties to satisfy their financial needs and the requirement of their tenant for water service. The Village Manager may consider limited exceptions to this requirement. Charges for water will be billed with a period of 30 days in which the amount due must be paid. After such due date, a penalty shall be applied as set by resolution. The village may alter billing cycles as deemed necessary.

Deleted Sec. 58-65.

This Ordinance shall be effective on the day of legal publication - June 4, 2009

Moved - Seconded -

Ayes:

Nays:

Absent:

ORDINANCE ADOPTION DATE:

ORDINANCE EFFECTIVE DATE:

_____
Carol J. Jones, Village Clerk

VILLAGE OF DEXTER

cnicholls@villageofdexter.org

8140 Main Street Dexter, MI 48130-1092 Phone (734)426-8303 ext 17 Fax (734)426-5614

MEMO

To: **President Keough and Council Members**
From: **Courtney Nicholls, Assistant Village Manager**
Date: **May 26, 2009**
Re: **Water & Sewer Use Ordinance Amendments**

During the analysis performed by the Michigan Department of Environmental Quality as part of the State Revolving Loan process it was discovered that some changes to our sewer use ordinance are required. While making the changes to the sewer ordinance, we should also make them to the water ordinance, as it will undergo a similar analysis in the Drinking Water Revolving Fund process. The MDEQ mandated changes involve two areas:

- Removing extra charges for users outside the Village limits. Recent case law has clarified a previously ambiguous state law regarding charging customers outside of the Village a higher rate for water service. The interpretation now requires commodity charges to be the same for all users regardless of location.
- Removing specific language related to the extra strength surcharges and industrial cost recovery fees. The State requires these fees to be reviewed annually and set by resolution along with the rates to make sure they are justified. Currently the Village does not have any customers that are charged extra strength surcharges or industrial cost recovery fees.

The other changes are minor clarifications so the ordinance matches our current practices.

The schedule for the adoption is as follows:
April 27 - Set Public Hearing for May 26, 2009
May 4 - Proposed Ordinance Published
May 11 - Discussion Item at Council
May 26 - Public Hearing & Ordinance Adoption
June 4 - Ordinance Published and takes effect
June 12 - SRF Application Part 2 / User Charge System Analysis Due to MDEQ

Sewer

Sec. 58-128 User Rates and Charges for Wastewater Disposal Service
(b) FIXING RATES AND CHARGES

Commencing on the effective date of this ordinance, the user rates and charges for wastewater treatment shall be fixed by the Village by resolution. ~~Charges for wastewater treatment furnished to premises outside the corporate limits of the Village shall be fixed by the Village by resolution prior to the rendering of such services.~~

~~Sec. 58-143. Sewer rates outside corporate limits.~~
~~Whenever the system is supplying sewage disposal service to premises located outside the corporate limits of the village, the rates for this service shall be fixed by the village council. The operation, maintenance and replacement portion of the rate charged shall be proportional to the~~

~~village rates for operation, maintenance and replacement, plus proportional debt retirement charges.~~

New Section 58.143 - Uniformity of user charge rates
User charge rates for normal strength domestic wastewater shall be uniform to all users in the service area regardless of municipal boundaries.

Sec. 58-144. Sewer rates.
Charges for sewage disposal service shall be levied upon all premises having any sewer connection with the public sewers as established by Resolution.
(1) For service to properties within the village. For all water metered, the operation, maintenance and replacement charge shall be established by Resolution.
(2) ~~For service to properties outside the village. The rate as established by Resolution will include and an additional $1.00/1,000 gallons.~~

Sec. 58-145. Extra strength surcharges.
When approved by village for discharge and after completion of a control manhole, users shall be charged on the basis of the following quarterly strength determinations* as ~~follows~~set by resolution:

TABLE INSET:

Parameter	~~Charge~~	In Excess Of
BOD	~~$0.315/pound~~	300 mg/l
SS	~~$0.346/pound~~	275 mg/l
Phosphorus as P	~~$1.968/pound~~	16 mb/l

* The strength determination shall be computed from concentrations determined by 24-hour composite samples.

Sec. 58-146. Industrial cost recovery.
(a) As set forth in the sewer use ordinance, all industrial users, of the sewer use ordinance, shall be charged a rate as set by resolution for ~~the following: $0.467 per 1,000 gallons of~~ metered water used in excess of 22 gallons per employee per day (gpepd).
(b) In lieu of the flow charge, industrial users shall pay ~~the following~~ surcharges set by resolution where strength and flow data is available:
  (1) ~~$0.061/pound of~~ BOD in excess of 300 mg/l;
  (2) ~~$0.067/pound of~~ suspended solids in excess of 275 mg/l;
  (3) ~~$0.376/pound of~~ phosphorus as P in excess of 16 mg/l;
  (4) ~~$0.140/1,000~~ gallons in excess of 22 gpepd.

Sec. 58-147. Billing.
All meters shall be read at least quarterly. Bills for sewage disposal services shall be rendered ~~quarterly~~ under the supervision of the village, and such bills shall be due and payable on the date specified in the bill. For bills not paid within ~~15~~ 30 days thereafter, a penalty ~~of 5 percent of the amount of the bill shall be charged per month.~~shall be applied as set by resolution. The village may alter billing cycles as deemed necessary.

Water

Sec. 58-56. Establishment.

~~Rates for consumers outside of the village limits shall be established by council by resolution. Minimum water~~Water charges to each dwelling unit and/or business connected with the village's water supply system shall be established by council by resolution~~as well as rates applied to usage greater than minimum~~.

New Section 58-561. Uniformity of user charge rates

User charge rates for water shall be uniform to all users in the service area regardless of municipal boundaries.

Sec. 58-59. Billing; penalty for delinquent payment.

Charges for water will only be established in the name of the property owner and, or the name of the person responsible for paying property taxes. The owner of the property will be responsible for properly managing rental properties to satisfy their financial needs and the requirement of their tenant for water service. The Village Manager may consider limited exceptions to this requirement. Charges for water will be billed ~~monthly~~ with a period of ~~15~~ 30 days in which the amount due must be paid. After such due date, a penalty ~~of five (5) percent per month will be added to the bill~~shall be applied as set by resolution. The village may alter billing cycles as deemed necessary.

~~Sec. 58-65. Minimum bill.~~

~~The minimum bill to any one consumer for service rendered in each billing period, whether a meter is used or not, shall be at the rates established by council by resolution except as provided in this section. In determining charges for such service to any user under any classification, where the amount of water consumed or used exceeds the minimum provided, the bill shall be figured upon the amount of water actually used at rates established by the village council by resolution.~~

P14

2009 Upcoming Meetings

Board	Date	Time	Location	Website	Village Representative
Washtenaw County Board of Commissioners	5/20/2009	6:45 p.m.	Board Room, Admin Building	http://www.ewashtenaw.org/government/boc/	
Webster Township Planning	5/20/2009	7:30 p.m.	Webster Township Hall	http://www.twp.webster.mi.us/	
Healthy Community Steering Committee	5/21/2009	8:30 a.m.	Chelsea Hospital - White Oak Room		Paul Cousins
Dexter Village Council Work Session - Facilities	5/26/2009	6:00 p.m.	Dexter Senior Center	http://www.villageofdexter.org	
Chelsea City Council	5/26/2009	7:00 p.m.	Washington Street Education Center	http://www.city-chelsea.org/	
Dexter Township Planning	5/26/2009	7:00 p.m.	Dexter Township Hall	http://www.twp-dexter.org/	
Scio Township Board	5/26/2009	7:00 p.m.	Scio Township Hall	http://www.twp.scio.mi.us/	
Dexter Village Council	5/26/2009	7:30 p.m.	Dexter Senior Center	http://www.villageofdexter.org	
Western Washtenaw Area Value Express	5/26/2009	8:15 a.m.	Chelsea Community Hospital		Jim Carson
Dexter Community Schools Board of Education	6/1/2009	7:00 p.m.	Creekside Intermediate School	http://web.dexter.k12.mi.us/	
Dexter District Library Board	6/1/2009	7:30 p.m.	Dexter District Library	http://www.dexter.lib.mi.us/	
Dexter Village Planning Commission	6/1/2009	7:30 p.m.	Senior Center	http://www.villageofdexter.org	Jim Carson
Washtenaw County Road Commission	6/2/2009	1:00 p.m.	Road Commission Offices	http://www.wcroads.org/	
Dexter Village Arts, Culture & Heritage Committee	6/2/2009	7:00 p.m.	Senior Center	http://www.villageofdexter.org	Paul Cousins
Dexter Village Town Hall Meeting	6/3/2009	6:30 p.m.	Dexter District Library	http://www.villageofdexter.org	
Washtenaw County Board of Commissioners	6/3/2009	6:45 p.m.	Board Room, Admin Building	http://www.ewashtenaw.org/government/boc/	
Washtenaw Area Transportation Study-Technical	6/3/2009	9:30 a.m.	Road Commission Offices	http://www.miwats.org/	Rhett Gronevelt
Dexter Area Historical Society	6/4/2009	7:30 p.m.	Dexter Area Historical Museum	http://www.hvcn.org/info/dextermuseum/	
Dexter Village Council	6/8/2009	7:30 p.m.	Dexter Senior Center	http://www.villageofdexter.org	

Due to the possibility of cancellations please verify the meeting date with the listed website or the Village Representative

AGENDA 5/26/09
ITEM H-1

gramannarbor@comcast.net; harmongini@msn.com; lking@wccnet.edu; dmcdougal296705@comcast.net; jswalden@umich.edu; HNV-GLYNIS@SBCGLOBAL.NET; annlin@umich.edu; daphne.r.adams@gm.com; suzanneb@med.umich.edu; nkfort@comcast.net; sng48@aol.com; cindyh@cch.org; MKERR@AnnArbor.org; ericmahler@hotmail.com; satur9@comcast.net; dmmorton4298@comcast.net; cmiller@wash.k12.mich.us; Mark Ouimet; popandgrammy@provide.net; Wesley Prater; tim@annarborspark.org; mschippani@comcast.net; cls3156@aol.com; Gregg Weaver; excellencequest@aiserv.net

Subject: You're Invited to attend an important Community Forum

Greetings, Members of Washtenaw County Government Boards, Committees and Commissions,

You have no doubt heard about the historic budget challenges before local governments this year. At Washtenaw County we are facing a revenue reduction unseen since the Great Depression. You are also likely aware that our County does not shrink from a challenge. Our business improvement process has brought a level of excellence in public service that has been recognized around the nation – even as we faced tough budget situations in the past. We expect to address the current challenge with the same creativity, sensitivity and systemic thinking that has become the hallmark of our government over the last decade.

This unusual time demands increased clarity regarding our investment priorities, and we believe that the civic leadership of Washtenaw County are essential partners in scoping out solutions. **We would like to invite you to join us in for one of our upcoming Community Forum.** The topic for the Forum will be the Financial State of Washtenaw County Government.

These meetings will provide an opportunity for an update from Administrator Bob Guenzel on the projected $26 million dollar deficit in the County's 2010/2011 budget. Just as important, the Forums will be a conversation led by Commissioner Conan Smith, the chair of our Ways & Means Committee, to get your feedback on options being considered by the Administrator for his recommended budget adjustments.

We are counting on concerned citizens like you to tell us how possible budget reductions might affect the community. Your input and insight will help inform decisions that can minimize any negative impacts while balancing the County budget.

Please join us at any of the forums listed below:

Tuesday, May 26, 2009
7:30 am to 9:30 am
Washtenaw County Learning Resource Center
Washtenaw County Service Center
4135 Washtenaw Avenue in Ann Arbor
~ A continental breakfast will be available ~

Wednesday, June 3, 2009
3:00 pm – 5:00 pm
Washtenaw County Learning Resource Center
Washtenaw County Service Center

4135 Washtenaw Avenue in Ann Arbor

Thursday, June 11, 2009
4:00 pm – 6:00 pm
Washtenaw Intermediate School District
1819 South Wagner Road in Ann Arbor

Sincerely,

The Washtenaw County Board of Commissioners

220 North Main Street
PO Box 8645
Ann Arbor, MI 48107-8645
734-222-6850
bidlackj@ewashtenaw.org

AGENDA 5-26-09

ITEM I-1

VILLAGE OF DEXTER - COMMUNITY DEVELOPMENT OFFICE
8140 Main Street • Dexter, Michigan 48130-1092 • (734) 426-8303 • Fax (734) 426-5614

Memorandum

To: Village Council
From: Allison Bishop, AICP, Community Development Manager
Re: Report
Date: May 26, 2009

ZBA

Attached to my report is the May 18, 2009 ZBA Notice of Decision.

OTHER

Enforcement – It is recommended that the Village of Dexter adopt a Code Enforcement Policy. Adopting a policy will help everyone; Council, residents, and staff understand what the expectations are for enforcement of the Village of Dexter Zoning Ordinance and General Code. A policy will also assure that each case is handled equally and documented appropriately.

I have conducted research from other communities on Enforcement Policies and have incorporated other community's policies with the Village's current procedures to develop the attached policy statement and procedures. I would like to give Council the opportunity to review the policy and get back to me with any suggestions, comments, concerns, etc. I plan to formally present the information to Council on June 8, 2009.

I have also developed a synopsis of code enforcement violations most commonly dealt with. The information will be included on the website and in the next newsletter.

Please feel free to contact me if you have any questions.
Thank you.

VILLAGE OF DEXTER - ZONING BOARD OF APPEALS

8140 Main Street, Dexter, Michigan 48130-1092 Phone (734)426-8303 ext. 15 Fax (734)426-5614

NOTICE OF DECISION

TO: Village Council
Planning Commission

CC: Sterling Imfeld, 7819 Ann Arbor Street, Dexter, MI 48130
Donna Dettling, Village Manager

FROM: Allison Bishop, Community Development Manager
DATE: Tuesday, May 19, 2009
RE: ZBA Decision (Case #2009-02)
Tax ID's HD-08-06-153-009

In compliance with the Zoning Board of Appeals Rules of Procedure and Policy, Article III, notice of the following ZBA decisions is given to Village Council and Planning Commission:

Variance Request (ZBA Case #2009-02)

On May 18, 2009, the ZBA reviewed a variance request, submitted by Sterling Imfeld for 7819 Ann Arbor Street, to waive the following sections of the Village of Dexter Zoning Ordinance to permit the construction of 12 x 12 foot potting shed. A variance was required from Section 3.02(B), Accessory Structures, maximum number and coverage regulations.

1. Section 3.02(B), Accessory Structures prohibits more than one accessory structure over 100 square feet per lot. The applicant currently has an existing 10 x 12 accessory structure; therefore a variance was required for the construction of the additional accessory structure (potting shed).

The staff review was presented, the applicant gave a presentation and the public present had the opportunity to speak.

The applicant's neighbors were presented and spoke of their support for the project.

The discussion included, but was not limited to the details of the review, the request, the applicant's rebuttal and the public's comments:

- Phasing plan for home improvements which include a future 2 car garage.
- Applicant's plans for 2011- no additional variances required.
- Large lot (100 x 200), minimal impact to large lot
- Applicant's quality proposal and application
- Former ZBA members home and understanding of storage difficulties
- Minor request and potentially changing the ordinance to permit residents to have a garage and a storage shed. Situation exists throughout the Village and is not unreasonable.
- Discussed comments in staff review.

ZBA Decision
On May 18, 2009, the Village of Dexter Board of Zoning Appeals moved the following:

Based on the information provided by the applicant at the May 18, 2009 Zoning Board of Appeals meeting the Board determines that the request to waive the maximum number and coverage regulations for accessory structure requirements of Sections 3.02(B) be **GRANTED**. The application submitted by Sterling Imfeld at 7819 Ann Arbor Street, HD-08-06-153-009 **MEETS** the conditions required for the granting of a variance. The applicant is therefore **PERMITTED** to construct a 12 x 12 potting shed as part of phase 1 and a standard 2-car detached garage to replace the existing 10 x 12 storage shed as part of phase 2.

The determination was made with consideration of following per Section 24.05 of the Village of Dexter Zoning Ordinance:

1. Substantial Justice as stated in the staff review and as discussed at the meeting.
2. Relationship to adjacent land uses as stated in the staff review and as discussed at the meeting.

Please feel free to contact me with any questions regarding the variance request or decision.

Thank you.

Respectfully submitted,

Allison Bishop, AICP
Community Development Manager

COMMUNITY DEVELOPMENT DEPARTMENT
CODE ENFORCEMENT POLICY
June 2009

PURPOSE AND AUTHORITY

The purpose of this policy statement is to provide standard policies for all code enforcement procedures conducted by the Community Development Office (hereinafter "Code Enforcement Department"). The authority to enforce the Village of Dexter regulations is provided by the Village of Dexter Zoning Ordinance, Village of Dexter General Code of Ordinances and the State of Michigan.

POLICY STATEMENT

The intent of code enforcement is to protect the public health, safety, and welfare of the Community and to provide for compliance with regulations. Code Enforcement will enforce the regulations in a fair and equitable manner and will provide policies and procedures that are clear and that provide the property owner with an understanding of the regulations and the procedures available to bring the property into compliance. Enforcement of the regulations by the Village and its professional staff will include both proactive and reactive enforcement procedures as defined below.

When staff first determines a code violation exists, either by complaint or inspection, the Code Enforcement Department seeks to focus on working with the violator to remedy the violation in the most efficient and timely manner. Initially, the Code Enforcement Department shall be more focused on having the property bring the subject property into compliance with the Regulations rather than punishing the violators by issuing a citation (i.e. fine).

When the Code Enforcement Department works with violators who are in the process of bringing a property into compliance with the regulations, the staff documents its actions and makes those records available to the public. Persons interested in the status of pending code violations may review files regarding the violation in the Community Development Office.

ENFORCEMENT POLICIES

The Code Enforcement Department will try to make every effort to consistently process complaints and manage enforcement actions. Deviation from established procedures should be documented and justified when adherence to these guidelines is not practical. The following are general policies:

- The regulations shall be enforced by the Code Enforcement Department and the duly authorized staff (the Zoning Enforcement Officer and others designated by the Community Development Department or Village Manager).
- All zoning related complaints shall be on complaint forms available at the Community Development Office and on the village's website.
- The Code Enforcement Department will investigate anonymous complaints. However, such complaints will receive a lower priority than those complaints lodged by a resident who discloses his or her identity unless staff determines that

the reported violation may pose an immediate threat to the public health, safety, or welfare of the community.

- Zoning is not to be used as a mean of furthering neighbor and/or civil disputes. In such cases, the staff may advise the complainant to address the issue by private means.
- All Code Enforcement letters and orders shall include the following: the nature of the violation; the date of inspection; the regulation being violated; the means to comply with the regulation; and the appeals process.

ENFORCEMENT PRIORITIES

The Code Enforcement Department shall prioritize all zoning enforcement actions in the following order:

1. Violations that pose immediate danger to public health, safety, or general welfare of the community;
2. Violations related to development projects that are in the construction phase;
3. Proactive enforcement programs initiated by the Village Council;
4. Reactive or complaint based enforcement programs;
5. Anonymous complaints, unless the Code Enforcement Department determines that the reported violation may pose an immediate threat to the public health, safety and welfare of the community.

ENFORCEMENT PROCEDURES

When conducting proactive and/or reactive enforcement action, the Code Enforcement Department shall adhere to the following procedures:

STEP ONE – *COMPLAINT FILED*

A concerned citizen must complete a Code Complaint Form. An inspection can also be generated/filed by the Zoning officials if a violation is observed, or if the Village Council brings an apparent violation to the Code Enforcement Department's attention. Anonymous complaints are accepted, but given a lower priority. All complaints shall be recorded and entered into the zoning file for the subject property and into the enforcement database. No action will be taken if the Zoning Official determines that the complaint is not considered a violation.

STEP TWO – *PRIORITIZE*

The violation shall be given an enforcement priority by the Zoning Official per the enforcement priorities list above.

STEP THREE – *CONDUCT A SITE INSPECTION*

A site inspection is required to determine whether there is a code violation or any other issues associated with the property. Photographs of the property should be taken to document the violation existed. The photographs should be included in the file, dated and initialed and/or signed by the inspector.

STEP FOUR – *PROPERTY RESEARCH*

The Code Enforcement Department shall conduct a check of its records for the subject property, such as subject property address, tax identification number, owner, tenant and previous and/or pending violations.

STEP FIVE – *ENFORCMENT*

If it is determined that a violation exists, the following procedural options are:

A. Issuance of an initial zoning violation notification letter requesting 10 days for violation abatement measures to be taken.
B. Following 10 days if violator has not contacted the Village to request extension of time to abate violation OR applied to the Zoning Board of Appeals for a challenge of interpretation, a Notice of Violation Citation will be issued giving an additional 5 days to abate the alleged violation.
C. If violation abatement has not occurred within the additional 5 days following the Notice of Violation Citation a Notice of Civil Infraction will be issued and court proceedings will be scheduled with District Court 14A, Chelsea.

The above procedures are not intended to be mutually exclusive and may be used in any combination to remove the violation.

STEP SIX – *ABEYANCE*

There may be instances where the violator has been issued a Notice of Violation or a Notice of Civil Infraction and the violator may need additional time to remedy the violation. In these instances, the Code Enforcement Department may agree to an abeyance of the enforcement action, so long as the violator is willing to agree in writing to specific terms of compliance set forth by the Code Enforcement Department. This technique has been developed in recognition that enforcement of codes requires flexibility in the approach in order to enable compliance. The Code Enforcement Officer may grant abeyance periods not to exceed 30 days each during any enforcement proceedings.

STEP SEVEN – *CLOSURE*

Once the violation has ceased and the violator is in compliance, the Code Official can close the case. Cases are closed if the Zoning Board of Appeals or the Courts do not find in favor of the Code Enforcement Department. No fee shall be collected where the case has been closed for the above referenced reasons.

VILLAGE OF DEXTER

CODE COMPLAINT FORM

This form must be completed for all filings of code related complaints. All complaints should be made in writing and filed with the Code Enforcement Department of the Community Development Office of the Village of Dexter. If the person or persons filing this complaint wish to remain anonymous do not fill out the complainant information. The person or persons filing this complaint shall understand that by signing and/or attesting to the information contained herein may be asked and/or summoned by subpoena to provide testimony on this complaint, if necessary.

NAME OF COMPLAINANT _____

ADDRESS _____

TELEPHONE (HOME/CELL) _____

NAME OF OWNER AND PROPERTY'S ADDRESS WHERE ALLEGED VIOLATION IS OCCURING: _____

_____

_____

PLEASE DESCRIBE THE ALLEGED VIOLATION IN DETAIL (times and dates of alleged violations are needed with pictures, if possible):

_____

_____

_____

_____

_____

_____

PLEASE SIGN HERE THAT YOU AGREE THAT THIS COMPLAINT DESCRIBED ABOVE IS TRUE AND ACCURATE TO THE BEST OF YOUR KNOWLEDGE:

_____ DATE: _____

SIGNATURE

OFFICE USE ONLY

TAX ID: _____

ADDRESS: _____

OWNER: _____

OCCUPANT: _____

DATE OF INSPECTION: _____

VILLAGE OF DEXTER CODE ENFORCEMENT

CODE ENFORCEMENT OFFICERS FIND THE MOST COMMON CONDITIONS THAT CAN LEAD TO VIOLATIONS OR TICKETS ARE:

- **Accumulation of junk and rubbish**
- **Trash**
- **Inoperable and/or unlicensed motor vehicles**
- **Temporary Signs**
- **Recreational Vehicle Storage**
- **Weeds and grass exceeding 8 inches**

This list is not all-inclusive. If you have any questions about a condition of any property in the Village, do not hesitate to contact the Village Code Enforcement Officials at 734-426-8303.

THE VILLAGE OF DEXTER AND YOUR NEIGHBORS APPRECIATE YOUR COOPERATION.

ACCUMULATION OF JUNK AND RUBBISH

It is the responsibility of every property owner, tenant, lessee or occupant to maintain the property in a clean and orderly condition. Materials should not be stored outdoors. Materials should be stored within a completely enclosed building.

TRASH

Trash and recycling containers shall not be placed at the curb prior to 5 pm the afternoon before scheduled trash pick up. Trash and recycling should be contained within approved containers. For more information and/or questions on trash or recycling contact the Village Offices for an information pamphlet.

INOPERABLE AND UNLICENSED MOTOR VEHICLES

Vehicles must:

- Be licensed and operable.
- Be parked in an off-street parking lot, driveway or garage.
- Be parked on hard-surfaced with materials such as asphalt, brick pavers, gravel or concrete.

Commercial vehicles cannot be stored in residential zones.

SIGNS

Temporary signs are prohibited in the Village unless permitted or approved by the Village Council.

Temporary signs include:

- Stick in the ground signs
- Banners

Excludes:
Garage sales sign are permitted for 48 hours and must be removed when sale is over.

RECREATIONAL VEHICLES (Boats, Trailers, Campers, Motor Homes, and similar vehicles)

- May not be stored in the front yard for a period of more than 48 hours.
- Must be parked in the side or rear yard at least 3 feet from the property line behind the front building line or within a completely enclosed building.

WEEDS AND GRASS

Growth of lawn, weeds or other noxious plants over 8 inches in height is considered a public nuisance.

It is the responsibility of every property owner, including vacant property, to maintain yard spaces.

OTHER COMMON VIOLATIONS include:

- Building without a permit or inspections, including decks, fences, and pools.
- Not keeping sidewalks and driveways free of snow and ice.

FOR THOSE RESIDNETS THAT ARE PART OF HOME OWNERS ASSOCIATIONS ADDITIONAL APPROVALS MAY BE NECESSARY. PLEASE CHECK WITH YOUR ASSOCIATION PRIOR TO CONTACTING THE VILLAGE.

AGENDA 5-26-09
ITEM I-4

VILLAGE OF DEXTER

ddettling@villageofdexter.org
8140 Main Street Dexter, MI 48130-1092 Phone (734)426-8303 ext 11 Fax (734)426-5614

MEMO

To: President Keough and Council Members
From: Donna Dettling, Village Manager
Date: May 26, 2009
Re: Village Manager Report

1. Meeting Review:
   - May 7th – Forest/Alley Project Progress Meeting
   - May 8th – Carey Baker Bridge aesthetics follow-up
   - May 11th- Adams Outdoor
   - May 14th – SEMCOG Workshop Grant
   - May 14th – West Shore Outdoor Sirens
   - May 14th –Workshop Storm Water Phase II
   - May 14th – DDA Meeting
   - May 15th – Dexter, Dexter, Webster Work Group
   - May 18th – Street Maintenance Bid Open
   - May 21st – Forest/Alley Project Progress Meeting
   - May 22nd – OHM Project Update

2. Upcoming Meeting Review:
   - May 26th – County Community forum
   - May 27th – Walking Audit Safe Routes to School
   - May 28th – SEMCOG Pedestrian Safety Workshop
   - June 3rd – Townhall Meeting
   - June 10th – Wellhead Protection Meeting
   - June 11th – DDA Meeting

3. Workshop Grant Process- Attended a free SEMCOG education program on May 14, 2009, "Grants: How elected officials can champion the process". The program focused on improving a community's chances for grant application success, how SEMCOG data can assist in grant applications, and grants currently available.

4. Workshop Phase II Stormwater Permit – Attended a free workshop hosted by OHM for Phase II Stormwater Communities. This training is a requirement for municipalities with a Phase II Stormwater Permit.

5. Project List-. Included in your packet is a working time-line for village projects. This Project Time-Line will be updated with new information and circulated as necessary.

6. Water Main Easement Update- OHM and staff met on site with both the Hosmer's and the Bates last week to look at the water main location along Parker and Shield Road. During the site visit Mr. Hosmer agreed to a location for a water main easement. The documents are being processed The Bates are still requiring that the Water Main be located in the current right of way. This would require the removal of several trees in the right of way and the Bates did not have a problem with that.

7. Dam Removal Expenses- The Huron River Watershed Council asked for cost details on the Mill Creek Dam Removal Project. Attached is the worksheet prepared to itemize costs associated with Dam Removal.

Mill Creek Dam First Signed Proposal April 10, 2007

Reconcile Dam Expenses- Pull Dam expenses out of Bridge Project

Permit/Consultant Fees			
Conceptual Design	$17,804.00		
Field Data Collection	$4,229.00		
Engineering Design	$17,973.00		
Permitting & Condition Resolution	$45,000.00		
Due Care Permit Condition	$7,200.00		
Permit modification - Apron removal	$4,300.00		
Specification & Bidding	$4,500.00		
Construction Oversight	$23,000.00		
Coordination & Stakeholder Relations	$10,347.00		
Administration	$5,700.00		
	$140,053.00		$140,053.00
Dam Removal Construction March 2008 through December 16, 2008			
MDOT Participating Construction Costs			
Dam Removal		$15,815.00	
Temporary Access Road		$72,712.00	
Rip Rap		$8,934.00	
Stormwater quality improvement structure		$34,366.00	
			$131,827.00
Sediment Management and Stream Stabilization			
Non MDOT Participating Construction Costs			
Rock Control Structures		$48,112.00	
Silt Fence		$7,000.00	
Rip Rap		$2,300.00	
Sediment Excavation		$80,600.00	
Embankment		$2,320.00	
Storm Sewer Infrastructure		$27,000.00	
Slope Restoration		$27,000.00	
Downstream Bank Restoration		$25,700.00	
			$220,032.00
			$491,912.00
General Contingency 10%		$35,185.90	
Washtenaw County Road Commission Project Oversight 15%		$52,778.85	
			$579,876.75

AGENDA 5-26-09

ITEM I-5.

Village President Report

Hello Residents and Council Members,

Here is my written update of my activities:

Activities since May 11, 2009 Village Council meeting:

May 12, 2009 - Attended a meeting, along with Allison and Paul Cousins, with URS, the Huron Clinton Metropolitan Authority and Washtenaw County Parks regarding the alignment of the Border to Border trail as it heads south from the Metropark and into the Village.

May 14, 2009 - Attended D.D.A. meeting. Reviewed the 2009-2010 budget format; the budget will be adopted in June. Tom Covert volunteered to take on the position of Treasurer - we very much appreciate his willingness to fill this position. The Board also unanimously passed the resolution in support of local purchasing.

May 20, 2009 - Sang Happy Birthday to the seniors at the Dexter Senior Center as part of their May birthday lunch with clarinet accompaniment provided by my daughter Carly.

Future activities:

May 25, 2009 - Memorial Day Parade

May 26, 2009 - Village Council work session on facilities (6 p.m. at the Senior Center)

May 26, 2009 - Village Council Meeting (Note this meeting is on a Tuesday evening due to the Memorial Day Holiday)

June 3, 2009 - Next Town Hall Meeting (6:30 p.m. at the Dexter District Library)

Please feel free to call me at home or send me an email anytime you have questions. I look forward to seeing you around town.

Shawn Keough

Village President

(734) 426-5486 (home number)

skeough@villageofdexter.org

AGENDA 5-26-09
ITEM J-1

SUMMARY OF BILLS AND PAYROLL

26-May-09

Payroll Check Register	05/20/09	$33,552.14	Bi-weekly payroll processing
Account Payable Check Register	05/27/09	$88,788.85	

$122,340.99 TOTAL BILLS & PAYROLL EXPENDED ALL FUNDS

Summary Items from Bills & Payroll	Amount	Comments

ALL PAYABLES ARE WITHIN ACCEPTABLE BUDGET LIMITS
DETAIL VENDOR LIST AND ACCOUNT SUMMARY PROVIDED

"This is the summary report that will be provided with each packet. Approval of the total bills and payroll expended, all funds will be necessary."

VENDOR APPROVAL SUMMARY REPORT

Date: 05/20/2009
Time: 10:27am
Page: 1

Village of Dexter

Vendor Name	Vendor Number	Description	Check Amount	Hand Check Amount
ALEXANDER CHEMICAL CORPORATION	ALEXANDER	CREDIT	659.00	0.00
AMERICAN WATER WORKS ASSOC	AMER WATER	MEMBERSHIP	165.00	0.00
ANN ARBOR LANDSCAPING INC.	AA LANDSCA	ANN ARBOR ST TREES	1,875.00	0.00
ANN ARBOR NEWS	A2 NEWS	WATER SYSTEM IMPROVVEMENT	157.48	0.00
ARBOR CARE TREE SURGEONS	ARBOR CARE	3580 DOVER	486.00	0.00
ARBOR SPRINGS WATER CO.INC	ARBOR SPRI	VILLLAGE OFFICE	11.50	0.00
CARRIER & GABLE, INC.	CARRIER	PUSH BUTTON	316.00	0.00
COMCAST	COMCAST	DPW	242.15	0.00
COURTNEY NICHOLLS	COUR	REIMBURSEMENT	55.00	0.00
DENTAL NETWORK OF AMERICA	DENTAL NET	COVERAGE 6/01-6/30/09	233.40	0.00
DEXTER SENIOR CITIZENS CENTER	DEX SENIOR	ANNUAL CONTRIBUTION	1,250.00	0.00
DEXTER VILLAGE	DEXVIL	~~OFFICE~~ Water Bills	3,760.60	0.00
DISPLAY SALES	DISPLAY	FLAG	547.00	0.00
DORNBOS SIGN & SAFTEY INC.	DORNBOS	WASHERS	63.32	0.00
ETNA SUPPLY CO	ETNA SUPPL	SENSUS	5,255.04	0.00
FIFTH STREET DENTAL CARE	FIFTH STRE	PATIENT: ED LOBDELL	106.25	0.00
GADALETO, RAMSBY & ASSOCIATES	FORT-GAD	COVERAGE 06/01-07/01/09	527.86	0.00
GREEN GUYS LAWN AND LANDSCAPE	G GUYS	SPRING APPLICATION FERTILIZER	95.00	0.00
HERITAGE NEWSPAPERS	HERITAGE N	SEWER WATER AMEND	432.00	0.00
KEMIRA WATER SOLUTIONS INC	KEMIRA	CHEMICALS	3,222.92	0.00
KENNEDY INDUSTRIES, INC.	KENNEDY IN	FIELD SERVICES	480.00	0.00
KLAPPERICH WELDING	KLAPPERICH	7' ANGEL	12.00	0.00
LOCAL TECHNICAL ASSISTANCE PRO	LOCAL TECH	WORKSHOP	40.00	0.00
LOWE'S BUSINESS ACCOUNT	LOWE S	DPW	25.90	0.00
MICHIGAN DEPT OF TRANSPORTATIO	MI DOT	ANN ARBOR ST PROJECT	16,804.39	0.00
MICHIGAN FARMERS MARKET ASSOC	MICH FARM	MEMBERSHIP RENEWAL	150.00	0.00
MICHIGAN MUNICIPAL LEAGUE	MI MUN LEA	MML DUES	1,504.00	0.00
MIDWESTERN CONSULTING	MIDWEST	SPEED STUDIES	4,360.00	0.00
NATIONAL RECREATIONAL AND PARK	NRPA	MEMBERSHIP	25.00	0.00
NETWORKING REPORTING	NETWORK RE	DWRF PROJECT PLAN	521.87	0.00
PARAGON LABORATORIES INC	PARA	LAB	55.00	0.00
PINCKNEY FAMILY DENISTRY,	PINCKNEY F	PATIENT: ERIN AIKEN	132.00	0.00
PLASTIC TECHNIQUES INC	PLASTIC TE	TOOLTRAY	334.42	0.00
RADTKE TRUCKING, LLC	ROY R	TOP SOIL	945.00	0.00
ROTO ROOTER	ROTO ROOTE	SANITARY SEWER	3,795.00	0.00
SHULTS EQUIPMENT, INC.	SHULTS EQU	REISSUE	707.67	0.00
STAPLES BUSINESS ADVANTAGE	STAPLES OF	OFFICE SUPPLIES	177.53	0.00
UNIVERSAL PUMP	UNI PUMP	AIR VENT	173.80	0.00
US BANK CORPORATE TRUST	US	STREETSCAPE SPECIAL	300.00	0.00
VICTOR STANLEY, INC.	VIC STANLE	COMPONENTS	3,294.00	0.00
WASHTENAW COUNTY TREASURER	W CTY TREA	LAW ENFORCEMENT	35,490.75	0.00
		Grand Total:	88,788.85	0.00

Fund / Department / Account	GL Number Abbrev	Vendor Name / Invoice Description	Check Number	Invoice Number	Due Date	Amount
Fund: General Fund						
Dept: Village Council						
101-101.000-802.000	Profession	MIDWESTERN CONSULTING SPEED STUDIES	0	030088A-63	05/19/2009	4,360.00
101-101.000-943.000	Council Ch	DEXTER SENIOR CITIZENS CENTER MAY RENT	0	05/19/09	05/19/2009	200.00
101-101.000-956.000	Council Di	COURTNEY NICHOLLS REIMBURSEMENT	0	05/19/09	05/19/2009	27.00
101-101.000-958.000	Membership	MICHIGAN FARMERS MARKET ASSOC MEMBERSHIP RENEWAL	0	05/19/09	05/19/2009	150.00
101-101.000-958.000	Membership	MICHIGAN MUNICIPAL LEAGUE MML DUES	0	05/19/09	05/19/2009	1,504.00
101-101.000-960.000	Education	LOCAL TECHNICAL ASSISTANCE PRO WORK SHOP	0		05/20/2009	20.00
101-101.000-960.000	Education	LOCAL TECHNICAL ASSISTANCE PRO WORKSHOP	0	05/19/09	05/19/2009	20.00
				Total Village Council		6,281.00
Dept: Village Manager						
101-172.000-721.000	Health & L	DENTAL NETWORK OF AMERICA COVERAGE 6/01-6/30/09	0	05/19/09	05/19/2009	116.70
101-172.000-721.000	Health & L	PINCKNEY FAMILY DENISTRY, PATIENT: ERIN AIKEN	0	05/19/09	05/19/2009	132.00
101-172.000-722.000	Life & Dis	GADALETO, RAMSBY & ASSOCIATES COVERAGE 06/01-07/01/09	0	05/19/09	05/19/2009	127.93
101-172.000-955.000	Miscellane	COURTNEY NICHOLLS REIMBURSEMENT	0	05/19/09	05/19/2009	28.00
				Total Village Manager		404.63
Dept: Village Clerk						
101-215.000-901.000	Printing &	ANN ARBOR NEWS WATER SYSTEM IMPROVVEMENT	0	13700	05/19/2009	157.48
101-215.000-901.000	Printing &	HERITAGE NEWSPAPERS SPRING CLEAN UP	0	1966576	05/19/2009	45.00
101-215.000-901.000	Printing &	HERITAGE NEWSPAPERS SEWER WATER AMEND	0	1967133	05/19/2009	117.00
				Total Village Clerk		319.48
Dept: Village Treasurer						
101-253.000-722.000	Life & Dis	GADALETO, RAMSBY & ASSOCIATES COVERAGE 06/01-07/01/09	0	05/19/09	05/19/2009	37.30
				Total Village Treasurer		37.30
Dept: Buildings & Grounds						
101-265.000-727.000	Office Sup	ARBOR SPRINGS WATER CO.INC VILLLAGE OFFICE	0	1115982	05/19/2009	11.50
101-265.000-727.000	Office Sup	STAPLES BUSINESS ADVANTAGE OFFICE SUPPLIES	0	8012436553	05/19/2009	177.53
101-265.000-920.000	Utilities	DEXTER VILLAGE OFFICE	0		05/20/2009	64.90
				Total Buildings & Grounds		253.93
Dept: Village Tree Program						
101-285.000-731.001	Trees	ANN ARBOR LANDSCAPING INC. ANN ARBOR ST TREES	0	05/19/09	05/19/2009	1,425.00
101-285.000-731.003	Trees for	ANN ARBOR LANDSCAPING INC. ANN ARBOR ST TREES	0	05/19/09	05/19/2009	450.00
				Total Village Tree Program		1,875.00
Dept: Law Enforcement						
101-301.000-803.000	Contracted	WASHTENAW COUNTY TREASURER LAW ENFORCEMENT	0	17324	05/20/2009	35,490.75
101-301.000-920.000	Utilities	DEXTER VILLAGE FIRE HALL	0		05/20/2009	425.80
				Total Law Enforcement		35,916.55
Dept: Fire Department						
101-336.000-920.000	Utilities	DEXTER VILLAGE FIRE HALL	0		05/20/2009	532.25
				Total Fire Department		532.25
Dept: Planning Department						

Fund / Department / Account	GL Number Abbrev	Vendor Name / Invoice Description	Check Number	Invoice Number	Due Date	Amount
Fund: General Fund						
Dept: Planning Department						
101-400.000-722.000	Life & Dis	GADALETO, RAMSBY & ASSOCIATES COVERAGE 06/01-07/01/09	0	05/19/09	05/19/2009	36.54
				Total Planning Department		36.54
Dept: Zoning Board of Appeals						
101-410.000-901.000	Printing &	HERITAGE NEWSPAPERS SPRING CLEAN UP	0	1966576	05/19/2009	27.00
				Total Zoning Board of Appeals		27.00
Dept: Department of Public Works						
101-441.000-721.000	Health & L	DENTAL NETWORK OF AMERICA COVERAGE 6/01-6/30/09	0	05/19/09	05/19/2009	116.70
101-441.000-721.000	Health & L	FIFTH STREET DENTAL CARE PATIENT: TODD & TRENT VIEBAHN	0	05/19/09	05/19/2009	90.00
101-441.000-722.000	Life & Dis	GADALETO, RAMSBY & ASSOCIATES COVERAGE 06/01-07/01/09	0	05/19/09	05/19/2009	38.81
101-441.000-740.000	Operating	KLAPPERICH WELDING 7' ANGEL	0	009021	05/19/2009	12.00
101-441.000-740.000	Operating	LOWE'S BUSINESS ACCOUNT DPW	0	05/19/09	05/19/2009	25.90
101-441.000-804.000	Tree Servi	ARBOR CARE TREE SURGEONS 3580 DOVER	0	05/19/09	05/19/2009	486.00
101-441.000-901.000	Printing &	HERITAGE NEWSPAPERS SPRING CLEAN UP	0	1966576	05/19/2009	54.00
101-441.000-901.000	Printing &	HERITAGE NEWSPAPERS SEWER WATER AMEND	0	1967133	05/19/2009	54.00
101-441.000-920.000	Utilities	DEXTER VILLAGE FIRE HALL	0		05/20/2009	106.45
101-441.000-920.000	Utilities	COMCAST DPW	0	05/19/09	05/19/2009	242.15
101-441.000-920.000	Utilities	DEXTER VILLAGE DPW	0	05/19/09	05/19/2009	78.70
				Total Department of Public Works		1,304.71
Dept: Downtown Public Works						
101-442.000-730.000	Farmers Ma	HERITAGE NEWSPAPERS SPRING CLEAN UP	0	1966576	05/19/2009	135.00
101-442.000-731.000	Landscape	VICTOR STANLEY, INC. COMPONENTS	0	05/19/09	05/19/2009	872.00
101-442.000-740.000	Operating	DISPLAY SALES FLAG	0	67068	05/19/2009	547.00
101-442.000-802.000	Profession	DEXTER SENIOR CITIZENS CENTER MAY RENT	0	05/19/09	05/19/2009	50.00
101-442.000-977.000	Equipment	VICTOR STANLEY, INC. COMPONENTS	0	05/19/09	05/19/2009	2,082.00
				Total Downtown Public Works		3,686.00
Dept: Solid Waste						
101-528.000-740.000	Operating	PLASTIC TECHNIQUES INC TOOLTRAY	0	0083867	05/19/2009	334.42
101-528.000-740.000	Operating	RADTKE TRUCKING, LLC TOP SOIL	0	05/19/09	05/19/2009	225.00
				Total Solid Waste		559.42
Dept: Parks & Recreation						
101-751.000-722.000	Life & Dis	GADALETO, RAMSBY & ASSOCIATES COVERAGE 06/01-07/01/09	0	05/19/09	05/19/2009	6.26
101-751.000-802.000	Profession	GREEN GUYS LAWN AND LANDSCAPE SPRING APPLICATION FERTILIZER	0	05/19/09	05/19/2009	95.00
101-751.000-955.000	Miscellane	NATIONAL RECREATIONAL AND PARK MEMBERSHIP	0	05/19/09	05/19/2009	25.00
101-751.000-955.000	Miscellane	VICTOR STANLEY, INC. COMPONENTS	0	05/19/09	05/19/2009	340.00
				Total Parks & Recreation		466.26
Dept: Contributions						
101-875.000-965.003	Senior	DEXTER SENIOR CITIZENS CENTER ANNUAL CONTRIBUTION	0		05/19/2009	1,000.00
				Total Contributions		1,000.00

Fund / Department / Account	GL Number Abbrev	Vendor Name / Invoice Description	Check Number	Invoice Number	Due Date	Amount
Fund: General Fund						
					Fund Total	52,700.07
Fund: Major Streets Fund						
Dept: Contracted Road Construction						
202-451.000-974.000	CIP Capita	MICHIGAN DEPT OF TRANSPORTATIO ANN ARBOR ST PROJECT	0	315939	05/19/2009	16,804.39
				Total Contracted Road Construction		16,804.39
Dept: Routine Maintenance						
202-463.000-722.000	Life & Dis	GADALETO, RAMSBY & ASSOCIATES COVERAGE 06/01-07/01/09	0	05/19/09	05/19/2009	32.55
				Total Routine Maintenance		32.55
Dept: Traffic Services						
202-474.000-722.000	Life & Dis	GADALETO, RAMSBY & ASSOCIATES COVERAGE 06/01-07/01/09	0	05/19/09	05/19/2009	10.02
202-474.000-740.000	Operating	CARRIER & GABLE, INC. PUSH BUTTON	0	226412	05/19/2009	222.00
202-474.000-740.000	Operating	CARRIER & GABLE, INC. PUSH BUTTON	0	226313	05/19/2009	94.00
202-474.000-740.000	Operating	DORNBOS SIGN & SAFTEY INC. WASHERS	0	44850	05/19/2009	63.32
				Total Traffic Services		389.34
Dept: Winter Maintenance						
202-478.000-722.000	Life & Dis	GADALETO, RAMSBY & ASSOCIATES COVERAGE 06/01-07/01/09	0	05/19/09	05/19/2009	20.03
				Total Winter Maintenance		20.03
					Fund Total	17,246.31
Fund: Local Streets Fund						
Dept: Routine Maintenance						
203-463.000-722.000	Life & Dis	GADALETO, RAMSBY & ASSOCIATES COVERAGE 06/01-07/01/09	0	05/19/09	05/19/2009	10.02
203-463.000-740.000	Operating	RADTKE TRUCKING, LLC TOP SOIL	0	05/19/09	05/19/2009	720.00
				Total Routine Maintenance		730.02
Dept: Traffic Services						
203-474.000-722.000	Life & Dis	GADALETO, RAMSBY & ASSOCIATES COVERAGE 06/01-07/01/09	0	05/19/09	05/19/2009	2.50
				Total Traffic Services		2.50
Dept: Winter Maintenance						
203-478.000-722.000	Life & Dis	GADALETO, RAMSBY & ASSOCIATES COVERAGE 06/01-07/01/09	0	05/19/09	05/19/2009	5.01
				Total Winter Maintenance		5.01
					Fund Total	737.53
Fund: Streetscape Debt Service Fund						
Dept: Long-Term Debt						
303-850.000-992.000	Bond Fees	US BANK CORPORATE TRUST STREETSCAPE SPECIAL	0	2381972	05/19/2009	150.00
				Total Long-Term Debt		150.00
					Fund Total	150.00
Fund: Equipment Replacement Fund						
Dept: Department of Public Works						
402-441.000-939.000	Vehicle Ma	SHULTS EQUIPMENT, INC. REISSUE	0	05/19/09	05/19/2009	707.67
				Total Department of Public Works		707.67
					Fund Total	707.67

Fund / Department / Account	GL Number Abbrev	Vendor Name / Invoice Description	Check Number	Invoice Number	Due Date	Amount
Fund: Sewer Enterprise Fund						
Dept: Sewer Utilities Department						
590-548.000-721.000	Health & L	FIFTH STREET DENTAL CARE PATIENT: ED LOBDELL	0		05/19/2009	16.25
590-548.000-722.000	Life & Dis	GADALETO, RAMSBY & ASSOCIATES COVERAGE 06/01-07/01/09	0	05/19/09	05/19/2009	120.53
590-548.000-742.000	Chem Plant	ALEXANDER CHEMICAL CORPORATION CHEMICALS	0	0415077	05/19/2009	749.00
590-548.000-742.000	Chem Plant	ALEXANDER CHEMICAL CORPORATION CREDIT	0	0415078	05/19/2009	-90.00
590-548.000-742.000	Chem Plant	KEMIRA WATER SOLUTIONS INC CHEMICALS	0	9017003727	05/19/2009	3,222.92
590-548.000-802.000	Profession	KENNEDY INDUSTRIES, INC. FIELD SERVICES	0	513688	05/19/2009	480.00
590-548.000-802.000	Profession	ROTO ROOTER SANITARY SEWER	0	656459	05/19/2009	3,795.00
590-548.000-824.000	Testing &	PARAGON LABORATORIES INC LAB	0	57566	05/19/2009	55.00
590-548.000-920.000	Utilities	DEXTER VILLAGE WWTP	0		05/19/2009	2,552.50
590-548.000-977.000	Equipment	UNIVERSAL PUMP AIR VENT	0	46102	05/19/2009	173.80
				Total Sewer Utilities Department		11,075.00
					Fund Total	11,075.00
Fund: Water Enterprise Fund						
Dept: Water Utilities Department						
591-556.000-722.000	Life & Dis	GADALETO, RAMSBY & ASSOCIATES COVERAGE 06/01-07/01/09	0	05/19/09	05/19/2009	80.36
591-556.000-937.000	Equip Main	ETNA SUPPLY CO SENSUS	0	1673134	05/19/2009	5,255.04
591-556.000-958.000	Membership	AMERICAN WATER WORKS ASSOC MEMBERSHIP	0	05/19/09	05/19/2009	165.00
				Total Water Utilities Department		5,500.40
Dept: Long-Term Debt						
591-850.000-992.000	Bond Fees	US BANK CORPORATE TRUST WATER/STORM	0	2381973	05/19/2009	150.00
				Total Long-Term Debt		150.00
Dept: Capital Improvements CIP						
591-901.000-974.000	CIP Capita	NETWORKING REPORTING DWRF PROJECT PLAN	0	244695	05/19/2009	521.87
				Total Capital Improvements CIP		521.87
					Fund Total	6,172.27
					Grand Total	88,788.85

AGENDA 5-26-09

ITEM L-1

VILLAGE OF DEXTER

cnicholls@villageofdexter.org

8140 Main Street Dexter, MI 48130-1092 Phone (734)426-8303 ext 17 Fax (734)426-5614

MEMO

To: **President Keough and Council Members**
From: **Courtney Nicholls, Assistant Village Manager**
Date: **May 26, 2009**
Re: **Fluoridation**

The estimated cost of adding fluoride to the Village's water is as follows:

- Equipment Purchase & Installation	$45,000
- Chemical Storage Building	$25,000
- Engineering	$9,000
Total Capital Costs	$79,000

This does not take into account the laboratory equipment that would need to be upgraded to monitor the naturally occurring levels of fluoride and determine the amount that would need to be added. We are working with OHM to obtain an estimate of these costs.

These costs estimates are based on adding fluoride to the water that comes from our current well field. When adding a fluoridation system at the new well, similar capital costs would be incurred. If we receive funding from the State's Drinking Water Revolving Fund it cannot be used to pay for fluoridation related expenses.

The ongoing operations and maintenance costs are estimated to be between $6,000 and $9,000 depending on the Village's water usage.

Courtney Nicholls

From: Joe Semifero [jrsemifero@yahoo.com]
Sent: Monday, May 18, 2009 10:46 AM
To: Donna Fisher; Jim Carson; Shawn Keough; Paul Cousins; Ray Tell; Jim Smith
Cc: Donna Dettling; Courtney Nicholls
Subject: Fluoridation Info - Request for Agenda Item for Consideration on 5/26 Meeting
Attachments: fluoridation_facts.pdf

Council - I am requesting Fluoridation for consideration at the May 26 meeting. More information related to the discussion from last Monday below.

Shawn - Can we include the attached Fluoridation Facts file from the ADA as part of the Council packet distribution?

Joe

Two items were asked about during the discussion on fluoride at the last meeting:

1) What is the difference between sub-optimal (<0.7ppm) and optimal (0.7ppm - 1.0ppm)? (<0.3ppm not effective)
2) What is done in Europe as the water is not fluoridated there and benefits associated with fluoride are still realized? (fluoridated salt and government provided dental care)

Please see the attached file, Fluoridation Facts, from the ADA, specifically:

Question 7 - Comparisons between low and optimal fluoridation.
Also, from a summary of research referenced as 116 in Facts: http://www.ncbi.nlm.nih.gov/pubmed/9608443?ordinalpos=5&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubme

Dental caries and dental fluorosis among schoolchildren who were lifelong residents of communities having either low or optimal levels of fluoride in drinking water.Selwitz RH, Nowjack-Raymer RE, Kingman A, Driscoll WS.

National Institute of Dental Research, Division of Intramural Research, Bethesda, MD 20892-6401, USA. selwitzr@de45.nidr.nih.gov

OBJECTIVE: This paper reports findings for dental caries and dental fluorosis in 8-10- and 13-16-year-old schoolchildren who were lifelong residents of communities having either naturally occurring low (Broken Bow and Holdrege, NE; < 0.3 ppm) or optimal (Kewanee, IL; 1 ppm) levels of fluoride in drinking water. METHODS: Findings are reported for participants who received both dental caries and dental fluorosis examinations (n = 495). The DMFS and TSIF indices, respectively, were used to assess dental caries and dental fluorosis. RESULTS: The mean DMFS score adjusted for age, sealant presence, and fluoride use was significantly lower in Kewanee (1.8) than was the adjusted mean caries score in either Holdrege (2.9) or Broken Bow (3.6). Adjusted mean DMFS scores in Broken Bow and Holdrege were not statistically different. The mean percent of fluorosed tooth surfaces per person, adjusted for age and use of dietary fluoride supplements, was similar in the three communities (approximately 15%); more than 80 percent of tooth surfaces in all participants were fluorosis-free. CONCLUSIONS: Findings from the present study suggest that water fluoridation still is beneficial and that dental sealants can play a significant role in preventing dental caries. In addition, findings from this survey appear to support the premise that the

difference in dental fluorosis prevalence between fluoridated and nonfluoridated communities has narrowed considerably in recent years.

Question 9 - Effectiveness of government dental health on rates.

Also, from http://www.bracesinfo.com/gendent/fluoride.htm:

> Kunzel W, Fischer T Caries Res 1997;31(3):166-73 compared the incidence of dental caries in two towns in Germany, one with fluoridated water one without fluoridation. Up until 1987 the people who lived in places with unfluoridated water showed much higher incidences of dental caries. But then in 1985, the German government started offering free dental sealants to people in both towns. Also people started using tarter control toothpastes. In the period from 1990 to 1998, there was very little difference in the caries rates in the towns with fluoridated water and those without fluoridation. Further there was a decrease in decay rates even in people who did not get sealants applied.

Question 11 - Optimal Levels versus lower levels of fluoride

Question 49 - Effects on animals or plants (question asked by resident at non-arranged)

Qestions 14 and 56 - Salt Fluoridation in Europe, etc.

Fluoridation Facts

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American Dental Association
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P42

Celebrating 60 Years of Water Fluoridation

DEDICATION

This 2005 edition of Fluoridation Facts is dedicated to
Dr. Herschel Horowitz, talented researcher, renowned dental epidemiologist
and tireless advocate of community water fluoridation.

ABOUT FLUORIDATION

[illegible]

ACKNOWLEDGMENTS

[illegible]

In addition to the legal review, Mr. Mark Rubin, Esq., Associate General Counsel, Division of Legal Affairs, made significant contributions to the editorial review.

Other significant staff contributors included: Mr. Paul O'Connor, Legislative Liaison, Department of State Government Affairs; Ms. Helen Rodis, Ph.D., Director of Science Information, Council on Scientific Affairs and Mr. Shukwan Sisk, Ph.D., Senior Director, Research and Laboratories, Council on Scientific Affairs.

A special thanks to the National Fluoridation Advisory Committee members who contributed to this edition: Ms. Diane Brunson, Dr. Robert N. Crawford, Jr., Dr. Lisa R. Howard, Dr. Jayanth V. Kumar, Dr. Ernest Newman, Mr. Thomas G. Reeves and Dr. Michael S. Swartz.

DISCLAIMER

This publication is designed to answer frequently asked questions about community water fluoridation, based on a numbers of relevant published articles. It is not intended to be a comprehensive review of the extensive literature on fluoridation and fluoride. Readers must also rely on their own review of the literature, including the sources cited herein and any subsequent published, for a complete understanding of these issues.

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American Dental Association
www.ada.org

ADA Statement Commemorating the 60th Anniversary of Community Water Fluoridation

Sixty years ago, Grand Rapids, Michigan became the world's first city to adjust the level of fluoride in its water supply. Since that time, fluoridation has dramatically improved the oral health of tens of millions of Americans. Community water fluoridation is the single most effective public health measure to prevent tooth decay. Additionally, the Centers for Disease Control and Prevention proclaimed community water fluoridation as one of 10 great public health achievements of the 20th century.

Fluoridation of community water supplies is simply the precise adjustment of the existing naturally occurring fluoride levels in drinking water to an optimal fluoride level recommended by the U.S. Public Health Service (0.7 – 1.2 parts per million) for the prevention of dental decay. Based on data from 2002, approximately 170 million people (or over two-thirds of the population) in the United States are served by public water systems that are fluoridated.

Studies conducted throughout the past 60 years have consistently indicated that fluoridation of commnnity water supplies is safe and effective in preventing dental decay in both children and adults. It is the most efficient way to prevent one of the most common childhood diseases – tooth decay (5 times as common as asthma aud 7 times as common as hay fever in 5- to17-year-olds).

Early studies, such as those conducted in Grand Rapids, showed that water fluoridation reduced the amount of cavities children get in their baby teeth by as much as 60% and reduced tooth decay in permanent adult teeth nearly 35%. Today, studies prove water fluoridation continues to be effective in reducing tooth decay by 20-40%, even in an era with widespread availability of fluoride from other sources, such as fluoride toothpaste.

The average cost for a community to flnoridate its water is estimated to range from approximately $0.50 a year per person in large communities to approximately $3.00 a year per person in small communities. For most cities, every $1 invested in water fluoridation saves $38 in dental treatment costs.

The American Dental Association continues to endorse fluoridation of community water supplies as safe and effective for preventing tooth decay. This support has been the Association's position since policy was first adopted in 1950. The ADA's policies regarding community water fluoridation are based on the overwhelming weight of peer-reviewed, credible scientific evidence. The ADA, along with state and local dental societies, continues to work with federal, state, local agencies and community coalitions to increase the number of communities benefiting from water fluoridation.

2005

211 East Chicago Avenue Chicago, Illinois 60611-2678

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EXECUTIVE SUMMARY

- Fluoridation of community water supplies is the single most effective public health measure to prevent dental decay.
- Throughout more than 60 years of research and practical experience, the overwhelming weight of credible scientific evidence has consistently indicated that fluoridation of community water supplies is safe.
- The Centers for Disease Control and Prevention has proclaimed community water fluoridation (along with vaccinations and infectious disease control) as one of ten great public health achievements of the 20th century.
- More than 100 national and international health, service and professional organizations recognize the public health benefits of community water fluoridation for preventing dental decay.
- Studies prove water fluoridation continues to be effective in reducing dental decay by 20-40%, even in an era with widespread availability of fluoride from other sources, such as fluoride toothpaste.
- Community water fluoridation benefits everyone, especially those without access to regular dental care. It is the most efficient way to prevent one of the most common childhood diseases – dental decay (5 times as common as asthma and 7 times as common as hay fever in 5-to-17-year-olds). Without fluoridation, there would be many more than the estimated 51 million school hours lost per year in this country because of dental-related illness.
- Community water fluoridation is the adjustment of fluoride that occurs naturally in water to optimal levels to protect oral health.
- For most cities, every $1 invested in water fluoridation saves $38 in dental treatment costs.
- Water that has been fortified with fluoride is similar to fortifying salt with iodine, milk with vitamin D and orange juice with vitamin C.
- Simply by drinking water, people can benefit from fluoridation's cavity protection whether they are at home, work or school.
- The average cost for a community to fluoridate its water is estimated to range from approximately $0.50 a year per person in large communities to approximately $3.00 a year per person in small communities.
- More than two-thirds of the population in the United States are served by public water systems that are optimally fluoridated.
- In the past five years (2000 through 2004), more than 125 U.S. communities in 36 states have voted to adopt fluoridation.
- Fluoridation has been thoroughly tested in the United States' court system, and found to be a proper means of furthering public health and welfare. No court of last resort has ever determined fluoridation to be unlawful.
- Be aware of misinformation on the Internet and other junk science related to water fluoridation.
- One of the most widely respected sources for information regarding fluoridation and fluorides is the American Dental Association. The ADA maintains Fluoride and Fluoridation Web pages at http://www.ada.org/goto/fluoride.

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Fluoridation Facts

INTRODUCTION

Since 1956, the American Dental Association (ADA) has published *Fluoridation Facts*. Revised periodically, *Fluoridation Facts* answers frequently asked questions about community water fluoridation. In this 2005 edition issued as part of the 60th Anniversary celebration of community water fluoridation, the ADA Council on Access, Prevention and Interprofessional Relations provides updated information for individuals and groups interested in the facts about fluoridation. The United States now has over 60 years of practical experience with community water fluoridation. Its remarkable longevity is testimony to fluoridation's significance as a public health measure. In recognition of the impact that water fluoridation has had on the oral and general health of the public, in 1999, the Centers for Disease Control and Prevention named fluoridation of drinking water as one of ten great public health achievements of the 20th century.[1,2]

Support for Water Fluoridation

Since 1950, the American Dental Association (ADA) has continuously and unreservedly endorsed the optimal fluoridation of community water supplies as a safe and effective public health measure for the prevention of dental decay. The ADA's policy is based on its continuing evaluation of the scientific research on the safety and effectiveness of fluoridation. Since 1950, when the ADA first adopted policy recommending community water fluoridation, the ADA has continued to reaffirm its position of support for water fluoridation and has strongly urged that its benefits be extended to communities served by public water systems.[3] The 2005 "ADA Statement Commemorating the 60th Anniversary of Community Water Fluoridation" reinforced that position.[4] Fluoridation is the most effective public health measure to prevent dental decay for children and adults, reduce oral health disparities and improve oral health over a lifetime.[5]

The American Dental Association, the U.S. Public Health Service, the American Medical Association and the World Health Organization all support community water fluoridation. Other national and international health, service and professional organizations that recognize the public health benefits of community water fluoridation for preventing dental decay are listed on the inside back cover of this publication.

Scientific Information on Fluoridation

The ADA's policies regarding community water fluoridation are based on generally accepted scientific knowledge. This body of knowledge is based on the efforts of nationally recognized scientists who have conducted research using the scientific method, have drawn appropriate balanced conclusions based on their research findings and have published their results in refereed (peer-reviewed) professional journals that are widely held or circulated. Studies showing the safety and effectiveness of water fluoridation have been confirmed by independent scientific studies conducted by a number of nationally and internationally recognized scientific investigators. While opponents of fluoridation have questioned its safety and effectiveness, none of their charges has ever been substantiated by generally accepted science.

With the advent of the Information Age, a new type of "pseudo-scientific literature" has developed. The public often sees scientific and technical information quoted in the press, printed in a letter to the editor or distributed via an Internet Web page. Often the public accepts such information as true simply because it is in print. Yet the information is not always based on research conducted according to the scientific method, and the conclusions drawn from research are not always scientifically justifiable. In the case of water fluoridation, an abundance of misinformation has been circulated. Therefore, scientific information from all print and electronic sources must be critically reviewed before conclusions can be drawn. (See Figure 1.) Pseudo-scientific literature may peak a reader's interest but when read as science, it can be misleading. The scientific validity and relevance of claims made by opponents of fluoridation might be best viewed when measured against criteria set forth by the U.S. Supreme Court.

Additional information on this topic may be found in Question 52.

History of Water Fluoridation

Research into the beneficial effects of fluoride began in the early 1900s. Frederick McKay, a young dentist, opened a dental practice in Colorado Springs, Colorado, and was surprised to discover that many local residents exhibited brown stains on their permanent teeth. Dr. McKay could find no documentation of the condition in the dental literature and eventually convinced Dr. G.V. Black, dean of the Northwestern University Dental School in Chicago, to join him in studying the condition. Through their research, Drs. Black and McKay determined that mottled enamel, as Dr. Black termed the condition, resulted from developmental imperfections in teeth. (Mottled enamel is a historical term. Today, this condition is called dental or enamel fluorosis.) Drs. Black and McKay wrote detailed descriptions of mottled enamel.[6,7]

In the 1920s, Dr. McKay, along with others, suspected that something either in or missing from the drinking water was causing the mottled enamel. Dr. McKay wrote

Figure 1. Key Elements In Reviewing Research

It is important to review information about fluoridation with a critical eye. Listed below are key elements to consider when reviewing information about fluoridation research.

1. **Credentials:** The author's background and credentials should reflect expertise in the area of research undertaken.

2. **Date:** The year of the publication should be apparent. The information should be relatively current, although well-designed studies can stand the test of time and scientific scrutiny. A review of existing literature can provide insight into whether the results of older studies have been superseded by subsequent studies.

3. **Accuracy:** If the information is a review of other studies, it should be accurate and representative of the original research. Information quoted directly from other sources should be quoted in its entirety.

4. **Statistical Methods:** The methods used to analyze the data should be generally accepted and appropriate.

5. **Comparability:** The research should be applicable to community water fluoridation and use an appropriate type and amount of fluoride. Many research projects investigate the use of fluoride at much higher levels than recommended for community water fluoridation. For example, the results of a study using a concentration of 125 parts per million (ppm) fluoride are not comparable to research findings regarding water fluoridated at 0.7 to 1.2 ppm.

6. **Type of Research:** How the research is conducted is relevant. Research conducted *in vitro* (outside the living body and in a laboratory environment) may not have the same results as research conducted *in vivo* (in a living human or other animal).

7. **Research Model:** A good study will try to replicate real life situations as close as possible. For example, results from animal studies using high doses of fluoride that are injected rather than provided in drinking water should be cautiously interpreted. Such studies are highly questionable as a predictor of the effects of human exposure to low concentrations of fluoride, such as those used to fluoridate water.

8. **Peer Review:** Publications presenting scientific information should be peer reviewed to help ensure that scientifically sound articlas are published. Peer review involves evaluation and rating of the scientific and technical merit of an article by other qualified scientists.

9. **Weight of Evidence:** Conclusions from one particular study or one particular researcher should be weighed against the bulk of established, generally accepted, peer-reviewed science. No single study by itself is conclusive. If other researchers have not been able to replicate the results of a particular study or the work of one researcher, the results of that study or body of research should be viewed with some skepticism.

10. **Easily Accessible:** Reputable studies on fluoridation are typically published in peer-reviewed journals and other vehicles that are easily obtainable through a medical/dental library or through *PubMed*, a service of the National Library of Medicine which can be accessed via the Internet at http://www.nlm.nih.gov/.

to the Surgeon General in 1926 indicating that he had identified a number of regions in Colorado, New Mexico, Arizona, California, Idaho, South Dakota, Texas and Virginia where mottled enamel existed. Also in the late 20s, Dr. McKay made another significant discovery – these stained teeth were surprisingly resistant to decay.[7]

Following additional studies completed in the early 1930s in St. David, Arizona[8] and Bauxite, Arkansas,[9] it was determined that high levels of naturally occurring fluoride in the drinking water were causing the mottled enamel. In Arizona, researchers scrutinized 250 residents in 39 local families and were able to rule out hereditary factors and environmental factors, except for one - fluoride in the water which occurred naturally at levels of 3.8 to 7.15 ppm. In Bauxite, H. V. Churchill, chief chemist with the Aluminum Company of America (later changed to ALCOA), was using a new method of spectrographic analysis in his laboratory to look at the possibility that the water from an abandoned deep well in the area might have high levels of aluminum-containing bauxite that was causing mottled teeth. What he found was that the water contained a high level of naturally occurring fluoride (13.7 ppm). When Dr. McKay learned of this new form of analysis and Dr. Churchill's findings, he forwarded samples of water from areas where mottled enamel was commonplace to Dr. Churchill. All of the samples were found to have high levels of fluoride when compared to waters tested from areas with no mottled enamel.[7]

During the 1930s, Dr. H. Trendley Dean, a dental officer of the U.S. Public Health Service, and his associates conducted classic epidemiological studies on the geographic distribution and severity of fluorosis in the United States.[10] These early studies were aimed at evaluating how high the fluoride levels in water could be before visible, severe dental fluorosis occurred. By 1936, Dean and his staff had made the critical discovery that fluoride levels of up to 1.0 part per million (ppm) in the drinking water did not cause the more severe forms of dental fluorosis. Dean additionally noted a correlation between fluoride levels in the water and reduced incidence of dental decay.[11,12]

In 1939, Dr. Gerald J. Cox and his associates at the Mellon Institute evaluated the epidemiological evidence and conducted independent laboratory studies. While the issue was being discussed in the dental research community at the time, they were the first to publish a paper that proposed adding fluoride to drinking water to prevent dental decay.[13] In the 1940s, four classic, community-wide studies were carried out to evaluate the addition of sodium fluoride to fluoride-deficient water supplies. The first community water fluoridation program, under the direction of Dr. Dean, began in Grand Rapids, Michigan, in January 1945. The other three studies were conducted in Newburgh, New York (May 1945); Brantford, Ontario (June 1945) and Evanston, Illinois (February 1947.)[13-16] The astounding success of these studies firmly established fluoridation as a practical and safe public health measure to prevent dental decay that would quickly be embraced by other communities.

The history of water fluoridation is a classic example of a curious professional making exacting clinical observations which led to epidemiologic investigation and eventually to a safe and effective community-based public health intervention which even today remains the cornerstone of communities' efforts to prevent dental decay.

"The Centers for Disease Control and Prevention named fluoridation of drinking water one of ten great public health achievements of the 20th century noting that it is a major factor responsible for the decline in dental decay."

Water Fluoridation as a Public Health Measure

Throughout decades of research and more than sixty years of practical experience, fluoridation of public water supplies has been responsible for dramatically improving the public's oral health. In 1994, the U.S. Department of Health and Human Services issued a report which reviewed public health achievements. Along with other successful public health measures such as the virtual eradication of polio and reductions in childhood blood lead levels, fluoridation was lauded as one of the most economical preventive interventions in the nation.[17] A policy statement on water fluoridation reaffirmed in 1995 by the USPHS stated that water fluoridation is the most cost-effective, practical and safe means for reducing the occurrence of dental decay in a community.[18] In 1998, recognizing the ongoing need to improve health and well being, the USPHS revised national health objectives to be achieved by the year 2010. Included under oral health was an objective to significantly expand the fluoridation of public water supplies. Specifically, Objective 21-9 states that at least 75% of the U.S. population served by community water systems should be receiving the benefits of optimally fluoridated water by the year 2010.[19]

In 1999, the Centers for Disease Control and Prevention named fluoridation of drinking water one of ten great public health achievements of the 20th century not-

ing that it is a major factor responsible for the decline in dental decay.[1,2]

Former U.S. Surgeon General David Satcher issued the first ever Surgeon General report on oral health in May 2000. In *Oral Health in America: A Report of the Surgeon General,* Dr. Satcher stated that community water fluoridation continues to be the most cost-effective, practical and safe means for reducing and controlling the occurrence of dental decay in a community.[5,20] Additionally, Dr. Satcher noted that water fluoridation is a powerful strategy in efforts to eliminate health disparities among populations. Studies have shown that fluoridation may be the most significant step we can take toward reducing the disparities in dental decay.[5,20-24]

In the 2003 *National Call to Action to Promote Oral Health,* U.S. Surgeon General Richard Carmona called on policymakers, community leaders, private industry, health professionals, the media and the public to affirm that oral health is essential to general health and well being. Additionally, Surgeon General Carmona urged these groups to apply strategies to enhance the adoption and maintenance of proven community-based interventions such as community water fluoridation.[25]

Community water fluoridation is a most valuable public health measure because:

- Optimally fluoridated water is accessible to the entire community regardless of socioeconomic status, educational attainment or other social variables.[26]
- Individuals do not need to change their behavior to obtain the benefits of fluoridation.
- Frequent exposure to small amounts of fluoride over time makes fluoridation effective through the life span in helping to prevent dental decay.
- Community water fluoridation is more cost effective than other forms of fluoride treatments or applications.[27]

Water Fluoridation's Role in Reducing Dental Decay

Water fluoridation and the use of topical fluoride have played a significant role in improving oral health. Early studies showed that water fluoridation can reduce the amount of cavities children get in their baby teeth by as much as 60% and can reduce dental decay in permanent adult teeth by nearly 35%. Since that time, numerous studies have been published making fluoridation one of the most widely studied public health measures in history. Later studies prove water fluoridation continues to be effective in reducing dental decay by 20-40%, even in an era with widespread availability of fluoride from other sources, such as fluoride toothpaste.[28,29] Increasing numbers of adults are retaining their teeth throughout their lifetimes due in part to the benefits they receive from water fluoridation. Dental costs for these individuals are likely to have been reduced and many hours of needless pain and suffering due to untreated dental decay have been avoided.

> *"Water fluoridation continues to be effective in reducing dental decay by 20-40%, even in an era with widespread availability of fluoride from other sources, such as fluoride toothpaste."*

It is important to note that dental decay is caused by dental plaque, a thin, sticky, colorless deposit of bacteria that constantly forms on teeth. When sugar and other carbohydrates are eaten, the bacteria in plaque produce acids that attack the tooth enamel. After repeated attacks, the enamel breaks down, and a cavity (hole) is formed. There are a number of factors that increase an individual's risk for dental decay:[27,30-33]

- Recent history of dental decay
- Elevated oral bacteria count
- Inadequate exposure to fluorides
- Exposed roots
- Frequent intake of sugar and sugary foods
- Poor or inadequate oral hygiene
- Decreased flow of saliva
- Deep pits and fissures in the chewing surfaces of teeth

Exposure to fluoride is not the only measure available to decrease the risk of decay. In formulating a decay prevention program, a number of intervention strategies may be recommended such as changes in diet and placement of dental sealants. However, fluoride is a key component in any recommended strategy.

Ongoing Need for Water Fluoridation

Because of the risk factors for dental decay noted previously, many individuals and communities still experience high levels of dental decay. Although water fluoridation demonstrates an impressive record of effectiveness and safety, only 67.3 % of the United States population on public water supplies receives fluoridated water containing protective levels of fluoride.[34] Unfortunately, some people continue to be confused about this effective public health measure. If the number of individuals drinking fluoridated water is to increase, the public must be accurately informed about its benefits.

BENEFITS

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QUESTION 1.

What is fluoride?

Answer.

Fluoride is a naturally occurring compound that can help prevent dental decay.

Fact.

The fluoride ion comes from the element fluorine. Fluorine is an abundant element in the earth's crust in the form of the fluoride ion. As a gas, it never occurs in its free state in nature, but exists only in combination with other elements as a fluoride compound. Fluoride compounds are components of minerals in rocks and soil. Water passes over rock formations and dissolves the fluoride compounds that are present, releasing fluoride ions. The result is that small amounts of fluoride are present in all water sources. Generally, surface water sources such as lakes, rivers and streams have very low levels of fluoride. For example, Lake Michigan's fluoride level is 0.17 ppm.[35] As water moves through the earth, it contacts fluoride-containing minerals and carries away fluoride ions. The concentration of fluoride in groundwater varies according to such factors as the depth at which the water is found and the quantity of fluoride bearing minerals in the area.[36] In the United States, the natural level of fluoride in ground water varies from very low levels to over 4 ppm. The fluoride level of the oceans ranges from 1.2 to 1.4 ppm.[37,38] Fluoride is naturally present to some extent in all foods and beverages, but the concentrations vary widely.[39-41]

QUESTION 2.

How does fluoride help prevent dental decay?

Answer.

Fluoride protects teeth in two ways – systemically and topically.

Fact.

Systemic fluorides are those ingested into the body. During tooth formation, ingested fluorides become incorporated into tooth structures. Fluorides ingested regularly during the time when teeth are developing (preeruptively) are deposited throughout the entire tooth surface and provide longer-lasting protection than those applied topically.[42] Systemic fluorides can also give topical protection because ingested fluoride is present in saliva, which continually bathes the teeth providing a reservoir of fluoride that can be incorporated into the tooth surface to prevent decay. Fluoride also becomes incorporated into dental plaque and facilitates further remineralization.[43] Sources of systemic fluoride in the United States include fluoridated water, dietary fluoride supplements in the forms of tablets, drops or lozenges and fluoride present in food and beverages.

> *"Fluoride protects teeth in two ways – systemically and topically."*

While it was originally believed that fluoride's action was exclusively systemic or preeruptive, by the mid-1950s, there was growing evidence of both systemic and topical benefits of fluoride exposure.[44]

Additional information on this topic may be found in Question 11.

Topical fluorides strengthen teeth already present in the mouth (posteruptively). In this method of delivery, fluoride is incorporated into the surface of teeth making them more decay-resistant. Topically applied fluoride provides local protection on the tooth surface. Topical fluorides include toothpastes, mouthrinses and professionally applied fluoride foams, gels and varnishes. As mentioned previously, systemic fluorides also provide topical protection. Low levels of fluoride in saliva and plaque from sources such as optimally fluoridated water can prevent and reverse the process of dental decay.[45] In clarifying the effectiveness of water fluoridation, John D.B. Featherstone, PhD, Professor and Chair,

Department of Preventive and Restorative Dental Services, University of California San Francisco, noted: "... There is irrefutable evidence in numerous studies that fluoride in the drinking water works to reduce dental caries in populations. This is still the case."[45]

> *"John D.B. Featherstone, PhD, Professor and Chair, Department of Preventive and Restorative Dental Services, University of California San Francisco, noted: '...There is irrefutable evidence in numerous studies that fluoride in the drinking water works to reduce dental caries in populations.'"*

The remineralization effect of fluoride is important. Fluoride ions in and at the enamel surface result in fortified enamel that is not only more resistant to decay (loss of minerals or demineralization), but enamel that can repair or remineralize early dental decay caused by acids from decay-causing bacteria.[42,47-51] Fluoride ions necessary for remineralization are provided by fluoridated water as well as various fluoride products such as toothpaste.

The maximum reduction in dental decay is achieved when fluoride is available preeruptively (systemically) for incorporation during all stages of tooth formation and posteruptively (topically) at the tooth surface. Water fluoridation provides both types of exposure.[44,52-54]

QUESTION 3.

What is water fluoridation?

Answer.

Water fluoridation is the adjustment of the natural fluoride concentration of fluoride-deficient water to the level recommended for optimal dental health.

Fact.

Based on extensive research, the United States Public Health Service (USPHS) established the optimum concentration for fluoride in the water in the United States in the range of 0.7 to 1.2 parts per million. This range effectively reduces dental decay while minimizing the occurrence of dental fluorosis. The optimum level is dependent on the annual average of the maximum daily air temperature in the geographic area.[55]

One milligram per liter (mg/L) of fluoride in water is identical to one part per million (ppm). At 1 ppm, one part of fluoride is diluted in a million parts of water. Large numbers such as a million can be very difficult to visualize. While not exact, the following comparisons can be of assistance in comprehending one part per million:

1 inch in 16 miles
1 minute in 2 years
1 cent in $10,000

For clarity, the following terms and definitions are used in this booklet:

Community water fluoridation is the adjustment of the natural fluoride concentration in water up to the level recommended for optimal dental health (a range of 0.7 to 1.2 ppm). Other terms used interchangeably in this booklet are water fluoridation, fluoridation and optimally fluoridated water. Optimal levels of fluoride may be present in the water naturally or by adjusted means.

Additional information on this topic may be found in Question 6.

Sub-optimally fluoridated water is water that naturally contains less than the optimal level (below 0.7 ppm) of fluoride. Other terms used interchangeably in this booklet are nonfluoridated water and fluoride-deficient water.

QUESTION 4.

How much fluoride is in your water?

Answer.

If your water comes from a public/community water supply, the options to learn the fluoride level of the water include contacting the local water supplier or the local/county/state health department, reviewing your Consumer Confidence Report (CCR) and using the Internet based "My Water's Fluoride." If your water source is a private well, it will need to be tested and the results obtained from a certified laboratory.

Fact.

The fluoride content of the local public or community water supply can be obtained by contacting the local water supplier or the local/county/state health department.

In 1999, the U.S. Environmental Protection Agency (EPA) began requiring water suppliers to put annual drinking water quality reports into the hands of its customers. Typically available around July 1st each year, these Water Quality Reports, or Consumer Confidence Reports (CCRs), may be mailed to your home, placed in the local newspaper or made available through the Internet.[56] To obtain a copy of the report, contact the local water supplier. The name of the water system (often not the name of the city) can be found on the water bill. If the name of the public water system is unknown, contact the local health department.

There are two sites on the Internet that supply information on water quality. The online source for water quality reports or CCRs is the EPA web site at http://www.epa.gov/safewater/dwinfo/index.html.[57]

Additionally, the Centers for Disease Control and Prevention's (CDC) fluoridation Web site, "My Water's Fluoride," is available at http://apps.nccd.cdc.gov/MWF/Index.asp.[58] For those states that have provided information to the CDC, the site lists fluoridation status by water system.

The EPA does not have the authority to regulate private drinking water wells. However, the EPA recommends that private well water be tested every year. While the EPA does not specifically recommend testing for the level of fluoride, health professionals will need this information prior to consideration of prescription of dietary fluoride supplements or to counsel patients about alternative water sources to reduce the risk of fluorosis if the fluoride levels are above 2 ppm.[59]

Additional information on this topic may be found in Questions 12, 24, 25 and 42.

Always use a state certified laboratory that conducts drinking water tests.[59] For a list of state certified labs, contact the local, county or state water/health department.

QUESTION 5.

What additives are used to fluoridate water supplies in the United States?

Answer.

Sodium fluoride, sodium fluorosilicate and fluorosilicic acid are the three additives approved for community water fluoridation in the United States. Sodium fluorosilicate and fluorosilicic acid are sometimes referred to as silicofluoride additives.

Fact.

The three basic additives used to fluoridate water in the United States are: 1) sodium fluoride which is a white, odorless material available either as a powder or crystals; 2) sodium fluorosilicate which is a white or yellow-white, odorless crystalline material and 3) fluorosilicic acid which is a white to straw-colored liquid.[36,60]

While fluoridation began in 1945 with the use of sodium fluoride, the use of silicofluorides began in 1946 and, by 1951, they were the most commonly used additives.[61] First used in the late 1940s, fluorosilicic acid is currently the most commonly used additive to fluoridate communities in the U.S.[36,61]

> *"To ensure the public's safety, standards have been established to ensure the safety of fluoride additives used in water treatment in the U.S."*

To ensure the public's safety, standards have been established to ensure the safety of fluoride additives used in water treatment in the U.S. Specifically, additives used in water fluoridation meet standards of the American Water Works Association (AWWA) and NSF International (NSF).

Additional information on the topic of fluoride additives may be found in Fluoridation Practice Section.

QUESTION 6.

Is there a difference in the effectiveness between naturally occurring fluoridated water (at optimal fluoride levels) and water that has fluoride added to reach the optimal level?

Answer.

No. The dental benefits of optimally fluoridated water occur regardless of the fluoride's source.

Fact.

Fluoride is present in water as "ions" or electrically charged atoms.[36] These ions are the same whether acquired by water as it seeps through rocks and sand or added to the water supply under carefully controlled conditions. When fluoride is added under controlled conditions to fluoride-deficient water, the dental benefits are the same as those obtained from naturally fluoridated water. Fluoridation is merely an increase of the level of the naturally occurring fluoride present in all drinking water sources.

> *"Fluoridation is merely an increase of the level of the naturally occurring fluoride present in all drinking water sources."*

Some individuals use the term "artificial fluoridation" to imply that the process of water fluoridation is unnatural and that it delivers a foreign substance into a water supply when, in fact, all water sources contain some fluoride. Community water fluoridation is a natural way to improve oral health.[62]

Additional information on this topic may be found in Question 45.

Prior to the initiation of "adjusted" water fluoridation, several classic epidemiological studies were conducted that compared naturally occurring fluoridated water to fluoride-deficient water. Strikingly low decay rates were found to be associated with the continuous use of water with fluoride content of 1 part per million.[12]

A fluoridation study conducted in the Ontario, Canada, communities of Brantford (optimally fluoridated by adjustment), Stratford (optimally fluoridated naturally) and Sarnia (fluoride-deficient) revealed much lower decay rates in both Brantford and Stratford as compared to nonfluoridated Sarnia. There was no observable difference in decay-reducing effect between the naturally occurring fluoride and adjusted fluoride concentration water supplies, proving that dental benefits were similar regardless of the source of fluoride.[16]

QUESTION 7.

Is water fluoridation effective in helping to prevent dental decay?

Answer.

Overwhelming evidence exists to prove the effectiveness of water fluoridation. Water fluoridation is a very effective method for preventing dental decay for children, adolescents and adults. Continued assessment, however, is important as the patterns and extent of dental decay change in populations.

Fact.

The effectiveness of water fluoridation has been documented in scientific literature for over 60 years. (See Figure 2.) Even before the first community fluoridation program began in 1945, epidemiologic data from the 1930s and 1940s revealed lower number of cavities in children consuming naturally occurring fluoridated water compared to children consuming fluoride-deficient water.[11,12] Since that time, thousands of studies have been done which continue to prove fluoride's effectiveness in decay reduction.

In Grand Rapids, Michigan, the first city in the world to fluoridate its water supply, a 15-year landmark study showed that children who consumed fluoridated water from birth had 50-63% less dental decay than children who had been examined during the original baseline survey completed in nonfluoridated Muskegon, Michigan.[63]

Ten years after fluoridation in Newburgh, New York, 6- to 9-year-olds had 58% less dental decay than their counterparts in nonfluoridated Kingston, New York, which was fluoride-deficient. After 15 years, 13- to 14-year-olds in Newburgh had 70% less decay than the children in Kingston.[64]

Figure 2. Effectiveness of Community Water Fluoridation

- **Centers for Disease Control and Prevention.** Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States. MMWR 2001;50 (No. RR-14). (Guidelines on the use of fluoride.)
- **Horowitz HS.** The effectiveness of community water fluoridation in the United States. J Public Health Dent 1996;56(5 Spec No):253-8. (A review of fifty years of water fluoridation.)
- **Murray JJ.** Efficacy of preventive agents for dental caries. Caries Res 1993;27(Suppl 1):2-8.(A review of studies conducted from 1976 through 1987.)
- **Newbrun E.** Effectiveness of water fluoridation. J Public Health Dent 1989;49(5):279-89. (The analysis of the results of 113 studies in 23 countries.)
- **Ripa LW.** A half-century of community water fluoridation in the United States: review and commentary. J Public Health Dent 1993;53(1):17-44. (The analysis of fifty years of water fluoridation.)

After 14 years of fluoridation in Evanston, Illinois, 14-year-olds had 57% fewer decayed, missing or filled teeth than the control group in Oak Park, Illinois, who drank water low in fluoride.[65]

In 1983, a study was undertaken in North Wales (Great Britain) to determine if the decay rate of fluoridated Anglesey continued to be lower than that of nonfluoridated Arfon, as had been indicated in a previous survey conducted in 1974. Decay rates of life-long residents in Anglesey, aged 5, 12 and 15, were compared with decay rates of identically aged residents in nonfluoridated Arfon. Study results demonstrated that a decline in decay had occurred in both communities since the previous survey in 1974. However, the mean decay rate of the children in fluoridated Anglesey was still 45% lower than that of those living in nonfluoridated Arfon.[66] These findings indicated a continuing need for fluoridation although decay levels had declined.[67]

In the United States, an epidemiological survey of nearly 40,000 schoolchildren was completed in 1987.[29] Nearly 50% of the children in the study aged 5 to 17 years were decay-free in their permanent teeth, which was a major change from a similar survey in 1980 in which approximately 37% were decay-free. This dramatic decline in decay rates was attributed primarily to the widespread use of fluoride in community water supplies, toothpastes, supplements and mouthrinses. Although decay rates had declined overall, data also revealed that the decay rate was 25% lower in children with continuous residence in fluoridated communities when the data was adjusted to control for fluoride exposure from supplements and topical treatments.

A controlled study conducted in 1990 demonstrated that average dental decay experience among schoolchildren who were lifelong residents of communities with low fluoride levels in drinking water was 61-100% higher as compared with dental decay experience among schoolchildren who were lifelong residents of a community with an optimal level of fluoride in the drinking water.[68] In addition, the findings of this study suggest that community water fluoridation still provides significant public health benefits and that dental sealants can play a significant role in preventing dental decay.

Using data from the dental surveys in 1991-2 and 1993-4, a British study predicted that on average, water fluoridation produces a 44% reduction in dental decay in 5-year-old children. The study further demonstrated that children in lower socioeconomic groups derive an even greater benefit from water fluoridation with an average 54% reduction in dental decay. Therefore, children with the greatest dental need benefit the most from water fluoridation.[69]

In 1993, the results of 113 studies in 23 countries were compiled and analyzed.[70] (Fifty-nine out of the 113 studies analyzed were conducted in the United States.) This review provided effectiveness data for 66 studies in primary teeth and for 86 studies in permanent teeth. Taken

together, the most frequently reported decay reductions observed were:

40-49% for primary teeth or baby teeth; and
50-59% for permanent teeth or adult teeth.

In a second review of studies conducted from 1976 through 1987,[28] when data for different age groups were separated, reductions in dental decay in fluoridated communities were:

30-60% in the primary dentition or baby teeth;
20-40% in the mixed dentition* (aged 8 to 12); (*A mixed dentition is composed of both baby teeth and adult teeth.)
15-35% in the permanent dentition or adult teeth (aged 14 to 17); and
15-35% in the permanent dentition (adults and seniors).

A comprehensive analysis of the 50-year history of community water fluoridation in the United States further demonstrated that the inverse relationship between higher fluoride concentration in drinking water and lower levels of dental decay discovered a half-century ago continued to be true.[71]

Baby bottle tooth decay is a severe type of early childhood decay that seriously affects babies and toddlers in some populations. Water fluoridation is highly effective in preventing decay in baby teeth, especially in children from low socioeconomic groups.[72] In a 1998 review of the effectiveness of methods currently used to prevent this type of decay, water fluoridation received the highest rating. For very young children, water fluoridation is the only means of prevention that does not require a dental visit or motivation of parents and caregivers.[73]

In 2001, the National Institutes of Health (NIH) held a consensus development conference, "Diagnosis and Management of Dental Caries Throughout Life." As part of the Consensus Statement issued at the conclusion of the conference, the panel noted that water fluoridation is widely accepted as both effective and of great importance in the primary prevention of tooth decay.[74]

> *"Children with the greatest dental need benefit the most from water fluoridation...The U.S. Task Force strongly recommended that community water fluoridation be included as part of a comprehensive population-based strategy to prevent or control tooth decay in communities."*

A systematic review of published studies conducted in 2001 by a team of experts on behalf of the U.S. Task Force on Community Preventive Services found that fluoridation was effective in reducing tooth decay among populations. Based on strong evidence of effectiveness, the Task Force strongly recommended that community water fluoridation be included as part of a comprehensive population-based strategy to prevent or control tooth decay in communities.[75-78]

QUESTION 8.

With other forms of fluoride now available, is water fluoridation still an effective method for preventing dental decay?

Answer.

Although other forms of fluoride are available, persons in nonfluoridated communities continue to demonstrate higher dental decay rates than their counterparts in communities with water fluoridation.[68,70,72,79-83]

Fact.

In the 1940s, children in communities with optimally fluoridated drinking water had reductions in decay rates of approximately 60% as compared to those living in nonfluoridated communities. At that time, drinking water was the only source of fluoride other than fluoride that occurs naturally in foods.

Recent studies reveal that decay rates have declined in naturally or adjusted fluoridated areas and nonfluoridated areas as well. One factor is the high geographic mobility of our populations. In other words, it is becoming increasing difficult to study large numbers of people in one location who have a history of consuming only fluoridated or nonfluoridated water.

> *"Even in an era with widespread availability of fluoride from other sources, studies prove water fluoridation continues to be effective in reducing dental decay by 20-40%."*

A second factor is the universal availability of fluoride from other sources including food, beverages, dental products (toothpaste, rinses, professionally applied foams, gels and varnish) and dietary supplements.[84] Foods and beverages processed in optimally fluoridated cities can contain higher levels of fluoride than those processed in nonfluoridated communities. These foods and beverages are consumed not only in the city where processed, but may be distributed to and consumed in nonfluoridated areas.[256] This "halo" or "diffusion" effect results in increased fluoride intake by people in nonfluoridated communities, providing them increased protection against dental decay.[52,71,86] As a result of the widespread availability of these various sources of fluoride, the difference between decay rates in fluoridated areas and nonfluoridated areas is somewhat less than several decades ago but it is still significant.[87] Failure to account for the diffusion effect may result in an underestimation of the total benefit of water fluoridation especially in areas where large quantities of fluoridated products are brought into nonfluoridated communities.[86]

Even in an era with widespread availability of fluoride from other sources, studies prove water fluoridation continues to be effective in reducing dental decay by 20-40%.[28,29]

QUESTION 9.

What happens if water fluoridation is discontinued?

Answer.

Over time, dental decay can be expected to increase if water fluoridation in a community is discontinued, even if topical products such as fluoride toothpaste and fluoride rinses are widely used.

Fact.

The following paragraphs provide a summary of key historical studies that have been conducted on the discontinuation of water fluoridation.

Antigo, Wisconsin began water fluoridation in June 1949, and ceased adding fluoride to its water in November 1960. After five and one-half years without optimal levels of fluoride, second grade children had over 200% more decay, fourth graders 70% more, and sixth graders 91% more than those of the same ages in 1960. Residents of Antigo re-instituted water fluoridation in October 1965 on the basis of the severe deterioration of their children's oral health.[88]

Because of a government decision in 1979, fluoridation in the northern Scotland town of Wick was discontinued after eight years. The water was returned to its sub-optimal, naturally occurring fluoride level of 0.02 ppm. Data collected to monitor the oral health of Wick children clearly demonstrated a negative health effect from the discontinuation of water fluoridation. Five years after the cessation of water fluoridation, decay in permanent (adult) teeth had increased 27% and decay in primary (baby) teeth increased 40%. This increase in decay occurred during a period when there had been a reported overall reduction in decay nationally and when fluoride toothpaste had been widely adopted.[89] These data suggest that decay levels in children can be expected to rise where water fluoridation is interrupted or terminated, even when topical fluoride products are widely used.

In a similar evaluation, the prevalence of decay in 10-year-old children in Stranraer, Scotland increased after the discontinuation of water fluoridation, resulting in a 115% increase in the mean cost of restorative dental treatment for decay and a 21% increase in the mean cost of all dental treatment. These data support the important role water fluoridation plays in the reduction of dental decay.[90]

A U.S. study of 6- and 7-year-old children who had resided in optimally fluoridated areas and then moved to the nonfluoridated community of Coldwater, Michigan, revealed an 11% increase in decayed, missing or filled tooth surfaces (DMFS) over a 3-year period from the time the children moved. These data reaffirm that relying only on topical forms of fluoride is not an effective or prudent public health practice.[28,91] Decay reductions are greatest where water fluoridation is available in addition to topical fluorides, such as fluoride toothpaste and fluoride rinses.

Finally, a study that reported the relationship between fluoridated water and decay prevalence focused on the city of Galesburg, Illinois, a community whose public water supply contained naturally occurring fluoride at 2.2 ppm. In 1959, Galesburg switched its community water source to the Mississippi River. This alternative water source provided the citizens of Galesburg a sub-optimal level of fluoride at approximately 0.1 ppm. During the time when the fluoride content was below optimal levels, data revealed a 10% decrease in the number of decay-free 14-year-olds (oldest group observed), and a 38% increase in dental decay. Two years later, in 1961, the water was fluoridated at the recommended level of 1.0 ppm.[92]

There have been several studies from outside the United States that have reported no increase in dental decay following the discontinuation of fluoridation. However, in all of the cases reported, the discontinuation of fluoridation coincided with the implementation of other measures to prevent dental decay.

For example, in La Salud, Cuba a study on dental decay in children indicated that the rate of dental decay did not increase after fluoridation was stopped in 1990. However, at the time fluoridation was discontinued a new topical fluoride program was initiated where all children received fluoride mouthrinses on a regular basis and children two to five received fluoride varnish once or twice a year.[93]

In Finland, a longitudinal study of Kuopio (fluoridated from 1959 to 1992) and Jyväskylä (low levels of natural fluoridation) showed little differences in decay rates between the two communities. This was attributed to a number of factors. The populations are extremely similar in terms of ethnic background and social structure. Virtually all children and adolescents used the government-sponsored, comprehensive, free dental care. The dental programs exposed the Finnish children to intense topical fluoride regimes and dental sealant programs. The result was that the effect of water fluoridation appeared minimal. Because of these unique set of factors, it was concluded these results could not be replicated in countries with less intensive preventive dental care programs.[94]

No significant decrease in dental decay was seen after fluoridation was discontinued in 1990 in Chemniz and Plauen which are located in what was formerly East Germany. The intervening factors in this case include improvements in attitudes toward oral health behaviors, broader availability and increased use of other preventive measures including fluoridated salt, fluoride toothpaste and dental sealants.[95]

A similar scenario is reported from the Netherlands. A study of 15-year-old children in Tiel (fluoridated 1953 to 1973) and Culemborg (nonfluoridated) was conducted comparing dental decay rates from a baseline in 1968 through 1988. The lower dental decay rate in Tiel after the cessation of fluoridation was attributed in part to the initiation of a dental health education program, free dietary fluoride supplements and a greater use of professionally applied topical fluorides.[96]

QUESTION 10.

Is dental decay still a serious problem?

Answer.

Yes. Dental decay or tooth decay is an infectious disease that continues to be a significant oral health problem.

Fact.

Dental decay is, by far, the most common and costly oral health problem in all age groups.[97] It is one of the principal causes of tooth loss from early childhood through middle age.[98,99] Decay continues to be problematic for middle-aged and older adults, particularly root decay because of receding gums. Older adults may experience similar or higher levels of dental decay than do children.[100] In addition to its effects in the mouth, dental decay can affect general well-being by interfering with an individual's ability to eat certain foods and by impacting an individual's emotional and social well-being by causing pain and discomfort. Dental decay, particularly in the front teeth, can detract from appearance, thus affecting self-esteem and employability.

> *"Decay continues to be problematic for middle-aged and older adults, particularly root decay because of receding gums."*

10.

11.

12.

Despite a decrease in the overall decay experience of U.S. schoolchildren over the past two decades, dental decay is still a significant oral health problem, especially in certain segments of the population. The 1986-1987 National Institute of Dental Research (NIDR) survey of approximately 40,000 U.S. school children found that 25% of students ages 5 to 17 accounted for 75% of the decay experienced in permanent teeth.[97] Despite progress in reducing dental decay, individuals in families living below the poverty level experience more dental decay than those who are economically better off.[20] Some of the risk factors that increase an individual's risk for decay are inadequate exposure to fluoride, irregular dental visits, deep pits and fissures in the chewing surfaces of teeth, inadequate flow of saliva, frequent sugar intake and very high oral bacteria counts.

Dental decay is one of the most common childhood diseases – five times as common as asthma and seven times as common as hay fever in 5- to 17-year-olds. Without fluoridation, there would be many more than the estimated 51 million school hours lost per year in this country because of dental-related illness.[101]

In addition to impacting emotional and social well-being, the consequences of dental disease are reflected in the cost of its treatment. According to the Centers for Medicare and Medicaid Services, the nation's total bill (including private and public spending) for dental services in 2003 was estimated to be $74.3 billion. This figure does not include indirect expenses of oral health problems or the cost of services by other health care providers.[102] Again, the goal must be prevention rather than repair. Fluoridation is presently the most cost-effective method for the prevention of dental decay for residents of a community in the United States.[103,104]

QUESTION 11.

Do adults benefit from fluoridation?

Answer.

Fluoridation plays a protective role against dental decay throughout life, benefiting both children and adults. In fact, inadequate exposure to fluoride places children and adults in the high risk category for dental decay.

Fact.

While the early fluoridation trials were not designed to study the possible benefits fluoridation might have for adults, by the mid-1950s, there was growing evidence of both systemic and topical benefits of fluoride exposure. It soon became evident that fluoridation helped prevent decay in adults, too.[44] Fluoride has both a systemic and topical effect and is beneficial to adults in two ways. The first is through the remineralization process in enamel, in which early decay does not enlarge, and can even reverse, because of frequent exposure to small amounts of fluoride. Studies have clearly shown that the availability of topical fluoride in an adult's mouth during the initial formation of decay can not only stop the decay process, but also make the enamel surface more resistant to future acid attacks. Additionally, the presence of systemic fluoride in saliva provides a reservoir of fluoride ions that can be incorporated into the tooth surface to prevent decay.[63]

Additional information on this topic may be found in Question 2.

> *"People in the United States are living longer and retaining more of their natural teeth than ever before."*

Another protective benefit for adults is the prevention of root decay.[100,105-107] Adults with gum recession are at risk for root decay because the root surface becomes exposed to decay-causing bacteria in the mouth. Studies have demonstrated that fluoride is incorporated into the structure of the root surface, making it more resistant to decay.[108-112] In Ontario, Canada, lifelong residents of the naturally fluoridated (1.6 ppm) community of Stratford had significantly lower root decay experience than those living in the matched, but nonfluoridated, community of Woodstock.[111]

People in the United States are living longer and retaining more of their natural teeth than ever before. Because older adults experience more problems with gum reces-

sion, the prevalence of root decay increases with age. A large number of exposed roots or a history of past root decay places an individual in the high risk category for decay.[30] Data from the 1988-1991 National Health and Nutrition Examination Survey (NHANES III) showed that 22.5% of all adults with natural teeth experienced root decay. This percentage increased markedly with age:

1) in the 18- to 24-year-old age group, only 6.9% experienced root decay;
2) in the 35- to 44-year-old age group, 20.8% experienced root decay;
3) in the 55- to 64-year-old age group, 38.2% showed evidence of root decay; and
4) in the over-75 age group, nearly 56% had root decay.[113]

In addition to gum recession, older adults tend to experience decreased salivary flow, or xerostomia, due to the use of medications or medical conditions.[114,115] Inadequate flow of saliva places an individual in the high risk category for decay.[30] This decrease in salivary flow can increase the likelihood of dental decay because saliva contains calcium, phosphates and fluorides – all necessary for early repair of dental decay.

There are data to indicate that individuals who have consumed fluoridated water continuously from birth receive the maximum protection against dental decay. However, teeth present in the mouth when exposure to water fluoridation begins also benefit from the topical effects of exposure to fluoride. In 1989, a small study in the state of Washington suggested adults exposed to fluoridated water *only during childhood* had similar decay rates as adults exposed to fluoridated water *only after age 14.* This study lends credence to the topical and systemic benefits of water fluoridation. The topical effects are reflected in the decay rates of adults exposed to water fluoridation only after age 14. The study also demonstrates that the preeruptive, systemic effects of fluoridation have lifetime benefits as reflected in the decay rates of adults exposed to fluoridation only during childhood. The same study also noted a 31% reduction of dental disease (based on the average number of decayed or filled tooth surfaces) in adults with a continuous lifetime exposure to fluoridated water as compared to adults with no exposure to water fluoridation.[110]

> *"Water fluoridation contributes much more to overall health than simply reducing dental decay: it prevents needless infection, pain, suffering and loss of teeth; improves the quality of life and saves vast sums of money in dental treatment costs."*

A Swedish study investigating decay activity among adults in optimal and low fluoride areas revealed that not only was decay experience significantly lower in the optimal fluoride area, but the difference could not be explained by differences in oral bacteria, buffer capacity of saliva or salivary flow. The fluoride concentration in the drinking water was solely responsible for decreased decay rates.[116]

Water fluoridation contributes much more to overall health than simply reducing dental decay: it prevents needless infection, pain, suffering and loss of teeth; improves the quality of life and saves vast sums of money in dental treatment costs.[28] Additionally, fluoridation conserves natural tooth structure by preventing the need for initial fillings and subsequent replacement fillings.[117,118]

Additional information on this topic may be found in Question 2.

QUESTION 12.

Are dietary fluoride supplements effective?

Answer.

For children who do not live in fluoridated communities, dietary fluoride supplements are an effective alternative to water fluoridation for the prevention of dental decay.[119-122]

Fact.

Dietary fluoride supplements are available only by prescription in the United States and are intended for use by children living in nonfluoridated areas to increase their fluoride exposure so that it is similar to that received by children who live in optimally fluoridated areas.[123,124] Dietary fluoride supplements are available in two forms: drops for infants aged six months or older, and chewable tablets for children and adolescents.[124] **Fluoride supplements should only be prescribed for children living in nonfluoridated areas.** The correct amount of a fluoride supplement is based on the child's age and the existing fluoride level in the drinking water.[125] Because fluoride is so widely available, it is recommended that dietary fluoride supplements be used only according to the recommended dosage schedule and after consideration of all sources of fluoride exposure.[30,126] For optimum benefits, use of supplements should begin at six months of age and be continued daily until the child is at least 16 years old.[125] The current dietary fluoride supplement schedule is shown in Table 1 on the next page.

The relatively higher cost and need for compliance over an extended period of time is a major procedural and economic disadvantage of community-based fluoride supplement programs, one that makes them impractical as an alternative to water fluoridation as a public health measure. In a controlled situation, as shown in a study involving children of health professionals, fluoride supplements achieve effectiveness comparable to that of water fluoridation. However, even with this highly educated and motivated group of parents, only half continued to give their children fluoride tablets for the necessary number of years.[127] Additional studies have verified that

Table 1. Dietary Fluoride Supplement Schedule 1994[125]

Approved by the American Dental Association, American Academy of Pediatrics, American Academy of Pediatric Dentistry

Age	Fluoride ion level in drinking water (ppm)*		
	<0.3 ppm	0.3-0.6 ppm	>0.6 ppm
Birth – 6 months	None	None	None
6 months – 3 years	0.25 mg/day**	None	None
3 – 6 years	0.50 mg/day	0.25 mg/day	None
6 – 16 years	1.0 mg/day	0.50 mg/day	None

* 1.0 part per million (ppm) = 1 milligram/liter (mg/L) ** 2.2 mg sodium fluoride contains 1 mg fluoride ion.

individual patterns of compliance vary greatly.[128,129,130] Independent reports from several countries, including the United States, have demonstrated that community-wide trials of fluoride supplements in which tablets were distributed for use at home were largely unsuccessful because of poor compliance.[131]

While total costs for the purchase of supplements and administration of a program are small (compared with the initial cost of the installation of water fluoridation equipment), the overall cost of supplements per child is much greater than the per capita cost of community fluoridation.[104] In addition, community water fluoridation provides decay prevention benefits for the entire population regardless of age, socioeconomic status, educational attainment or other social variables.[26] This is particularly important for families who do not have access to regular dental services.

Additional information on this topic may be found in Questions 4, 13, 24 and 25.

QUESTION 13.

Does the ADA recommend fluoride for children under six years of age?

Answer.

Yes. The ADA recognizes that lack of exposure to fluoride places individuals of any age at risk for dental decay. Fluoride exposure may take many forms including water fluoridation and dietary fluoride supplements.

Fact.

For children who live in nonfluoridated communities, dietary fluoride supplements are an effective alternative to water fluoridation to help prevent dental decay. Dietary fluoride supplements are available only by prescription and are intended for use by children living in nonfluoridated areas to increase their fluoride exposure so that it is similar to that experienced by children who live in optimally fluoridated areas.[124]

The dietary fluoride supplement schedule is just that – a *supplement* schedule (Table 1). Recognizing that children will receive fluoride from other sources (food and beverages) even in nonfluoridated areas, the amounts in the table reflect the *additional* amount of fluoride intake necessary to achieve an optimal anti-cavity effect.

> *"The dietary fluoride supplement schedule is just that – a* supplement *schedule."*

The dietary fluoride supplement schedule should not be viewed as recommending the absolute upper limits of the amount of fluoride that should be ingested each day. In 1997, the Food and Nutrition Board of the Institute of Medicine developed the Dietary Reference Intakes, a comprehensive set of reference values for dietary nutrient values. The new values present nutrient requirements to optimize health and, for the first time, set maximum-level guidelines to reduce the risk of adverse effects from excessive consumption of a nutrient. In the case of fluoride, levels were established to reduce dental decay without causing moderate dental fluorosis.[123]

For example, the dietary fluoride supplement schedule recommends that a two-year-old child living in a non-fluoridated area (where the primary water source contains less than 0.3 ppm fluoride) should receive 0.25 mg of *supplemental* fluoride per day. This does not mean that this child should ingest exactly 0.25 mg of fluoride per day. On the contrary, a two-year-old child could receive important anti-cavity benefits by teking 0.25 mg of supplemental fluoride a day without causing any adverse effects on health. This child would most probably be receiving fluoride from other sources (foods and beverages) even in a non-fluoridated area and the recommendation of 0.25 mg of fluoride per day takes this into account. In the unlikely event the child did not receive any extra fluoride from food and beverages, the 0.25 mg per day could be inadequate fluoride supplementation to achieve an optimal anti-cavity effect.

The following statement is correct. "The dosage has been lowered two different times as evidenced of too much fluoride has appeared." Rather than being a prob-

lem, as those opposed to the use of fluoride might imply, this is evidence that the ADA is doing the right thing. The ADA continually reviews available scientific evidence, and revises its statements based on the most current scientific information. In 1994, a Dietary Fluoride Supplement Workshop cosponsored by the ADA, the American Academy of Pediatric Dentistry and the American Academy of Pediatrics was held in Chicago. Based on a review of scientific evidence, a consensus was reached on a new dosage schedule developed in recognition that numerous sources of topical and systemic fluoride are available today that were not available many years ago.[125] The revised dietary fluoride supplement schedule appears as Table 1.

QUESTION 14.

In areas where water fluoridation is not feasible because of engineering constraints, are alternatives to water fluoridation available?

Answer.

Yes. Some countries outside the United States that do not have piped water supplies capable of accommodating community water fluoridation have chosen to use salt fluoridation.

Fact.

Salt fluoridation is used extensively in a number of countries in Europe (examples: France, Hungary, Germany, Spain and Switzerland) and Central and South America (examples: Boliva, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Honduras, Nicaragua, Venezuela, Costa Rica, Jamaica, Mexico, Peru and Uruguay.)[132,133] The Pan American Health Organization (PAHO), a regional division of the World Health Association (WHO), with responsibilities for health matters in North, South and Central America as well as the Caribbean has been active in developing strategies to implement decay prevention programs in the regions of the Americas using both water and salt fluoridation.[133,134]

Studies evaluating the effectiveness of salt fluoridation outside the U.S. have concluded that fluoride delivered via salt may produce decay reductions similar to that of optimally fluoridated water.[135] An analysis of published results of studies from some countries shows that, for 12-year-old children, the initial level of decay reduction due to salt fluoridation is between 35% and 80%.[136,137]

An advantage of salt fluoridation is that it does not require a centralized piped water system. This is of particular use in many developing countries that do not have such water systems. When both domestic salt and bulk salt (used by commercial bakeries, restaurants, institutions, and industrial food production) is fluoridated, the decay-reducing effect may be comparable to that of water fluoridation over an extended period of time.[136] On the other hand, when only domestic salt is fluoridated, the decay-reducing effect may be diminished.[135]

Salt fluoridation has several disadvantages that do not exist with water fluoridation. Challenges occur with implementation of salt fluoridation when there are multiple sources of drinking water in an area. The natural fluoride level of each source must be determined and, if the level is optimal or excessive, fluoridated salt should not be distributed in that area.[138] Finally, there is general agreement that a high consumption of sodium is a risk factor for hypertension (high blood pressure).[139,140] People who have hypertension or must restrict their salt intake may find salt fluoridation an unacceptable method of receiving fluoride.

Additional information on this topic may be found in Question 56.

Fluoridated milk has been suggested as another alternative to community water fluoridation in countries outside the U.S. WHO has supported milk fluoridation feasibility projects in the United Kingdom, People's Republic of China, Peru and Thailand.[141] Studies among small groups of children have demonstrated a decrease in dental decay levels resulting from consumption of fluoridated milk; however, these studies were not based on large-scale surveys. More research is needed before milk fluoridation can be recommended as an alternative to water or salt fluoridation.[142] The rationale for adding fluoride to milk is that this method "targets" fluoride directly to children, but the amount of milk consumed by children is quite variable, more so than water. Concerns have been raised about decreased widespread benefits due to the slower absorption of fluoride from milk than from water and the considerable number of persons, especially adults, who do not drink milk for various reasons.[143] The monitoring of fluoride content in milk is technically more difficult than for drinking water because there are many more dairies than communal water supplies. In addition, because fluoridated milk should not be sold in areas having natural or adjusted fluoridation, regulation would be difficult, and established marketing patterns would be disrupted.[42]

QUESTION 15.

Can the consistent use of bottled water result in individuals missing the benefits of optimally fluoridated water?

Answer.

Yes. The majority of bottled waters on the market do not contain optimal levels (0.7-1.2 ppm) of fluoride.[144-148]

Fact.

Individuals who drink bottled water as their primary source of water could be missing the decay preventive effects of optimally fluoridated water available from their community water supply.

The consumption of bottled water in the United States has been growing by at least one gallon per person each year - more than doubling in the last ten years. Consumption rates for the past five years are shown in Table 2.[14]

Table 2. U.S. Bottled Water Market[149]

Per Capita Consumption 2000-2004

Year	Gallons Per Capita	Annual % Change
2000	17.2	---
2001	18.7	8.7%
2002	20.7	10.8%
2003	22.1	7.0%
2004	23.8	7.6%

In 2004, total U.S. sales of bottled water surpassed 6.8 billion gallons, an 8.6% advance over 2003 with wholesale dollar sales reaching a record of approximately $9.2 billion. This category includes sparkling and non-sparkling water, domestic and imported water, water in single-serve bottles and larger packages as well as vended and direct delivered waters. U.S. residents now drink more bottled water annually (23.8 gallons per person in 2004) than any other beverage with the exception of carbonated soft drinks.[149,150] In 2004, consumption of carbonated soft drinks fell for the sixth straight year after several decades of uninhibited growth (53.7 gallons per person in 2004 compared to 54.8 gallons per person in 1999).[150]

16.

> *"Individuals who drink bottled water as their primary source of water could be missing the decay preventive effects of optimally fluoridated water available from their community water supply."*

In 1994, a small study at two community health centers in Rhode Island showed that 55% of the total households responding used only bottled water for drinking while 59% of the households with children reported using only bottled water for drinking. The vast majority of these bottled waters had less than optimal levels of fluoride. While most of the patient population of the health centers was either on public assistance (60%) or uninsured (20%), families spent their limited resources to purchase bottled water. It was reported that 52% of children on public assistance and 35% of the uninsured children used bottled water.[151]

The fluoride content of bottled water can vary greatly. A 1989 study of pediatric dental patients and their use of bottled water found the fluoride content of bottled water from nine different sources varied from 0.04 ppm to 1.4 ppm.[152] In a 1991 study of 39 bottled water samples, 34 had fluoride levels below 0.3 ppm. Over the two years the study was conducted, six products showed a two- to four-fold drop in fluoride content.[153] A similar study of five national brands of bottled water conducted in 2000, showed that significant differences in fluoride concentration existed between the five brands and that three of the five brands tested demonstrated significant differences between the various batches tested of the same brand.[154]

In evaluating how bottled water consumption affects fluoride exposure, there are several factors to consider. First is the amount of bottled water consumed during the day. Second is whether bottled water is used for drinking, in meal preparation and for reconstituting soups, juices and other drinks. Third is whether another source of drinking water is accessed during the day such as an optimally fluoridated community water supply at day-care, school or work.

A final important issue is determining the fluoride content of the bottled water. While drinking water is regulated by the U.S. EPA,[155] bottled water is regulated by the U.S. Food and Drug Administration (FDA) which has established standards for its quality.[156]

Additional information on this topic may be found in Question 43.

Bottled water is defined as water that is intended for human consumption sealed in bottles or other containers with no added ingredients except that it may optionally contain safe and suitable antimicrobial agents. The FDA has established maximum allowable levels for physical, chemical, microbiological, and radiological contaminants in the bottled water quality standard regulations. The FDA has also approved standards for the optional addition of fluoride.[156] Effective in 1996, FDA regulations require fluoride content of bottled water to be listed on the label *only if fluoride is added during processing.*[157] If the fluoride level is not shown on the label of the bottled water, the company can be contacted, or the water can be tested to obtain this information.

For additional information on bottled water and fluoride exposure, view the ADA's Web page "Bottled Water, Home Water Treatment Systems and Fluoride Exposure" at http://www.ada.org/goto/bottledwater. (Figure 3)

Figure 3. Bottled Water/Home Water Treatment Systems

A MISSING INGREDIENT?

http://www.ada.org/goto/bottledwater

- Does your bottled water contain fluoride?
- Does your water filter remove fluoride?

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QUESTION 16.

Can home water treatment systems (e.g. water filters) affect optimally fluoridated water supplies?

Answer.

Yes. Some types of home water treatment systems can reduce the fluoride levels in water supplies potentially decreasing the decay-preventive effects of optimally fluoridated water.

Fact.

There are many kinds of home water treatment systems including water filters (for example: carafe filters, faucet filters, under the sink filters and whole house filters), reverse osmosis systems, distillation units and water softeners. There has not been a large body of research regarding the extent to which these treatment systems affect fluoridated water. Available research is often conflicting and unclear. However, it has been consistently documented that reverse osmosis systems and distillation units remove significant amounts of fluoride from the water supply.[41,158,159] On the other hand, repeated studies regarding water softeners confirm earlier research indicating the water softening process caused no significant change in fluoride levels.[160,161] With water filters, the fluoride concentration remaining in the water depends on the type and quality of the filter being used, the status of the filter and the filter's age. Some activated carbon filters containing activated alumina may remove significant amounts of the fluoride.[162] Each type of filter should be assessed individually.[159]

Individuals who drink water processed by home water treatment systems as their primary source of water could be losing the decay preventive effects of optimally fluoridated water available from their community water supply. Consumers using home water treatment systems should have their water tested at least annually to establish the fluoride level of the treated water. More frequent testing may be needed. Testing is available through local and state public health departments. Private laboratories may also offer testing for fluoride levels in water.

Information regarding the existing level of fluoride in a community's public water system can be obtained by asking a local dentist, contacting your local or state health department, or contacting the local water supplier.

Additional information on this topic may be found in Question 4.

For additional information on home water treatment systems and fluoride exposure, view the ADA's Web page "Bottled Water, Home Water Treatment Systems and Fluoride Exposure" at http://www.ada.org/goto/bottledwater. (Figure 3)

Notes

SAFETY

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QUESTION 17.

Does fluoride in the water supply, at the levels recommended for the prevention of dental decay, adversely affect human health?

17.

18.

Answer.

The overwhelming weight of scientific evidence indicates that fluoridation of community water supplies is safe. (See Figure 4.)

Fact.

For generations, millions of people have lived in areas where fluoride is found naturally in drinking water in concentrations as high or higher than those recommended to prevent dental decay. Research conducted among these persons confirms the safety of fluoride in the water supply.[84,163-166] In fact, in August 1993, the National Research Council, a branch of the National Academy of Sciences, released a report prepared for the Environmental Protection Agency (EPA) that confirmed that the currently allowed fluoride levels in drinking water do not pose a risk for health problems such as cancer, kidney failure or bone disease.[167] Based on a review of available data on fluoride toxicity, the expert subcommittee that wrote the report concluded that the EPA's ceiling of 4 ppm for naturally occurring fluoride in drinking water was "appropriate as an interim standard."[167] Subsequently, the EPA announced that the ceiling of 4 ppm would protect against adverse health effects with an adequate margin of safety and published a notice of intent not to revise the fluoride drinking water standard in the *Federal Register.*[168]

As with other nutrients, fluoride is safe and effective when used and consumed properly. No charge against the benefits and safety of fluoridation has ever been substantiated by generally accepted scientific knowledge. After 60 years of research and practical experience, the preponderance of scientific evidence indicates that fluoridation of community water supplies is both safe and effective.[169]

> *"After 60 years of research and practical experience, the preponderance of scientific evidence indicates that fluoridation of community water supplies is both safe and effective."*

Many organizations in the U.S. and around the world involved with health issues have recognized the value of community water fluoridation. The American Dental Association (ADA) adopted its original resolution in support of fluoridation in 1950 and has repeatedly reaffirmed its position publicly and in its House of Delegates based on its continuing evaluation of the safety and effectiveness of fluoridation.[3] The 2005 "ADA Statement Commemorating the 60th Anniversary of Community Water Fluoridation" reinforced that position.[4] The American Medical Association's (AMA) House of Delegates first endorsed fluoridation in 1951. In 1986, and again in 1996, the AMA reaffirmed its support for fluoridation as an effective means of reducing dental decay.[170] The World Health Organization, which initially recommended the practice of water fluoridation in 1969,[171] reaffirmed its support for fluoridation in 1994 stating that: "Providing that a community has a piped water supply, water fluoridation is the most effective method of reaching the whole population, so that all social classes benefit without the need for active participation on the part of individuals."[138] Following a comprehensive 1991 review and evaluation of

Figure 4. Safety of Community Water Fluoridation

- **Institute of Medicine, Food and Nutrition Board.** Dietary reference intakes for calcium, phosphorus, magnesium, vitamin D and fluoride. Report of the Standing Committee on the Scientific Evaluation of Dietary Reference Intakes. Washington, DC: National Academy Press;1997.
- **National Research Council.** Health effects of ingested fluoride. Report of the Subcommittee on Health Effects of Ingested Fluoride. Washington, DC: National Academy Press;1993.
- **US Department of Health and Human Services, Public Health Service.** Review of fluoride: benefits and risks. Report of the Ad Hoc Subcommittee on Fluoride. Washington, DC; February 1991.
- **World Health Organization.** Fluorides and human health. Monograph series no 59. Geneva, Switzerland;1970.

the public health benefits and risks of fluoride, the U.S. Public Health Service reaffirmed its support for fluoridation and continues to recommend the use of fluoride to prevent dental decay.[84]

Recent statements by five leading health authorities on community water fluoridation can be found in the back of this publication.

National and international health, service and professional organizations that recognize the public health benefits of community water fluoridation for preventing dental decay are listed on the inside back cover of this publication.

QUESTION 18.

Are additional studies being conducted to determine the effects of fluorides in humans?

Answer.

Yes. Since its inception, fluoridation has undergone a nearly continuous process of reevaluation. As with other areas of science, additional studies on the effects of fluorides in humans can provide insight as to how to make more effective choices for the use of fluoride. The American Dental Association and the U.S. Public Health Service support this on-going research.

Fact.

For more than 60 years, thousands of reports have been published on all aspects of fluoridation.[84,167] The accumulated dental, medical and public health evidence concerning fluoridation has been reviewed and evaluated numerous times by academicians, committees of experts, special councils of government and most of the world's major national and international health organizations. The verdict of the scientific community is that water fluoridation, at recommended levels, safely provides major oral health benefits. The question of possible secondary health effects caused by fluorides consumed in optimal concentrations throughout life has been the object of thorough medical investigations which have failed to show any impairment of general health throughout life.[138,163-166]

"The verdict of the scientific community is that water fluoridation, at recommended levels, safely provides major

In scientific research, there is no such thing as "final knowledge." New information is continuously emerging and being disseminated. Under the Safe Drinking Water Act (SDWA), the U. S. Environmental Protection Agency (EPA) must periodically review the existing National Primary Drinking Water Regulations (NPDWRs) "not less often than every 6 years." This review is a routine part of the EPA's operations as dictated by the SDWA.[172]

In April 2002, the EPA announced the results of its preliminary revise/not revise decisions for 68 chemical NPDWRs. Fluoride was one of the 68 chemicals reviewed. The EPA determined that it fell under the "Not Appropriate for Revision at this Time" category, but noted that it planned to ask the National Academy of Science (NAS) to update the risk assessment for fluoride. The NAS had previously completed a review of fluoride for EPA approximately 12 years ago which was published as "Health Effects of Ingested Fluoride" in 1993 by the National Research Council.

At the request of the NAS, the National Research Council's Committee on Toxicology created the Subcommittee on Fluoride in Drinking Water to review toxicologic, epidemiologic, and clinical data published since 1993 and exposure data on orally ingested fluoride from drinking water and other sources (e.g., food, toothpaste, mouthrinses). Based on this review the Subcommittee will evaluate the scientific and technical basis of the EPA's maximum contaminant level (MCL) of 4 milligram per liter (mg/L or ppm) and secondary maximum contaminant level (SMCL) of 2 mg/L for fluoride in drinking water. The Subcommittee will advise the EPA on the adequacy of its fluoride MCL and SMCL to protect children and others from adverse health effects and identify data gaps and make recommendations for future research relevant to setting the MCL and SMCL for fluoride. The Subcommittee began its work in November 2002 and is currently projected to complete the project in early 2006.[173]

The definition of a contaminant is a function of the National Primary Drinking Water Regulations. The EPA

considers a contaminant to be ANYTHING found in water that may be harmful to human health. The EPA has designated 90 microorganisms, minerals and chemicals as contaminants.[174,175]

While research continues, the weight of scientific evidence indicates water fluoridation is safe and effective in preventing dental decay in humans.[84]

Additional information on this topic may be found in Questions 7, 8, and 42.

QUESTION 19.

Does the total intake of fluoride from air, water and food pose significant health risks?

Answer.

The total intake of fluoride from air, water and food, in an optimally fluoridated community in the United States, does not pose significant health risks.

Fact.

Fluoride from the Air

The atmosphere normally contains negligible concentrations of airborne fluorides. Studies reporting the levels of fluoride in air in the United States suggest that ambient fluoride contributes little to a person's overall fluoride intake.[179,180]

19.

20.

Fluoride from Water

In the United States, the natural level of fluoride in ground water varies from very low levels to over 4 ppm. Public water systems in the U.S. are monitored by the Environmental Protection Agency (EPA), which requires that public water systems not exceed fluoride levels of 4 ppm.[168] The optimal concentration for fluoride in water in the United States has been established in the range of 0.7 to 1.2 ppm. This range will effectively reduce dental decay while minimizing the occurrence of mild dental fluorosis. The optimal fluoride level is dependent on the annual average of the maximum daily air temperature in the geographic area.[36]

Children living in a community with water fluoridation get a portion of their daily fluoride intake from fluoridated water and a portion from dietary sources which would include food and other beverages. When considering water fluoridation, an individual must consume one liter of water fluoridated at 1 part per million (1 ppm) to receive 1 milligram (1 mg) of fluoride.[42,178] Children under six years of age, on average, consume less than one-half liter of drinking water a day.[178] Therefore, children under six years of age would consume, on average, less than 0.5 mg of fluoride a day from drinking optimally fluoridated water (at 1 ppm).

A ten-year comparison study of long-time residents of Bartlett and Cameron, Texas, where the water supplies contained 8.0 and 0.4 parts per million of fluoride, respectively, included examinations of organs, bones and tissues. Other than a higher prevalence of dental fluorosis in the Bartlett residents, the study indicated that long term consumption of dietary fluoride (resident average length of fluoride exposure was 36.7 years), even at levels considerably higher than recommended for decay prevention, resulted in no clinically significant physiological or functional effects.[166]

Fluoride in Food

Foods and beverages commercially processed (cooked or reconstituted) in optimally fluoridated cities can contain higher levels of fluoride than those processed in nonfluoridated communities. These foods and beverages are consumed not only in the city where processed, but may be distributed to and consumed in nonfluoridated areas.[26] This "halo" or "diffusion" effect results in increased fluoride intake by people in nonfluoridated communities, providing them increased protection against dental decay.[71,85,86] As a result of the widespread availability of these various sources of fluoride, the difference between decay rates in fluoridated areas and nonfluoridated areas is somewhat less than several decades ago but still significant.[87] Failure to account for the diffusion effect may result in an underestimation of the total benefit of water fluoridation especially in areas where a large amount of fluoridated products are brought into nonfluoridated communities.[86]

Water and water-based beverages are the chief source of dietary fluoride intake. Conventional estimates are that approximately 75% of dietary fluoride comes from water and water-based beverages.[179]

The average daily dietary intake of fluoride (expressed on a body weight basis) by children residing in optimally fluoridated (1 ppm) communities is 0.05 mg/kg/day; in communities without optimally fluoridated water, average intakes for children are about 50% lower.[123] Dietary fluoride intake by adults in optimally fluoridated (1 ppm) areas averages 1.4 to 3.4 mg/day, and in nonfluoridated areas averages 0.3 to 1.0 mg/day.[123]

In looking at the fluoride content of food and beverages over time, it appears that fluoride intake from dietary sources has remained relatively constant. Except for samples prepared or cooked with fluoridated water, the fluoride content of most foods and beverages is not significantly different between fluoridated and nonfluoridated communities. When fluoridated water is used to prepare or cook the samples, the fluoride content of foods and beverages is higher as reflected in the intake amounts noted in the previous paragraph. This difference has remained relatively constant over time.[180,181]

The fluoride content of fresh solid foods in the United States generally ranges from 0.01 to 1.0 part per million.[102,179] It has long been known that fish, such as sardines, may contribute to higher dietary fluoride intake if the bones are ingested as fluoride has an affinity for calcified tissues. Additionally, brewed teas may also contain fluoride concentrations of 1 ppm to 6 ppm depending on the amount of dry tea used, the water flu-

oride concentration and the brewing time.[182] The fluoride value for unsweetened instant tea powder appears very high when reported as a dry powder because this product is extremely concentrated. However, when one teaspoon of the unsweetened tea powder is added to an eight ounce cup of tap water, the value for prepared instant tea is similar to the values reported for regular brewed tea.[179]

Unveiled in 2004, the National Fluoride Database is a comprehensive, nationally representative database of the fluoride concentration in foods and beverages consumed in the United States. The database for fluoride was designed for use by epidemiologists and health researchers to estimate fluoride intake and to assist in the investigation of the relationships between fluoride intake and human health. The database contains fluoride values for beverages, water, and some lower priority foods.[179]

QUESTION 20.

How much fluoride should an individual consume each day to reduce the occurrence of dental decay?

Answer.

The appropriate amount of daily fluoride intake varies with age and body weight. As with other nutrients, fluoride is safe and effective when used and consumed properly.

Fact.

In 1997, the Food and Nutrition Board of the Institute of Medicine developed a comprehensive set of reference values for dietary nutrient intakes.[123] These new reference values, the Dietary Reference Intakes (DRI), replace the Recommended Dietary Allowances (RDA) which had been set by the National Academy of Sciences since 1941. The new values present nutrient requirements to optimize health and, for the first time, set maximum-level guidelines to reduce the risk of adverse effects from excessive consumption of a nutrient. Along with calcium, phosphorous, magnesium and vitamin D, DRIs for fluoride were established because of its proven effect on dental decay.

As demonstrated in Table 3, fluoride intake in the United States has a large range of safety.

The first DRI reference value is the Adequate Intake (AI) which establishes a goal for intake to sustain a desired indicator of health without causing side effects. In the case of fluoride, the AI is the daily intake level required to reduce dental decay without causing moderate dental fluorosis. The AI for fluoride from all sources (fluoridated water, food, beverages, fluoride dental products and dietary fluoride supplements) is set at 0.05 mg/kg/day (milligram per kilogram of body weight per day).

Using the established AI of 0.05 mg/kg, the amount of fluoride for optimal health to be consumed each day has been calculated by gender and age group (expressed as average weight). See Table 3 in this Question.

The DRIs also established a second reference value for maximum-level guidelines called tolerable upper intake levels (UL). The UL is higher than the AI and is *not* the recommended level of intake. The UL is the estimated maximum intake level that should not produce unwanted effects on health. The UL for fluoride from all sources (fluoridated water, food, beverages, fluoride dental products and dietary fluoride supplements) is set at 0.10 mg/kg/day (milligram per kilogram of body weight per day) for infants, toddlers, and children through eight years of age. For older children and adults, who are no longer at risk for dental fluorosis, the UL for fluoride is set at 10 mg/day regardless of weight.

Table 3. Dietary Reference Intakes for Fluoride

Food and Nutrition Board of the Institute of Medicine 1997[123]

Age Group	Reference Weights kg (lbs)*	Adequate Intake (mg/day)	Tolerable Upper Intake (mg/day)
Infants 0-6 months	7 (16)	0.01	0.7
Infants 7-12 months	9 (20)	0.5	0.9
Children 1-3 years	13 (29)	0.7	1.3
Children 4-8 years	22 (48)	1.0	2.2
Children 9-13 years	40 (88)	2.0	10.0
Boys 14-18 years	64 (142)	3.0	10.0
Girls 14-18 years	57 (125)	3.0	10.0
Males 19 years and over	76 (166)	4.0	10.0
Females 19 years and over	61 (133)	3.0	10.0

* Value based on data collected during 1988-94 as part of the Third National Health and Nutrition Examination Survey (NHANES III) in the United States.[123]

Using the established ULs for fluoride, the amount of fluoride that may be consumed each day to reduce the risk of moderate dental fluorosis for children under eight, has been calculated by gender and age group (expressed as average weight). (See Table 3.)

As a practical example, daily intake of 2 mg of fluoride is adequate for a nine to 13-year-old child weighing 88 pounds (40 kg). This was calculated by multiplying 0.05 mg/kg/day (AI) times 40 kg (weight) to equal 2 mg. At the same time, that 88 pound (40kg) child could consume 10 mg of fluoride a day as a tolerable upper intake level.

Children living in a community with water fluoridation get a portion of their daily fluoride intake from fluoridated water and a portion from dietary sources which would include food and other beverages. When considering water fluoridation, an individual must consume one liter of water fluoridated at 1 part per million (1 ppm) to receive 1 milligram (1 mg) of fluoride.[42,178] Children under six years of age, on average, consume less than one-half liter of drinking water a day.[178] Therefore, children under six years of age would consume, on average, less than 0.5 mg of fluoride a day from drinking optimally fluoridated water (at 1 ppm).

If a child lives in a nonfluoridated area, the dentist or physician may prescribe dietary fluoride supplements. As shown in Table 1 "Dietary Fluoride Supplement Schedule 1994" (See Question 12), the current dosage schedule recommends supplemental fluoride amounts that are below the AI for each age group. The dosage schedule was designed to offer the benefit of decay reduction with margin of safety to prevent mild to moderate dental fluorosis. For example, the AI for a child 3 years of age is 0.7 mg/day. The recommended dietary fluoride supplement dosage for a child 3 years of age in a nonfluoridated community is 0.5 mg/day. This provides leeway for some fluoride intake from processed food and beverages, and other sources.

Decay rates are declining in many population groups because children today are being exposed to fluoride from a wider variety of sources than decades ago. Many of these sources are intended for topical use only; however, some fluoride is ingested inadvertently by children.[183] Inappropriate ingestion of fluoride can be prevented, thus reducing the risk for dental fluorosis without jeopardizing the benefits to oral health.

For example, it has been reported in a number of studies that young children inadvertantly swallow an average of 0.30 mg of fluoride from fluoride toothpaste at each brushing.[184,185-189] If a child brushes twice a day, 0.60 mg may be ingested inappropriately. This may slightly exceed the Adequate Intake (AI) values from Table 3. The 0.60 mg consumption is 0.10 mg higher than the AI value for children 6 to 12 months and is 0.10 mg lower than the AI for children from 1-3 years of age.[123] Although toothpaste is not meant to be swallowed, children may consume the daily recommended Adequate Intake amount of fluoride from toothpaste alone. In order to decrease the risk of dental fluorosis, the American Dental Association since 1992 has recommended that parents and caregivers put only one pea-sized amount of fluoride toothpaste on a young child's toothbrush at each brushing. Also, young children should be supervised while brushing and taught to spit out, rather than swallow, the toothpaste. Consult with your child's dentist or physician if you are considering using fluoride toothpaste before age two.

Additional information on this topic may be found in Question 25.

It should be noted that the amounts of fluoride discussed here are intake, or ingested, amounts. When fluoride is ingested, a portion is retained in the body and a portion is excreted. This issue will be discussed further in Question 22.

QUESTION 21.

Is there a need for prenatal dietary fluoride supplementation?

Answer.

There is no scientific basis to suggest any need to increase a woman's daily fluoride intake during pregnancy or breastfeeding to protect her health. At this time, scientific evidence is insufficient to support the recommendation for prenatal fluoride supplementation for decay prevention for infants.[123,190]

Fact.

The Institute of Medicine has determined that, "No data from human studies document the metabolism of fluoride during lactation. Because fluoride concentrations in human milk are very low (0.007 to 0.011 ppm) and relatively insensitive to differences in the fluoride concentrations of the mother's drinking water, fluoride supplementation during lactation would not be expected to significantly affect fluoride intake by the nursing infant or the fluoride requirement of the mother."[123]

The authors of the only prospective, randomized, double blind study to evaluate the effectiveness of prenatal dietary supplementation have concluded that the data do not support the hypothesis that prenatal fluoride has a strong decay preventive effect.[190] Moreover, prenatal dietary fluoride supplementation will not have an affect on the baby's permanent teeth because permanent teeth do not begin to develop during pregnancy.[191]

QUESTION 22.

When fluoride is ingested, where does it go?

Answer.

Much of the fluoride is excreted. Of the fluoride retained, almost all is found in calcified (hard) tissues, such as bones and teeth. Fluoride helps to prevent dental decay when incorporated into the teeth.

Fact.
After ingestion of fluoride, such as drinking a glass of optimally fluoridated water, the majority of the fluoride is absorbed from the stomach and small intestine into the blood stream.[192] This causes a short term increase in fluoride levels in the blood. The fluoride levels increase quickly and reach a peak concentration within 20-60 minutes.[193] The concentration declines rapidly, usually within three to six hours following peak levels, due to the uptake of fluoride by calcified tissues and efficient removal of fluoride by the kidneys.[182] Approximately 50% of the fluoride absorbed each day by young or middle-aged adults becomes associated with hard tissues within 24 hours while virtually all of the remainder is excreted in the urine. Approximately 99% of the fluoride present in the body is associated with hard tissues.[192]

Ingested or systemic fluoride becomes incorporated into forming tooth structures. Fluoride ingested regularly during the time when teeth are developing is deposited throughout the entire surface of the tooth and contributes to long lasting protection against dental decay.[42]

Additional information on this topic may be found in Question 2.

An individual's age and stage of skeletal development will affect the rate of fluoride retention.The amount of fluoride taken up by bone and retained in the body is inversely related to age. More fluoride is retained in young bones than in the bones of older adults.[183,192,193]

According to generally accepted scientific knowledge, the ingestion of optimally fluoridated water does not have an adverse effect on bone health.[194-198] Evidence of advanced skeletal fluorosis, or crippling skeletal fluorosis, "was not seen in communities in the United States where water supplies contained up to 20 ppm (natural levels of fluoride)."[123,199] In these communities, daily fluoride intake of 20 mg/day would not be uncommon.[123] Crippling skeletal fluorosis is extremely rare in the United States and is not associated with optimally fluoridated water; only 5 cases have been confirmed during the last 35 years.[123]

Additional information on this topic may be found in Question 23.

The kidneys play the major role in the removal of fluoride from the body. Normally kidneys are very efficient and excrete fluoride very rapidly. However, decreased fluoride removal may occur among persons with severely impaired kidney function who may not be on kidney dialysis.[167] No cases of dental fluorosis or symptomatic skeletal fluorosis have been reported among persons with impaired kidney function; however, the overall health significance of reduced fluoride removal is uncertain and continued follow-up is recommended especially for children with impaired kidney function.[84]

Additional information on this topic may be found in Question 40.

QUESTION 23.

Will the ingestion of optimally fluoridated water over a lifetime adversely affect bone health?

Answer.
No, the ingestion of optimally fluoridated water does not have an adverse effect on bone health.[194-198,203-205]

Fact.
The weight of scientific evidence does not provide an adequate basis for altering public health policy regarding fluoridation because of bone health concerns. A number of investigations have studied the effects on bone structure of individuals residing in communities with optimal and higher than optimal concentrations of fluoride in the drinking water. These studies have focused on whether there exists a possible link between fluoride and bone fractures. Additionally, the possible association between fluoride and bone cancer has been studied.

In 1991, a workshop, co-sponsored by the National Institute of Arthritis and Musculoskeletal and Skin Diseases and the then National Institute of Dental Research, addressed the potential relationship of hip fracture and bone health in humans to fluoride exposure from drinking water. Meeting at the National Institutes of Health, researchers examined historic and contemporary research on fluoride exposure and bone health. At that time, participants concluded there was no basis for altering current public health policy regarding current guidelines for levels of fluoride in drinking water. Recommendations were made regarding additional research in several areas.[194]

In 1993, two studies were published demonstrating that exposure to fluoridated water does not contribute to an increased risk for hip fractures. One study looked at the risk of hip fractures in residents of two similar communities in Alberta, Canada.[195] In this study, researchers compared a city with fluoridated drinking water optimally adjusted to 1 ppm to a city whose residents drank water containing naturally occurring fluoride at a concentration of only 0.3 ppm. No significant difference was observed in the overall hip fracture hospitalization rates for residents of both cities. "These findings suggest that fluoridation of drinking water has no impact, neither beneficial nor deleterious, on the risk of hip fracture."[195]

The second study examined the incidence of hip fracture rates before and after water fluoridation in Rochester, Minnesota.[196] Researchers compared the hip fracture rates of men and women aged 50 and older from 1950 to 1959 (before the city's water supply was fluoridated in 1960) with the ten-year period after fluoridation. Their findings showed that hip fracture rates had decreased, and that the decrease began before fluoridation was introduced, and then continued. These data demonstrate no increase in the risk of hip fracture associated with water fluoridation.

An ecological study conducted in eastern Germany compared the incidence of hip fractures for adults living in Chemnitz (optimally fluoridated) and Halle (fluoride-deficient). The results suggested the consumption of optimally fluoridated water reduced the incidence of hip fractures in elderly individuals, especially women over 84 years of age.[200]

The ingestion of optimally fluoridated water does not have an adverse effect on bone health.[194-198,200] Exposure to fluoride at levels considered optimal for the prevention of dental decay appears to have no significant impact on bone mineral density or risk of bone fracture.[201-205] Some studies have reported hip fracture risk increased slightly, decreased slightly or was unchanged in fluoridated areas compared to nonfluoridated areas. A recent systematic review of these studies concluded there was no clear association with water fluoridation and hip fracture.[206]

> *"Exposure to fluoride at levels considered optimal for the prevention of dental decay appears to have no significant impact on bone mineral density or risk of bone fracture."*

24. While a number of studies reported findings at a population level, both the Hillier and Phipps studies examined risk on an individual rather than a community basis taking into account other risk factors such as medications, age of menopause, alcohol consumption, smoking, dietary calcium intake and physical activity. Using these more rigorous study designs, Hillier and Phipps reported no change or lower hip fracture risk in those drinking fluoridated water.[203,204]

In *Bone Health and Osteoporosis: A Report of the Surgeon General* issued in 2004, fluoride is listed as a nutrient that has potentially beneficial effects on bone.[207]

Lastly, the possible association between fluoride and bone cancer has been studied. In the early 1990s, two studies were conducted to evaluate the carcinogenicity of sodium fluoride in laboratory animals. The first study was conducted by the National Toxicology Program (NTP) of the National Institute of Environmental Health Sciences.[208] The second study was sponsored by the Proctor and Gamble Company.[209] In both studies, higher than optimal concentrations of sodium fluoride (25, 100 and 175 ppm) were consumed by rats and mice. When the NTP and the Proctor and Gamble studies were combined, a total of eight individual sex/species groups became available for analysis. Seven of these groups showed no significant evidence of malignant tumor formation. One group, male rats from the NTP study, showed "equivocal" evidence of carcinogenicity, which is defined by NTP as a marginal increase in neoplasms – i.e., osteosarcomas (malignant tumors of the bone) – that may be chemically related. The Ad Hoc Subcommittee on Fluoride of the U.S. Public Health Service combined the results of the two studies and stated: "Taken together, the two animal studies available at this time fail to establish an association between fluoride and cancer."[84,210]

Additional information on this topic may be found in Question 28.

QUESTION 24.

What is dental fluorosis?

Answer.

Dental fluorosis is a change in the appearance of teeth and is caused when higher than optimal amounts of fluoride are ingested in early childhood while tooth enamel is forming. The risk of dental fluorosis can be greatly reduced by closely monitoring the proper use of fluoride products by young children.

Fact.

Dental fluorosis is caused by a disruption in enamel formation which occurs during tooth development in early childhood related to a higher than optimal intake of fluoride .[182] Enamel formation of permanent teeth, other than third molars (wisdom teeth), occurs from about the time of birth until approximately five years of age. After tooth enamel is completely formed, dental fluorosis cannot develop even if excessive fluoride is ingested.[211] Older children and adults are not at risk for the development of dental fluorosis. Dental fluorosis becomes apparent only after the teeth erupt. Because dental fluorosis occurs while teeth are forming under the gums, teeth that have erupted are not at risk for dental fluorosis. It should be noted that many other developmental changes that affect the appearance of tooth enamel are not related to fluoride intake.

Table 4. Dental Fluorosis Classification by H.T. Dean–1942[212]

Classification	Criteria–Description of Enamel
Normal	Smooth, glossy, pale creamy-white translucent surface
Questionable	A few white flecks or white spots
Very Mild	Small opaque, paper-white areas covering less than 25% of the tooth surface
Mild	Opaque white areas covering less than 50% of the tooth surface
Moderate	All tooth surfaces affected; marked wear on biting surfaces; brown stain may be present
Severe	All tooth surfaces affected; discrete or confluent pitting; brown stain present

Dental fluorosis has been classified in a number of ways. One of the most universally accepted classifications was developed by H. T. Dean in 1942; its descriptions can be easily visualized by the public (see Table 4).[212]

In using Dean's Fluorosis Index, each tooth present in an individual's mouth is rated according to the fluorosis index in Table 4. The individual's fluorosis score is based upon the severest form of fluorosis recorded for two or more teeth. Dean's Index, which has been used for more than 60 years, remains popular for prevalence studies in large part due to its simplicity and the ability to make comparisons with findings from a number of earlier studies.[213]

Very mild to mild fluorosis has no effect on tooth function and may make the tooth enamel more resistant to decay. These types of fluorosis are not readily apparent to the affected individual or casual observer and often require a trained specialist to detect. In contrast, the moderate and severe forms of dental fluorosis, characterized by esthetically (cosmetically) objectionable changes in tooth color and surface irregularities, are typically easy to detect. Most investigators regard even the more advanced forms of dental fluorosis as a cosmetic effect rather than a functional adverse effect.[123] The U.S. Environmental Protection Agency, in a decision supported by the U.S. Surgeon General, has determined that objectionable dental fluorosis is a cosmetic effect with no known health effects.[168] Little research on the psychological effects of dental fluorosis on children and adults has been conducted, perhaps because the majority of those who have the milder forms of dental fluorosis are unaware of this condition.[84]

In a 1986-7 national survey of U.S. school children conducted by the National Institute of Dental Research (NIDR), dental fluorosis was present in 22.3% of the children examined using Dean's Index.[84] These children were exposed to a variety of sources of fluoride (fluoridated water, food, beverages, fluoride dental products and dietary supplements). The prevalence of the types of dental fluorosis observed was:

Very mild fluorosis	17.0%
Mild fluorosis	4.0%
Moderate fluorosis	1.0%
Severe fluorosis	0.3%
Total	22.3%

The incidence of moderate or severe fluorosis comprised a very small portion (6%) of the total amount of fluorosis. In other words, 94% of all dental fluorosis was the very mild to mild form of dental fluorosis.

This survey conducted by NIDR remains the only source of national data regarding the prevalence of dental fluorosis. In a study that compared this data with data recorded by H. Trendley Dean in the 1930s, it was determined that the greatest increase in fluorosis from the 1930s to the 1980s appeared in the group with suboptimally fluoridated water. During the last ten years of this period, children were exposed to fluoride from multiple sources including water, infant formula, foods, foods and drinks prepared with fluoridated water as well as dietary supplements and the ingestion of fluoride toothpaste making it difficult to pinpoint the effect any one item had on the development of fluorosis. As part of the most recent National Health and Nutrition Examination Survey (NHANES) 1999-2002, new fluorosis data has been collected as a representative sample of the U.S. population. By comparing NIDR and the latest NHANES data, researchers will be able to determine trends in the prevalence and severity of dental fluorosis in the past 15 years and examine if changes in exposure to systemic fluorides such as infant formulas, toothpaste and dietary fluoride supplements have had some effect.[214]

Using the same NIDR study, researchers looked at children aged 12-14 years who had never received dietary fluoride supplements and had only lived in one home. Through their analysis, they found that approximately 2% of U.S. school children may experience perceived esthetic problems which could be attributed to the currently recommended levels of fluoride in drinking water. They reported that dental fluorosis in the esthetically important front teeth occurs less often and is less severe than when looking at all teeth in an individual. While the researchers were not able to provide a cost estimate associated with the treatment of this fluorosis, they did note that such estimates are frequently an overestimation of the actual costs. Additionally, any change recommended to the current fluoridation policy would need to be weighed against fluoridation's lifetime benefits and the feasibility and associated costs of alternative solutions.[215]

As with other nutrients, fluoride is safe and effective when used and consumed properly. The recommended optimum water fluoride concentration of 0.7 to 1.2 ppm was established to maximize the decay preventive benefits of fluoride, and the same time minimize the likelihood of mild dental fluorosis.[84]

> *"The risk of teeth forming with the very mildest form of fluorosis must be weighed against the benefit that the individual's teeth will also have a lower level of dental decay thus saving dental treatment costs, patient discomfort and tooth loss."*

The benefits and risks of community water fluoridation have been examined and are discussed extensively in the Benefits Section and the safety of water fluoridation is discussed in great detail in the remainder of this (Safety) Section of this document. In assessing the risks of dental fluorosis, scientific evidence indicates it is probable that approximately 10% of children consuming optimally fluoridated water, in the absence of fluoride from all other sources, will develop very mild dental fluorosis.[10] As defined in Table 4, very mild fluorosis is characterized by small opaque, paper-white area covering less than 25% of the tooth surface. The risk of teeth forming with the very

mildest form of fluorosis must be weighed against the benefit that the individual's teeth will also have a lower level of dental decay thus saving dental treatment costs, patient discomfort and tooth loss.[11,12] In addition, the risk of fluorosis may be viewed as an alternative to having dental decay, which is a disease that may cause cosmetic problems much greater than dental fluorosis.[216]

In 1994, a review of five recent studies indicated that the amount of dental fluorosis attributable to water fluoridation was approximately 13%. This represents the amount of fluorosis that might be eliminated if community water fluoridation was discontinued.[85] In other words, the majority of dental fluorosis can be associated with other risk factors such as the inappropriate ingestion of fluoride products.

Additional information on this topic may be found in Question 25.

The type of fluorosis seen today remains largely limited to the very mild and mild categories; however, the prevalence of dental fluorosis in both fluoridated and nonfluoridated communities in the United States is highar than it was when the original epidemiological studies were conducted approximately 60 years ago.[84] The inappropriate use of fluoride-containing dental products is the largest risk factor for increased fluorosis as fluoride intake from food and beverages has remained constant over time.[180,181] The risk of fluorosis can be greatly reduced by following label directions for the use of these fluoride products.[123,167]

Additional information on this topic may be found in Question 25.

QUESTION 25.

What can be done to reduce the occurrence of dental fluorosis in the U.S.?

Answer.

The vast majority of dental fluorosis in the United States can be prevented by limiting the ingestion of topical fluoride products (such as toothpaste) and the appropriate use of dietary fluoride supplements without denying young children the decay prevention benefits of community water fluoridation.

Fact.

During the period of enamel formation in young children (before teeth appear in the mouth), inappropriate ingestion of high levels of fluoride is the risk factor for dental fluorosis.[85,217] Studies of fluoride intake from the diet including foods, beverages and water indicate that fluoride ingestion from these sources has remained relatively constant for over half a century and, therefore, is not likely to be associated with an observed increase in dental fluorosis.[180-182]

Additional information on this topic may be found in Question 19.

Dental decay has decreased because children today are being exposed to fluoride from a wider variety of sources than decades ago. Many of these sources are intended for topical use only; however, some fluoride is ingested inadvertently by children.[183] Inappropriate ingestion of topical fluoride can be minimized, thus reducing the risk for dental fluorosis without reducing decay prevention benefits.

Since 1992, the American Dental Association (ADA) has required manufacturers of toothpaste to include the phrase **"Use only a pea-sized amount (of toothpaste) for children under six"** on fluoride toothpaste labels with the ADA Seal of Acceptance. The rationale for choosing six years of age for the toothpaste label is based on the fact that the swallowing reflex is not fully developed in children of preschool age and they may inadvertently swallow toothpaste during brushing. In addition, the enamel formation of permanent teeth is basically complete at six and so there is a decreased risk of fluorosis. Because dental fluorosis occurs while teeth are forming under the gums, individuals whose teeth have erupted are not at risk for dental fluorosis.

Additional information on this topic may be found in Question 24.

Numerous studies have established a direct relationship between young children brushing with more than a pea-sized amount of fluoride toothpaste and the risk of very mild or mild dental fluorosis in both fluoridated and nonfluoridated communities.[189,218,219] It was noted that 34% of the dental fluorosis cases in a nonfluoridated community were explained by children having brushed more than once per day during the first two years of life. In the optimally fluoridated community, 68% of the fluorosis cases were explained by the children using more than a pea-sized amount of toothpaste during the first year of life.[220] **Parents and caregivers should put only one pea-sized amount of fluoride toothpaste on a young child's toothbrush at each brushing. Young children should be supervised while brushing and taught to spit out, rather than swallow, the toothpaste. Consult with your child's dentist or physician if you are considering using fluoride toothpaste before age two.**

Additionally, it has been shown that 65% of the fluorosis cases in a nonfluoridated area were attributed to fluoride supplementation under the pre-1994 protocol. Thirteen percent of fluorosis cases in a fluoridated community could be explained by a history of taking dietary fluoride supplements inappropriately.[220] Dietary fluoride supplements should be prescribed as recommended in the dietary fluoride supplement schedule approved by the American Dental Association, the American Academy of Pediatrics and the American Academy of Pediatric Dentistry in 1994 (see Table 1).[30,125] **Fluoride supplements should only be prescribed for children living in nonfluoridated areas.** Because of many sources of fluoride in the diet, proper prescribing of fluoride supplements can be complex. It is suggested that all sources of fluoride be evaluated with a thorough fluoride history before supplements are prescribed for a child.[122] That evaluation should include testing of the home water supply if the fluoride concentration is unknown.

Additional information on this topic may be found in Question 42.

Parents, caretakers and health care professionals should judiciously monitor use of all fluoride-containing dental products by children under age six. As is the case with any therapeutic product, more is not always better. Care should be taken to adhere to label directions on fluoride prescriptions and over-the-counter products (e.g. fluoride toothpastes and rinses). **The ADA recommends the use of fluoride mouthrinses, but not for children under six years of age because they may swallow the rinse.** These products should be stored out of the reach of children.

Finally, in areas where naturally occurring fluoride levels in ground water are higher than 2 ppm, consumers should consider action to lower the risk of dental fluorosis for young children. (Adults are not affected because dental fluorosis occurs only when developing teeth are exposed to elevated fluoride levels.) Families on community water systems should contact their water supplier to ask about the fluoride level. Consumers with private wells should have the source tested yearly to accurately determine the fluoride content. Consumers should consult with their dentist regarding water testing and discuss appropriate dental health care measures. In homes where young children are consuming water with a fluoride level greater than 2 ppm, families should use an alternative primary water source, such as bottled water, for drinking and cooking. It is also important to remember that the ADA recommends dietary fluoride supplements only for children living in areas with less than optimally fluoridated water.

Additional information on this topic may be found in Questions 4, 12 and 42.

QUESTION 26.

Why is there a warning label on a tube of fluoride toothpaste?

Answer.

The American Dental Association originally required manufacturers to place a label on fluoride toothpaste in 1991 to ensure proper use and therefore reduce the risk of dental fluorosis.

Fact.

In 1991, the American Dental Association (ADA) began requiring toothpaste manufacturers to include the following language on all ADA-Accepted toothpastes: "Do not swallow. Use only a pea-sized amount for children under six. To prevent swallowing, children under six years of age should be supervised in the use of toothpaste."

> *"To ensure children's safety, the ADA limits the total amount of fluoride allowed in ADA-Accepted toothpaste."*

The ADA warning labels were adopted to help reduce the risk of mild dental fluorosis. This type of fluorosis is not readily apparent to the affected individual or casual observer and often requires a trained specialist to detect. Dental fluorosis only occurs when more than the optimal daily amount of fluoride is ingested.

Additionally, to ensure children's safety, the ADA limits the total amount of fluoride allowed in any one tube of ADA-Accepted toothpaste.

Since 1997, the U.S. Food and Drug Administration (FDA) has required the label language, "If you accidentally swallow more than used for brushing, seek professional help or contact a poison control center immediately" on all fluoride toothpastes sold in the U.S.

The new FDA labels are consistent with the ADA statements, with the exception of the poison control warning.

The ADA Council on Scientific Affairs believes that the last sentence on the label could unnecessarily frighten parents and children and that this portion of the label overstates any demonstrated or potential danger posed by fluoride toothpastes.

The ADA notes that a child could not absorb enough fluoride from one tube of toothpaste to cause a serious problem and that the excellent safety record on fluoride toothpaste argues against any unnecessary regulation.[221]

QUESTION 27.

Is fluoride, as provided by community water fluoridation, a toxic substance?

Answer.

No. Fluoride, at the concentrations found in optimally fluoridated water, is not toxic according to generally accepted scientific knowledge.

Fact.

Like many common substances essential to life and good health – salt, iron, vitamins A and D, chlorine, oxygen and even water itself – fluoride can be toxic in excessive quantities. Fluoride in the much lower concentrations (0.7 to 1.2 ppm) used in water fluoridation is not harmful or toxic.

Acute fluoride toxicity occurring from the ingestion of optimally fluoridated water is impossible.[182] The amount of fluoride necessary to cause death for a human adult (155 pound man) has been estimated to be 5-10 grams of sodium fluoride, ingested at one time.[222] This is more than 10,000-20,000 times as much fluoride as is consumed at one time in a single 8 ounce glass of optimally fluoridated water.

Chronic fluoride toxicity may develop after 10 or more years of exposure to very high levels of fluoride, levels not associated with optimal fluoride intake in drinking water. The primary functional adverse effect associated with long term excess fluoride intake is

skeletal fluorosis. The development of skeletal fluorosis and its severity is directly related to the level and duration of fluoride exposure. For example, the ingestion of water naturally fluoridated at approximately 5 ppm for 10 years or more is needed to produce clinical signs of osteosclerosis (a mild form of skeletal fluorosis that can be seen as a change in bone density on x-rays) in the general population. In areas naturally fluoridated at 5 ppm, daily fluoride intake of 10 mg/day would not be uncommon.[123] A survey of X-rays from 170,000 people in Texas and Oklahoma whose drinking water had naturally occurring fluoride levels of 4 to 8 ppm revealed only 23 cases of osteosclerosis and no cases of crippling skeletal fluorosis.[223] Evidence of advanced skeletal fluorosis, or crippling skeletal fluorosis, "was not seen in communities in the United States where water supplies contained up to 20 ppm (natural levels of fluoride)."[123,199] In these communities, daily fluoride intake of 20mg/day would not be uncommon.[123] Crippling skeletal fluorosis is extremely rare in the United States and is not associated with optimally fluoridated water; only 5 cases have been confirmed during the last 35 years.[123]

Additional information on this topic may be found in Question 20.

28. 29. The Agency for Toxic Substances and Disease Registry (ATSDR) prepares toxicological profiles for various hazardous substances most commonly found at facilities on the CERCLA National Priorities List (Superfund Sites). The *Toxicological Profile for Fluorides, Hydrogen Fluoride and Fluorine* was revised in 2003. The ATSDR states that existing data indicates that subsets of the population may be unusually susceptible to the toxic effects of fluoride and its compounds at high doses. However, there are no data to suggest that exposure to the low levels associated with community water fluoridation would result in adverse effects in these potentially susceptible populations.[224]

> *"The possibility of adverse health effects from continuous low level consumption of fluoride over long periods has been studied extensively. As with other nutrients, fluoride is safe and effective when used and consumed properly."*

The possibility of adverse health effects from continuous low level consumption of fluoride over long periods has been studied extensively. As with other nutrients, fluoride is safe and effective when used and consumed properly. No charge against the benefits and safety of fluoridation has ever been substantiated by generally accepted scientific knowledge. After 60 years of research and practical experience, the preponderance of scientific evidence indicates that fluoridation of community water supplies is both safe and effective.

At one time, high concentrations of fluoride additives were used in insecticides and rodenticides.[36] Today fluoride additives are rarely used in pesticides because more effective additives have been developed.[183]

While large doses of fluoride may be toxic, it is important to recognize the difference in the effect of a massive dose of an extremely high level of fluoride versus the recommended amount of fluoride found in optimally fluoridated water. The implication that fluorides in large doses and in trace amounts have the same effect is completely unfounded. Many substances in widespread use are very beneficial in small amounts, but may be harmful in large doses – such as salt, chlorine and even water itself.

QUESTION 28.

Does drinking optimally fluoridated water cause or accelerate the growth of cancer?

Answer.

According to generally accepted scientific knowledge, there is no association between cancer rates in humans and optimal levels of fluoride in drinking water.[225]

Fact.

Since community water fluoridation was introduced in 1945, more than 50 epidemiologic studies in different populations and at different times have failed to demonstrate an association between fluoridation and the risk of cancer.[84] Studies have been conducted in the United States,[226-231] Japan,[232] the United Kingdom,[233-235] Canada[236] and Australia.[237] In addition, several independent bodies have conducted extensive reviews of the scientific literature and concluded that there is no relationship between fluoridation and cancer.[84,163,165,176,206,238]

The U.S. Environmental Protection Agency (EPA) further commented on the safety of appropriate fluoride exposure in the December 5, 1997, *Federal Register*.[239] In a notice of a final rule relating to fluoride additives; the EPA stated, "...the weight of evidence from more than 50 epidemiological studies does not support the hypothesis of an association between fluoride exposure and increased cancer risk in humans. The EPA is in agreement with the conclusions reached by the National Academy of Sciences (NAS)."

Despite the abundance of scientific evidence to the contrary, claims of a link between fluoridation and increased cancer rates continue. This assertion is largely based on one study comparing cancer death rates in ten large fluoridated cities versus ten large nonfluoridated cities in the United States. The results of this study have been refuted by a number of organizations and researchers.[240] Scientists at the National Cancer Institute analyzed the same data and found that the original investigators failed to adjust their findings for variables, such as age and gender differences, that affect cancer rates. A review by other researchers pointed to further shortcomings in

the study. The level of industrialization in the fluoridated cities was much higher than the nonfluoridated cities. Researchers noted that a higher level of industrialization is usually accompanied by a higher incidence of cancer. While the researchers noted that the fluoridated cities did have higher cancer rates over the twenty year study, the rate of increase in the nonfluoridated cities was exactly the same (15%) as the fluoridated cities. Following further reviews of the study, the consensus of the scientific community continues to support the conclusion that the incidence of cancer is unrelated to the introduction and duration of water fluoridation.[84]

In the early 1990s, two studies using higher than optimal levels of fluoride were conducted to evaluate the carcinogenicity of sodium fluoride in laboratory animals. The first study was conducted by the National Toxicology Program (NTP) of the National Institute of Environmental Health Sciences.[208] The second study was sponsored by the Proctor and Gamble Company.[209] In both studies, higher than optimal concentrations of sodium fluoride (25, 100 and 175 ppm) were consumed by rats and mice. When the NTP and the Proctor and Gamble studies were combined, a total of eight individual sex/species groups became available for analysis. Seven of these groups showed no significant evidence of malignant tumor formation. One group, male rats from the NTP study, showed "equivocal" evidence of carcinogenicity, which is defined by NTP as a marginal increase in neoplasms – i.e., osteosarcomas (malignant tumors of the bone) – that may be chemically related. The Ad Hoc Subcommittee on Fluoride of the U.S. Public Health Service combined the results of the two studies and stated: "Taken together, the two animal studies available at this time fail to establish an association between fluoride and cancer."[84,210]

Since that time, a number of studies have examined the hypothesis that fluoride is a risk factor for bone cancer. None of these studies reported an association between optimal levels of fluoride in drinking water and cancer of the bone.[241-244]

Additional information on this topic may be found in Question 23.

In a 1990 study, scientists at the National Cancer Institute evaluated the relationship between fluoridation of drinking water and cancer deaths in the United States during a 36 year period, and the relationship between fluoridation and the cancer rate during a 15 year period. After examining more than 2.3 million cancer death records and 125,000 cancer case records in counties using fluoridated water, the researchers saw no indication of a cancer risk associated with fluoridated drinking water.[84]

In 2001, researchers from Japan analyzed data on cancers taken from the International Agency for Research on Cancer World Health Organization in 1987, 1992 and 1997 and concluded that fluoridation may increase the risk for numerous types of cancers.[245] However, the methodology used in this analysis was inherently flawed as there are major and obvious differences in a number of factors relevant to the risk for cancer in the fluoridated and nonfluoridated communities. For example, this analysis did not control for differences in urbanization, socioeconomic status, geographic region, occupations, industries, diet, medical practices or tobacco use between the fluoridated and nonfluoridated communities. Thus any attempt to interpret cancer risk between these communities with this number of uncontrolled variables is scientifically inappropriate.

> *"The American Cancer Society states, 'Scientific studies show no connection between cancer rates in humans and adding fluoride to drinking water.'"*

In a document entitled "Fluoride and Drinking Water Fluoridation," the American Cancer Society states, "Scientific studies show no connection between cancer rates in humans and adding fluoride to drinking water."[225]

QUESTION 29.

Does fluoride, as provided by community water fluoridation, inhibit the activity of enzymes in humans?

Answer.

Fluoride, in the amount provided through optimally fluoridated water, has no effect on human enzyme activity according to generally accepted scientific knowledge.

Fact.

Enzymes are organic compounds that promote chemical change in the body. Generally accepted scientific knowledge has not indicated that optimally fluoridated water has any influence on human enzyme activity. There are no available data to indicate that, in humans drinking optimally fluoridated water, the fluoride affects enzyme activities with toxic consequences.[246] The World Health Organization report, *Fluorides and Human Health* states, "No evidence has yet been provided that fluoride ingested at 1 ppm in the drinking water affects intermediary metabolism of food stuffs, vitamin utilization or either hormonal or enzymatic activity."[247]

The concentrations of fluoride used in laboratory studies to produce significant inhibition of enzymes are hundreds of times greater than the concentration present in body fluids or tissues.[222] While fluoride may affect enzymes in an artificial environment outside of a living organism in the laboratory, it is unlikely that adequate cellular levels of fluoride to alter enzyme activities would be attainable in a living organism.[246] The two primary physiological mechanisms that maintain a low concentration of fluoride ion in body fluids are the rapid excretion of fluoride by the kidneys and the uptake of fluoride by calcified tissues.

QUESTION 30.

Does the ingestion of optimally fluoridated water adversely affect the thyroid gland or its function?

Answer.

There is no scientific basis that shows fluoridated water has an adverse effect on the thyroid gland or its function.

Fact.

In an effort to determine if fluoride in drinking water affects the function, shape and size of the thyroid gland, researchers conducted a study comparing one group of people who consumed water that contained natural fluoride levels of 3.48 ppm and one group who consumed water with extremely low fluoride levels of 0.09 ppm. The researchers noted that all study participants had been residents of their respective communities for more than 10 years. The researchers concluded that prolonged ingestion of fluoride at levels above optimal to prevent dental decay had no effect on thyroid gland size or function. This conclusion was consistent with earlier animal studies.[248]

In addition, two studies have explored the association between fluoridated water and cancer of the thyroid gland. Both studies found no association between optimal levels of fluoride in drinking water and thyroid cancer.[226,249]

In an effort to link fluoride and decreased thyroid function, those opposed to fluoridation cite one small study from the 1950's in which 15 patients who had hyperthyroidism (an overactive thyroid) were given relative large amounts of sodium fluoride orally or by injection in an effort to inhibit the thyroid's function. The researchers concluded that efforts to treat hyperthyroidism with fluoride was successful only occasionally among persons subjected to massive doses of fluoride. This study does not support claims that low fluoride levels in drinking water would cause hypothyroidism (an underactive thyroid).[250]

QUESTION 31.

Does water fluoridation affect the pineal gland causing the early onset of puberty?

Answer.

Generally accepted science does not suggest that water fluoridation causes the early onset of puberty.

Fact.

The pineal gland is an endocrine gland located in the brain which produces melatonin.[251] Endocrine glands secrete their products into the bloodstream and body tissues and help regulate many kinds of body functions. The hormone, melatonin, plays a role in sleep, aging and reproduction.

A single researcher has published one study in a peer-reviewed scientific journal regarding fluoride accumulation in the pineal gland. The purpose of the study was to discover whether fluoride accumulates in the pineal gland of older adults. This limited study, conducted on only 11 cadavers whose average age at death was 82 years, indicated that fluoride deposited in the pineal gland was significantly linked to the amount of calcium in the pineal gland. It would not be unexpected to see higher levels of calcium in the pineal gland of older individuals as this would be considered part of a normal aging process. As discussed in Question 22, approximately 99% of the fluoride present in the body is associated with hard or calcified tissues.[192] The study concluded fluoride levels in the pineal gland were not indicators of long-term fluoride exposure.[252]

The same researcher has theorized in unpublished reports posted on the Internet that the accumulation of fluoride in children's pineal gland leads to an earlier onset of puberty. However, the researcher notes that there is no verification that fluoride accumulates in children's pineal glands. Moreover, a study conducted in Newburgh (fluoridated) and Kingston (non-fluoridated), New York found no statistical significance between the onset of menstruation for girls living in a fluoridated verses non-fluoridated area.[253]

QUESTION 32.

Can fluoride, at the levels found in optimally fluoridated drinking water, alter immune function or produce allergic reaction (hypersensitivity)?

Answer.

There is no scientific evidence of any adverse effect on specific immunity from fluoridation, nor have there been any confirmed reports of allergic reaction.[254]

Fact.

There is no scientific evidence linking problems with immune function such as HIV or AIDS (acquired immune deficiency syndrome) with community water fluoridation.[255]

There are no confirmed cases of allergy to fluoride, or of any positive skin testing in human or animal models.[254] A committee of the National Academy of Sciences evaluated clinical reports of possible allergic responses to fluoride and reported, "The reservation in accepting (claims of allergic reaction) at face value is the lack of similar reports in much larger numbers of people who have been exposed to considerably more fluoride than was involved in the original observations."[39] The World Health Organization also judged these cases to represent "a variety of unrelated conditions" and found no evidence of allergic reactions to fluoride.[256,257]

A 1996 review of the literature on fluoride and white cell function examined numerous studies and concluded that there is no evidence of any harmful effect on specific immunity following fluoridation nor any confirmed reports of allergic reactions.[254]

QUESTION 33.

Is fluoride, as provided by community water fluoridation, a genetic hazard?

Answer.

Following a review of generally accepted scientific knowledge, the National Research Council of the National Academy of Sciences supports the conclusion that drinking optimally fluoridated water is not a genetic hazard.[167]

Fact.

Chromosomes are the DNA-containing bodies of cells that are responsible for the determination and transmission of hereditary characteristics. Genes are the functional hereditary unit that occupies a fixed location on a chromosome. Many studies have examined the possible effects of fluoride on chromosome damage. While there are no published studies on the genotoxic (damage to DNA) effect of fluoride in humans, numerous studies have been done on mice.[167] These studies have shown no evidence that fluoride damages chromosomes in bone marrow or sperm cells even at fluoride levels 100 times higher than that in fluoridated water.[258-264] Another independent group of researchers reported a similar lack of fluoride-induced chromosomal damage to human white blood cells, which are especially sensitive to agents which cause genetic mutations. Not only did fluoride fail to damage chromosomes, it protected them against the effect of a known mutagen (an agent that causes changes in DNA).[265,266] The genotoxic effects of fluoride were also studied in hamster bone marrow cells and cultured hamster ovarian cells. Again, the results supported the conclusion that fluoride does not cause chromosomal damage, and therefore, was not a genetic hazard.[267] In further tests, fluoride has not caused genetic mutations in the most widely used bacterial mutagenesis assay (the Ames test) over a wide range of fluoride levels.[267-270]

The National Research Council (NRC) of the National Academy of Sciences supports the conclusion that drinking optimally fluoridated water is not a genetic hazard. In a statement summarizing its research, the NRC states, "in vitro data indicate that:

1) the genotoxicity of fluoride is limited primarily to doses much higher than those to which humans are exposed,
2) even at high doses, genotoxic effects are not always observed, and
3) the preponderance of the genotoxic effects that have been reported are of the types that probably are of no or negligible genetic significance."[167]

The lowest dose of fluoride reported to cause chromosomal changes in mammalian cells was approximately 170 times that found normally found in human cells in areas where drinking water is fluoridated, which indicates a large margin of safety.[167]

QUESTION 34.

Does fluoride at the levels found in water fluoridation affect human reproduction, fertility or birth rates?

Answer.

There is no credible, scientific evidence that fluoridation has an adverse effect on human reproduction, fertility or birth rates.

Fact.

Very high levels of fluoride intake have been associated with adverse effects on reproductive outcomes in many animal species. Based on these findings, it appears that fluoride concentrations associated with adverse reproductive effects in animals are far higher (100-200 ppm) than those to which human populations are exposed. Consequently, there is insufficient scientific basis on which to conclude that ingestion of fluoride at levels found in community water fluoridation (0.7 – 1.2 ppm) would have adverse effects on human reproduction.[167]

One human study compared county birth data with county fluoride levels greater than 3 ppm and attempted to show an association between high fluoride levels in drinking water and lower birth rates.[271] However, because of serious limitations in design and analysis, the investigation failed to demonstrate a positive correlation.[272]

A study examining the relative risk of stillbirths and congenital abnormalities (facial clefts and neural tube defects) found no evidence that fluoridation had any effect of these outcomes.[273]

The National Research Council (NRC) of the National Academy of Sciences (NAS) supports the conclusion that drinking optimally fluoridated water is not a genetic hazard.[167]

Additional information on this topic may be found in Question 33.

QUESTION 35.

Does drinking optimally fluoridated water cause an increase in the rate of children born with Down Syndrome?

Answer.

There is no known association between the consumption of optimally fluoridated drinking water and Down Syndrome.

Fact.

This question originally arose because of two studies published in 1956 and 1963 by a psychiatrist. Data collected in several Midwest states in 1956 formed the basis for his two articles published in French journals, purporting to prove a relationship between fluoride in the water and Down Syndrome.[274,275]

Experienced epidemiologists and dental researchers from the National Institute of Dental Research and

staff members of the National Institute of Mental Health have found serious shortcomings in the statistical procedures and designs of these two studies. Among the most serious inadequacies is the fact that conclusions were based on the fluoridation status of the communities where the mothers gave birth, rather than the status of the rural areas where many of the women lived during their pregnancies.[222] In addition, the number of Down Syndrome cases found in both fluoridated and nonfluoridated communities were much lower than the rates found in many other parts of the United States and the world, that casting doubt on the validity of findings.

The following paragraphs provide a summary of numerous studies that have been conducted which refute the conclusions of the 1956 studies.

A British physician reviewed vital statistics and records from institutions and school health officers, and talked with public health nurses and others caring for children with Down Syndrome. The findings noted no indication of any relationship between Down Syndrome and the level of fluoride in water consumed by the mothers.[276]

These findings were confirmed by a detailed study of approximately 2,500 Down Syndrome births in Massachusetts. A rate of 1.5 cases per 1,000 births was found in both fluoridated and nonfluoridated communities, providing strong evidence that fluoridation does not increase the risk of Down Syndrome.[277]

Another large population-based study with data relating to nearly 1.4 million births showed no association between water fluoridation and the incidence of congenital malformations including Down Syndrome.[278]

In 1980, a 25-year review of the prevalence of congenital malformations was conducted in Birmingham, England. Although Birmingham initiated fluoridation in 1964, no changes in the prevalence of children born with Down Syndrome occurred since that time.[279]

A comprehensive study of Down Syndrome births was conducted in 44 U.S. cities over a two-year period. Rates of Down Syndrome were comparable in both fluoridated and nonfluoridated cities.[280]

QUESTION 36.

Does ingestion of optimally fluoridated water have any neurological impact?

Answer.

There is no generally accepted scientific evidence establishing a causal relationship between consumption of optimally fluoridated water and central nervous system disorders, attention deficit disorders or effects on intelligence.

Fact.

There have been claims that exposure to fluoride presents a neurotoxic (harmful or damaging to nerve tissue) risk or lowered intelligence. Such claims are based partly on one 1995 study in which rats were fed fluoride at levels up to 125 times greater than that found in optimally fluoridated water.[281] The study attempted to demonstrate that rats fed extremely high levels of fluoride (75 ppm to 125 ppm in drinking water) showed behavior-specific changes related to cognitive deficits.

In addition, the experiment also studied the offspring of rats who were injected two to three times a day with fluoride during their pregnancies in an effort to show that prenatal exposure resulted in hyperactivity in male offspring.

However, two scientists who reviewed the 1995 study[282] have suggested that the observations made can be readily explained by mechanisms that do not involve neurotoxicity. The scientists found inadequacies in experimental design that may have led to invalid conclusions. For example, the results of the experiment were not confirmed by the use of control groups which are an essential feature of test validation and experimental design. In summary the scientists stated, "We do not believe the study by Mullenix et al. can be interpreted in any way as indicating the potential for NaF (sodium fluoride) to be a neurotoxicant." Another reviewer[182] noted, "...it seems more likely that the unusually high brain fluoride concentrations reported in Mullenix et al. were the result of some analytical error."

> *"A seven-year study compared the health and behavior of children from birth through six years of age in communities with optimally fluoridated water ...The results suggested that there was no evidence to indicate that exposure to optimally fluoridated water had any detectable effect on children's health or behavior."*

A seven-year study compared the health and behavior of children from birth through six years of age in communities with optimally fluoridated water with those of children the same age without exposure to optimally fluoridated water. Medical records were reviewed yearly during the study. At age six and seven, child behavior was measured using both maternal and teacher ratings. The results suggested that there was no evidence to indicate that exposure to optimally fluoridated water had any detectable effect on children's health or behavior. These results did not differ even when data was controlled for family social background.[283]

The research conducted by Mullenix et al discussed in this question has not been replicated by other researchers.

Additional information on how to critically review research can be found in the Introduction and Figure 1.

QUESTION 37.

Does drinking fluoridated water increase the level of lead in the blood or cause lead poisoning in children?

Answer.

Generally accepted scientific evidence has not shown any association between water fluoridation and blood lead levels.

Fact.

One set of researchers has claimed that the silicofluoride additives used in community water fluoridation may be responsible for acidic drinking water which leaches lead from plumbing systems thereby increasing lead uptake by children. They go on to theorize that communities that use the silicofluorides have greater numbers of children with high levels of lead in their blood than nonfluoridated communities and that the results of the use of silicofluorides are reflected in these communities' residents exhibiting higher rates of learning disabilities, attention deficit disorders, violent crimes and criminals who were using cocaine at the time of arrest.[284]

From his research, Masters has claimed to be able to predict the estimated cost of increased prison populations due to water fluoridation. For example, in a 2003 appearance before the Palm Beach County (Florida) Commission, Masters stated that if the county fluoridated with silicofluorides, they could expect an additional 819 violent crimes per year directly related to water fluoridation with a minimum additional annual cost of imprisonment of $14,391,255.[284]

Scientists from the Environmental Protection Agency (EPA) have reviewed the basic science that was the foundation for the claim that silicofluorides leach lead from plumbing systems and found that many of the chemical assumptions made and statistical methods utilized in the original ecological study were scientifically unjustified. They went on to state that the research was inconsistent with accepted scientific knowledge and the authors of the original studies (Masters et al) failed to identify or account for these inconsistencies. Overall, the EPA scientists concluded that "no credible evidence exists to show that water fluoridation has any quantitatable effects on the solubility, bioavailability, bioaccumulation, or reactivity of lead (0) or lead (II) compounds.[285]

According to the Centers for Disease Control and Prevention, the average blood lead levels of young children in the U.S. have continued to decline since the 1970s primarily due to the phase-out of leaded gasoline and the resulting decrease in lead emissions. The primary remaining sources of childhood lead exposure are deteriorated leaded paint, house dust contaminated by leaded paint and soil contaminated by both leaded paint and decades of industrial and motor vehicle emissions.[286] Approximately 95% of the primary sources of adult lead exposure are occupational. Adult blood lead levels have continued to decline over the last ten years due largely to improved prevention measures in the workplace and changes in employment patters.[287] It should be noted that since the 1970s, while blood lead levels have continued to decline, the percentage of the population receiving optimally fluoridated water has continued to increase.[34]

The research conducted by Masters et al discussed in this question has not been replicated by other researchers.

Additional information on how to critically review research can be found in the Introduction and Figure 1.

QUESTION 38.

Does drinking optimally fluoridated water cause Alzheimer's disease?

Answer.

Generally accepted science has not demonstrated an association between drinking optimally fluoridated water and Alzheimer's disease.

Fact.

The exact cause of Alzheimer's disease has yet to be identified. Scientists have identified the major risk factors for Alzheimer's as age and family history. Scientists believe that genetics may play a role in many Alzheimer's cases. Other possible risk factors that are being studied are level of education, diet, environment and viruses to learn what role they might play in the development of this disease.[288]

A study published in 1998[289] raised concerns about the potential relationship between fluoride and Alzheimer's disease. However, several flaws in the experimental design preclude any definitive conclusions from being drawn.[290]

Interestingly, there is evidence that aluminum and fluoride are mutually antagonistic in competing for absorption in the human body.[42,291] While a conclusion cannot be made that consumption of fluoridated water has a preventive effect on Alzheimer's, there is no generally accepted scientific knowledge to show consumption of optimally fluoridated water is a risk factor for Alzheimer's disease.

QUESTION 39.

Does drinking optimally fluoridated water cause or contribute to heart disease?

Answer.

Drinking optimally fluoridated water is not a risk factor for heart disease.

Fact.

This conclusion is supported by results of a study conducted by the National Heart and Lung and Blood Institute of the National Institutes of Health. Researchers examined a wide range of data from communities that have optimally fluoridated water and from areas with insufficient fluoride.The final report concluded that:

> "Thus, the evidence from comparison of the health of fluoridating and nonfluoridating cities, from medical and pathological examination of persons exposed to a lifetime of naturally occurring fluorides or persons with high industrial exposures, and from broad national experience with fluoridation all consistently indicate no adverse effect on cardiovascular health."[292]

39.
40.
41.

> *"The American Heart Association states: 'No evidence exists that adjusting the fluoride content of public water supplies to a level of about one part per million has any harmful effect on the cardiovascular system.'"*

The American Heart Association states: "No evidence exists that adjusting the fluoride content of public water supplies to a level of about one part per million has any harmful effect on the cardiovascular system."[293] The American Heart Association identifies aging, male sex, heredity, cigarette and tobacco smoke, high blood cholesterol levels, high blood pressure, physical inactivity, obesity and diabetes mellitus as major risk factors for cardiovascular disease.[294]

A number of studies have considered trends in urban mortality in relation to fluoridation status. In one study, the mortality trends from 1950-70 were studied for 473 cities in the United States with populations of 25,000 or more. Findings showed no relationship between fluoridation and heart disease death rates over the 20-year period.[228] In another study, the mortality rates for approximately 30 million people in 24 fluoridated cities were compared with those of 22 nonfluoridated cities for two years. No evidence was found of any harmful health effects, including heart disease, attributable to fluoridation. As in other studies, crude differences in the mortality experience of the cities with fluoridated and nonfluoridated water supplies were explainable by differences in age, gender and race composition.[227]

QUESTION 40.

Is the consumption of optimally fluoridated water harmful to kidneys?

Answer.

The consumption of optimally fluoridated water has not been shown to cause or worsen human kidney disease.

Fact.

Approximately 50% of the fluoride ingested daily is removed from the body by the kidneys.[182,192,193] Because the kidneys are constantly exposed to various fluoride concentrations, any health effects caused by fluoride would likely manifest themselves in kidney cells. However, several large community-based studies of people with long-term exposure to drinking water with fluoride concentrations up to 8 ppm have failed to show an increase in kidney disease.[168,253,295]

In a report issued in 1993 by the National Research Council, the Subcommittee on Health Effects of Ingested Fluoride stated that the threshold dose of fluoride in drinking water which causes kidney effects in animals is approximately 50 ppm - more than 12 times the maximum level allowed in drinking water by the Environmental Protection Agency. Therefore, they concluded that "ingestion of fluoride at currently recommended concentrations is not likely to produce kidney toxicity in humans."[167]

Many people with kidney failure depend on hemodialysis (treatment with an artificial kidney machine) for their survival. During hemodialysis, the patient's blood is exposed to large amounts of water each week (280-560 quarts). Therefore, procedures have been designed to ensure that the water utilized in the process contain a minimum of dissolved substances that could diffuse indiscriminately into the patient's bloodstream.[296] Since the composition of water varies in different geographic locations in the United States, the U.S. Public Health Service recommends dialysis units use techniques such as reverse osmosis and de-ionization to remove excess iron, magnesium, aluminum, calcium, and other minerals, as well as fluoride, from tap water before the water is used for dialysis.[296,297]

Additional information on this topic is available in Question 22.

QUESTION 41.

What are some of the erroneous health claims made against water fluoridation?

Answer:

From sources such as the Internet, newsletters, and personal anecdotes in e-mails, community water fluoridation is frequently charged with causing all of the following adverse health effects:

- AIDS
- Allergic Reactions (loss of hair, skin that burns and peels after contact with fluoridated water)
- Alzheimer's disease
- Arthritis
- Asthma
- Behavior Problems (attention deficit disorders)
- Bone Disease (osteoporosis –increased bone/hip fractures)
- Cancer (all types including osteosarcoma or bone cancer)
- Chronic Bronchitis
- Colic (acute abdominal pain)
- Down Syndrome
- Emphysema
- Enzyme Effects (gene-alterations)
- Flatulence (gas)
- Gastrointestinal Problems (irritable bowel syndrome)
- Harmful Interactions with Medications
- Heart Disease
- Increased Infant Mortality
- Kidney Disease
- Lead Poisonings
- Lethargy (lack of energy)
- Lower IQ (mental retardation)
- Malpositioned Teeth
- Pineal Gland (early puberty) (chronic insomnia)
- Reproductive Organs (damaged sperm) (reduced fertility)
- Skin Conditions (redness, rash/welts, itching)
- Sudden Infant Death Syndrome (SIDS)
- Thyroid Problems (goiter and obesity due to hypothroidism)

AND

- Tooth Decay

Fact.

As discussed throughout this booklet, the overwhelming weight of credible scientific evidence has consistently indicated that fluoridation of community water supplies is safe and effective. The possibility of any adverse health effects from continuous low-level consumption of fluoride has been and continues to be extensively studied. It has been determined that approximately 10% of dental fluorosis is attributable to water fluoridation. This type of very mild to mild fluorosis has been determined to be a cosmetic effect rather than an adverse health effect. Of the thousands of credible scientific studies on fluoridation, none has shown health problems associated with the consumption of optimally fluoridated water.

"Of the thousands of credible scientific studies on fluoridation, none has shown health problems associated with the consumption of optimally fluoridated water."

Notes

FLUORIDATION PRACTICE

Q 42.	Water quality?	p. 40	Q 45.	Source of additives?	p. 43	Q 48.	Corrosion?	p. 44
Q 43.	Regulation?	p. 41	Q 46.	System safety concerns?	p. 43	Q 49.	Environment?	p. 45
Q 44.	Standards?	p. 42	Q 47.	Engineering?	p. 44			

QUESTION 42.

Will the addition of fluoride affect the quality of drinking water?

Answer.

Optimal levels of fluoride do not affect the quality of water. All ground and surface water in the United States contain some naturally occurring fluoride.

Fact.

Nearly all water supplies must undergo various water treatment processes to be safe and suitable for human consumption. During this process, more than 40 chemicals/additives are typically used including aluminum sulfate, ferric chloride, ferric sulfate, activated carbon, lime, soda ash and, of course, chlorine. Fluoride is added only to water that has naturally occurring levels lower than optimal.[36]

42.

43.

Fluoridation is the adjustment of the fluoride concentration of fluoride-deficient water supplies to the recommended range of 0.7 to 1.2 parts per million of fluoride for optimal dental health. The U.S. Environmental Protection Agency (EPA) recognizes that fluoride in children's drinking water at levels of approximately 1.0 ppm reduces the number of dental cavities.[298] The optimal level is dependent on the annual average of the maximum daily air temperature in a given geographic area.[36,55]

Additional information on this topic may be found in Questions 3 and 6.

Under the Safe Drinking Water Act, the EPA has established drinking water standards for a number of substances, including fluoride, in order to protect the public's health. There are several areas in the United States where the ground water contains higher than optimal levels of naturally occurring fluoride. Therefore, federal regulations were established to require that naturally occurring fluoride levels in a community water supply not exceed a concentration of 4.0 mg/L.[293] Under the Safe Drinking Water Act, this upper limit is the Maximum Contaminant Level (MCL) for fluoride. Under the MCL standard, if the naturally occurring level of fluoride in a public water supply exceeds the MCL (4.0 mg/L for fluoride), the water supplier is required to lower the level of fluoride below the MCL. This process is called defluoridation.

The EPA has also set a Secondary Maximum Contaminant Level (SMCL) of 2.0 mg/L, and requires consumer notification by the water supplier if the fluoride level exceeds 2.0 mg/L. The SMCL, while not federally enforceable, is intended to alert families that regular consumption of water with natural levels of fluoride greater than 2.0 mg/L by young children may cause moderate to severe dental fluorosis in the developing permanent teeth, a cosmetic condition with no known adverse health effect.[298] The notice to be used by water systems that exceed the SMCL must contain the following points:

1. The notice is intended to alert families that children under nine years of age who are exposed to levels of fluoride greater than 2.0 mg/liter may develop dental fluorosis.
2. Adults are not affected because dental fluorosis occurs only when developing teeth are exposed to elevated fluoride levels.
3. The water supplier can be contacted for information on alternative sources or treatments that will insure the drinking water would meet all standards (including the SMCL).

The 1993 National Research Council report, "Health Effects of Ingested Fluoride," reviewed fluoride toxicity and exposure data for the EPA and concluded that the current standard for fluoride at 4.0 mg/L (set in 1986) was appropriate as an interim standard to protect the public health.[167] In EPA's judgment, the combined weight of human and animal data support the current fluoride drinking water standard. In December 1993, the EPA published a notice in the *Federal Register* stating the ceiling of 4 mg/L would protect against adverse health effects with an adequate margin of safety and published a notice of intent not to revise the fluoride drinking water standards.[168]

The EPA further commented on the safety of fluoride in the December 5, 1997, *Federal Register*.[239] In a notice of a final rule relating to fluoride additives the EPA stated, "There exists no directly applicable scientific documentation of adverse medical effects at levels of fluoride below 8 mg/L (0.23mg/kg/day)." The EPA's Maximum Concentration Limit (MCL) of 4.0 mg/L (0.114 mg/kg/day) is one half that amount, providing an adequate margin of safety.

Under the Safe Drinking Water Act (SDWA), the EPA must periodically review the existing National Primary Drinking Water Regulations (NPDWRs) "not less often than every 6 years." This review is a routine part of the EPA's operations as dictated by the SDWA. NPDWRs, or primary standards, are legally enforceable standards that

apply to public water systems. Primary standards protect public health by limiting the levels of contaminants in drinking water.

In April 2002, the EPA announced the results of its preliminary revise/not revise decisions for 68 chemical NPDWRs. Fluoride was one of the 68 chemicals reviewed. The EPA determined that it fell under the "Not Appropriate for Revision at this Time" category, but noted that it planned to ask the National Academy of Science (NAS) to update the risk assessment for fluoride. The NAS had previously completed a review of fluoride for EPA approximately 12 years ago which was published as "Health Effects of Ingested Fluoride" in 1993 by the National Research Council.

At the request of the NAS, the National Research Council's Committee on Toxicology created the Subcommittee on Fluoride in Drinking Water to review toxicologic, epidemiologic, and clinical data published since 1993 and exposure data on orally ingested fluoride from drinking water and other sources (e.g., food, toothpaste, dental rinses). Based on this review the Subcommittee will evaluate the scientific and technical basis of the EPA's maximum contaminant level (MCL) of 4 milligram per liter (mg/L or ppm) and secondary maximum contaminant level (SMCL) of 2 mg/L for fluoride in drinking water and advise EPA on the adequacy of its fluoride MCL and SMCL to protect children and others from adverse health effects. Additionally, the Subcommittee will identify data gaps and make recommendations for future research relevant to setting the MCL and SMCL for fluoride.

The Subcommittee began its work in November 2002 and is currently projected to complete the project in early 2006.[173]

QUESTION 43.

Who regulates drinking water additives in United States?

Answer.

The United States Environmental Protection Agency regulates drinking water additives.

Fact

In 1974, Congress passed the original Safe Drinking Water Act (SDWA) which protects the public's health by regulating the nation's public drinking water supply.[299]

The SDWA, as amended in 1986 and 1996,[299] requires the U.S. Environmental Protection Agency (EPA) ensure the public is provided with safe drinking water.[155]

On June 22, 1979, the U.S. Food and Drug Administration (FDA) and the EPA entered into a Memorandum of Understanding (MOU) to clarify their roles and responsibilities in water quality assurance. The stated purpose of the MOU is to "avoid the possibility of overlapping jurisdiction between the EPA and FDA with respect to control of drinking water additives. The two agencies agreed that the SDWA's passage in 1974 implicitly repealed FDA's jurisdiction over drinking water as a 'food' under the Federal Food, Drug and Cosmetic Act (FFDCA). Under the agreement, EPA enjoys exclusive regulatory authority over drinking water served by public water supplies, including any additives in such water. FDA retains jurisdiction over bottled drinking water under Section 410 of the FFDCA and over water (and substances in water) used in food or food processing once it enters the food processing establishment."[155]

> *"From time to time, states and communities have had to deal with legislation or ballot initiatives aimed at requiring the approval of the FDA before any agent can be added to community water systems...On the surface, this may appear to be a 'common sense' approach. However, its only real purpose is to defeat efforts to provide water fluoridation. That is because it would require the FDA – which does NOT regulate water systems – to approve any water additive. By mistakenly (and perhaps craftily) naming the wrong federal agency, the probable outcome is to stop or prevent water fluoridation."*

From time to time, states and communities have had to deal with legislation or ballot initiatives aimed at requiring the approval of the FDA before any agent can be added to community water systems. Often referred to as the Fluoride Product Quality Control Act, Water Product Quality Ordinance or Pure Water Ordinance, the legislation is specifically used by those opposed to water fluoridation as a tool to prevent water systems from providing community water fluoridation. Often this legislation does not mention fluoride or fluoridation. Those supporting this type of legislation may claim that they are not against water fluoridation but are proponents of pure water and do not want anything added to water that has not been approved by the FDA.

On the surface, this may appear to be a "common sense" approach. However, its only real purpose is to defeat efforts to provide water fluoridation. That is because it would require the FDA – which does NOT regulate water systems – to approve any water additive. By mistakenly (and perhaps craftily) naming the wrong federal agency, the probable outcome is to stop or prevent water fluoridation.

QUESTION 44.

What standards have been established to ensure the safety of fluoride additives used in community water fluoridation in the United States?

Answer.

The three fluoride additives used in the U.S. to fluoridate community water systems (sodium fluoride, sodium fluorosilicate, and fluorosilicic acid) meet safety standards established by the American Water Works Association (AWWA) and NSF International (NSF).

Fact.

Additives used in water treatment meet safety standards prepared in response to a request by the Environmental Protection Agency (EPA) to establish minimum requirements to ensure the safety of products added to water for its treatment, thereby ensuring the public's health. Specifically, fluoride additives used in water fluoridation meet standards established by the American Water Works Association (AWWA) and NSF International (NSF). Additionally, the American National Standards Institute (ANSI) endorses both AWWA and NSF standards for fluoridation additives and includes its name on these standards.

44. The American Water Works Association is an international nonprofit scientific and educational society dedicated to the improvement of drinking water quality and supply. AWWA is the authoritative resource for knowledge, information, and advocacy to improve the quality and supply of drinking water in North America and beyond. Founded in 1881, AWWA is the largest organization of water supply professionals in the world.[300]

45. NSF International, a not-for-profit, non-governmental organization, is the world leader in standards development, product certification, education, and risk-management for public health and safety. For 60 years, NSF has been committed to public health, safety, and protection of the environment. NSF is widely recognized for its scientific and technical expertise in the health and environmental sciences. Its professional staff includes engineers, chemists, toxicologists, and environmental health professionals with broad experience both in public and private organizations.[301]

46. The American National Standards Institute (ANSI) is a private, non-profit organization that administers and coordinates the U.S. voluntary standardization and conformity assessment system. The Institute's mission is to enhance both the global competitiveness of U.S. business and the U.S. quality of life by promoting and facilitating voluntary consensus standards and conformity assessment systems, and safeguarding their integrity.[302]

The purpose of AWWA standards for fluoride additives is to provide purchasers, manufacturers and suppliers with the minimum requirements for fluoride additives, including physical, chemical, packaging, shipping and testing requirements. In part, the AWWA standards for fluoride additives state, "The [fluoride compound] supplied under this standard shall contain no soluble materials or organic substances in quantities capable of producing deleterious or injurious effects on the health of those consuming water that has been properly treated with the [fluoride compound]." Certified analyses of the additives must be furnished by the manufacturer or supplier.[60]

NSF Standard 60 ensures the purity of drinking water additives. NSF Standard 61 provides guidance for equipment used in water treatment plants. The NSF/ANSI Standards were developed by a consortium of associations including NSF, AWWA, the Association of State Drinking Water Administrators and the Conference of State Health and Environmental Managers with support from the EPA. In part, they establish minimum requirements for the control of potential adverse human health effects from products added to water for its treatment.[303,304]

Fluoride additives, like all of the more than 40 additives typically used in water treatment, are "industrial grade" additives. The water supply is an industry and all additives used at the water plant are classified as industrial grade additives. Examples of other "industrial grade" additives which are commonly used in water plant operations are chlorine (gas), ferrous sulfate, hydrochloric acid, sulfur dioxide and sulfuric acid.[36]

Sometimes antifluoridationists express the view that they are not really opposed to fluoridation, but are opposed to the use of "industrial grade" fluoride additives. They may even go so far as to state that they would support fluoridation if the process was implemented with pharmaceutical grade fluoride additives that were approved by the Food and Drug Administration (FDA). On the surface, this may appear to be a "common sense" approach. In fact, this is usually a ploy whose only real purpose is to stop fluoridation. The EPA, not the FDA, regulates additives in drinking water.

Additional information on this topic may be found in Question 43.

The claim is sometimes made that no studies on safety exist on the additives used in water fluoridation. The scientific community does not study health effects of concentrated additives as put into water; studies are done on the health effects of the treated water. While sodium fluoride was the first additive used in water fluoridation, the use of silicofluoride additives (sodium fluorosilicate and fluorosilicic acid) began in the late 1940s. By 1951, silicofluorides had become the most commonly used fluoride additives in water fluoridation.[61] Many of the early studies on the health effects of fluoridation were completed in communities that were using the silicofluoride additives, most generally fluorosilicic acid.[305-310] However, at that time, the additives used to fluoridate were not always identified in research reports. As the body of research on fluoridation grew, it became evident that there was no adverse health effects associated with water fluoridation regardless of which fluoride additive was used.

Additional information on this topic may be found in Question 5.

Additionally, over time, a number of comprehensive reviews of the health effects of fluoridation have been published. These reviews which support the safety of water fluoridation include many studies conducted in large fluoridated communities which used the silicofluoride additives.[71,84,163,165,167,311-313]

Beyond the foundation that has been established through the overwhelming weight of credible, peer-reviewed scientific evidence, there is over 60 years of practical experience that lends additional credence to the science that concludes that fluoridation is safe.

QUESTION 45.

What is the source of the additives used to fluoridate water supplies in the United States?

Answer.

Fluoride additives used in the United States are derived from the mineral apatite.

Fact.

The three fluoride additives used in the United States for water fluoridation (sodium fluoride, sodium fluorosilicate, and fluorosilicic acid) are derived from apatite which is a type of limestone deposit used in the production of phosphate fertilizers. Apatite contains 3-7% fluoride and is the main source of fluorides used in water fluoridation.[36]

During processing, apatite is ground up and treated with sulfuric acid, producing phosphoric acid (the main ingredient in the production of phosphate fertilizer) plus a solid and two gases. The solid, calcium sulfate (also known as gypsum) is the material used to form drywall or sheetrock. The two gases, hydrogen fluoride and silicon tetrafluoride, are captured in water to form fluorosilicic acid which today is the most commonly used fluoride additive in the United States.[60]

The two remaining fluoride additives (sodium fluoride and sodium fluorosilicate) are derived from fluorosilicic acid. Sodium fluoride is produced when fluorosilicic acid is neutralized with caustic soda. Fluorosilicic acid is neutralized with sodium chloride or sodium carbonate to produce sodium fluorosilicate.[36]

From time to time opponents of fluoridation allege that fluoridation additives are byproducts of the phosphate fertilizer industry in an effort to infer the additives are not safe. Byproducts are simply materials produced as a result of producing something else – they are by no means necessarily bad, harmful or waste products. In the chemical industry, a byproduct is anything other than the economically most important product produced. Byproducts may have certain characteristics which make them valuable resources. For example, in addition to orange juice, various byproducts are obtained from oranges during juice production that are used in cleaners, disinfectants, flavorings and fragrances.[314]

> "To ensure the public's safety, additives used in water fluoridation meet standards of the American Water Works Association (AWWA) and NSF International (NSF)."

Fluoride additives are valuable byproducts produced as a result of producing phosphate fertilizer. To ensure the public's safety, additives used in water fluoridation meet standards of the American Water Works Association (AWWA) and NSF International (NSF).

Additional information on this topic may be found in Question 44.

QUESTION 46.

Does the process of water fluoridation present unusual safety concerns for water systems and water operators?

Answer.

No. With proper planning, maintenance and monitoring, water fluoridation is a safe process.

Fact.

Water plant facilities and water plant personnel perform a valuable public service by carefully adjusting the level of fluoride in water to improve the oral health of the community. Facilities and personnel are subject to a number of regulations designed to ensure safety. The Occupational Safety and Health Administration (OSHA) provides guidelines for the safety of employees in the workplace.[60,315] Additionally, the American Water Works Association publishes detailed guidance on safety and safe working conditions for water plant personnel. Furthermore, the Centers for Disease Control and Prevention has established safety procedures designed specifically for water plant operators in charge of implementing fluoridation.[315] Adherence to these guidelines helps to ensure continuous levels of optimally fluoridated drinking water while maintaining water operator safety.

As part of the safety procedures, water plant personnel receive training on the management of the chemicals/additives in water plants. While the optimal fluoride concentration found in drinking water has been proven safe, water plant operators and engineers may be exposed to much higher fluoride levels when handling fluoride additives at the water treatment facility.[36] Fluoride additives present comparable risks as other chemicals/additives in common use at water treatment facilities, such as hypochloride, quick-lime, aluminum sulfate, sodium hydroxide and ferrous sulfate. In fact, the fluoride additives are much less dangerous than chlorine gas commonly used in water plant operations.

Today's equipment allows water treatment personnel to easily monitor and maintain the desired fluoride con-

centration. Automatic monitoring technology is available that can help to ensure that the fluoride concentration of the water remains within the recommended range.

It is important that the water treatment operators responsible for monitoring the addition of fluoride to the water supply be appropriately trained and that the equipment used for this process is adequately maintained.[315] As with any mechanical equipment, water fluoridation equipment should be tested, maintained and replaced as needed. With over 60 years of experience and thousands of water systems in operation, there have been remarkably few untoward incidents.

QUESTION 47.

Does fluoridation present difficult engineering problems?

Answer.

No. Properly maintained and monitored water fluoridation systems do not present difficult engineering problems.

Fact.

With proper planning and maintenance of the system, fluoride adjustment is compatible with other water treatment processes. Today's equipment allows water treatment personnel to easily monitor and maintain the desired fluoride concentration. Automatic monitoring technology is available that can help to ensure that the fluoride concentration of the water remains within the recommended range.

When added to community water supplies the concentrated fluoride additives become greatly diluted. For example, fluorosilicic acid is diluted approximately 180,000 times to reach the recommended range of 0.7 to 1.2 parts per million. At 1 ppm, one part of fluoride is diluted in a million parts of water. Large numbers such as a million can be difficult to visualize. While not exact, the following comparisons can be of assistance in comprehending one part per million:

1 inch in 16 miles
1 minute in 2 years
1 cent in $10,000

> *"Because there is more than 60 years of experience with water fluoridation, there is considerable guidance on sound engineering practices to design, construct, operate and maintain water fluoridation systems."*

Because there is more than 60 years of experience with water fluoridation, there is considerable guidance on sound engineering practices to design, construct, operate and maintain water fluoridation systems. Fluoride additives are introduced to the water supply as liquids, but are measured by two basic types of devices, dry feeders or solution feeders (metering pumps). By design, and with proper maintenance and testing, water systems limit the amount of fluoride that can be added to the system (i.e., the use of a day tank that only holds one day's supply of fluoride) so prolonged over-fluoridation becomes a mechanical impossibility.[36]

QUESTION 48.

Will fluoridation corrode water pipes or add lead, arsenic and other toxic contaminants to the water supply?

Answer.

Allegations that fluoridation causes corrosion of water delivery systems are not supported by current scientific evidence.[36] Furthermore, the concentrations of contaminants in water as a result of fluoridation do not exceed, but, in fact, are well below regulatory standards set to ensure the public's safety.

Fact.

Water fluoridation has no impact on the acidity or pH of drinking water and will not cause lead and copper to be leached from water pipes. Corrosion of pipes by drinking water is related primarily to dissolved oxygen concentration, pH, water temperature, alkalinity, hardness, salt concentration, hydrogen sulfide content and the presence of certain bacteria. Under some water quality conditions, a small increase in the acidity of drinking water that is already slightly acidic may be observed after treatment with alum, chlorine, fluorosilicic acid or sodium florosilicate. In such cases, further water treatment is indicated by water plant personnel to adjust the pH upward to neutralize the acid. This is part of routine water plant operations. Note that the Water Quality Report or Consumer Confidence Report that all water systems send to customers on a yearly basis, lists the pH of the system's finished water and compares that level against the standard set at a pH of 7.0 (neutral) or higher indicating that the water leaving the plant is non-acidic.

Additional information on this topic may be found in Question 4.

A 1999 study[316] charged that fluorosilicic acid and sodium silicofluoride did not disassociate completely when added to water systems and may be responsible for lower pH levels of drinking water, leaching lead from plumbing systems and increasing lead uptake by children.

In response to the study, scientists from the U.S. Environmental Protection Agency (EPA) have reviewed the basic science that was the foundation for the claim that silicofluorides leach lead from water pipes and found that many of the chemical assumptions made in the original research were scientifically unjustified. Fluoride additives do disassociate very quickly and completely releasing fluoride ions into the water. The research was inconsistent with accepted scientific knowledge and the authors of the original studies failed to identify or account for these inconsistencies. The EPA scientists discounted

this study and said there was no credible data to suggest any link between fluoridation and lead.[285]

Fluorosilicic acid is the additive used to fluoridate the vast majority of community water systems in the U.S. Because it is a natural substance derived from apatite which is mined from the earth, fluorosilicic acid may contain minute amounts of contaminants such as lead and arsenic. However, existing regulations and standards require that these contaminants, including arsenic and lead, be at levels considered safe by the EPA when the fluorosilicic acid is diluted to produce optimally fluoridated water.[317,318] Evidence of testing by the fluoride additive manufacturer documents that the concentrations of these contaminants do not exceed, but, in fact, are well below regulatory standards set to ensure the public's safety. Most batches of the additive do not contain any detectable amount of either lead or arsenic. On average, the concentration of arsenic and lead in optimally fluoridated drinking water created using fluorosilicic acid is less than 0.1 part per billion.[319]

QUESTION 49.

Does fluoridated water harm the environment?

Answer.

Scientific evidence supports the fluoridation of public water supplies as safe for the environment and beneficial for people.

Fact.

The U.S. Environmental Protection Agency (EPA) has set an enforceable Federal drinking water standard for fluoride at 4.0 mg/L. As long as the 4.0 mg/L standard is not exceeded, State and local authorities determine whether or not to fluoridate.[320]

> *"Under the Washington's State Environmental Protection Act (SEPA), a study concluded that there are 'no probable significant adverse environmental impacts.'"*

Under the Washington's State Environmental Protection Act (SEPA), a study was conducted in Tacoma-Pierce County to investigate the environmental consequences of adding optimal levels of fluoride to drinking water. Noting that the amount of fluoride in the water does not reach levels that are harmful to plants or animals, the SEPA study concluded that there are "no probable significant adverse environmental impacts."[321]

There is no evidence that optimally fluoridated water has any effect on gardens, lawns or plants.[322]

A comprehensive literature review conducted in 1990 revealed absolutely no negative environmental impacts as a result of water fluoridation. Historically, issues surrounding problems with fluoride and the environment have involved incidents related to industrial pollution or accidents.[323]

Notes

PUBLIC POLICY

Q 50.	Valuable measure?	p. 46	Q 53.	Internet?	p. 51	Q 56.	Banned in Europe?	p. 54
Q 51.	Courts of law?	p. 47	Q 54.	Public votes?	p. 51			
Q 52.	Opposition?	p. 47	Q 55.	International fluoridation?	p. 54			

QUESTION 50.

Is water fluoridation a valuable public health measure?

Answer.

Yes. Water fluoridation is a public health measure that benefits people of all ages, is safe and is a community public health program that saves money.

Fact.

Throughout decades of research and more than 60 years of practical experience, fluoridation of public water supplies has been responsible for dramatically improving the public's oral health status. Former Surgeon General of the United States, Dr. Luther Terry, called fluoridation as vital a public health measure as immunization again disease, pasteurization of milk and purification of water.[7] Another former U.S. Surgeon General Dr. C. Everett Koop stated that fluoridation is the single most important commitment that a community can make to the oral health of its citizens.

50.

51.

52.

> *"Former U.S. Surgeon General Dr. C. Everett Koop stated that fluoridation is the single most important commitment that a community can make to the oral health of its citizens."*

In 1994, the U.S. Department of Health and Human Services issued a report which reviewed public health achievements. Along with other successful public health measures such as the virtual eradication of polio and reductions in childhood blood lead levels, fluoridation was lauded as one of the most economical preventive values in the nation.[17] A policy statement on water fluoridation reaffirmed in 1995 by the U.S. Public Health Service (USPHS) stated that water fluoridation is the most cost-effective, practical and safe means for reducing the occurrence of dental decay in a community.[18] In 1998, recognizing the ongoing need to improve health and well being, the USPHS revised national health objectives to be achieved by the year 2010. Included under oral health was an objective to significantly expand the fluoridation of public water supplies. Specifically, Objective 21-9 states that at least 75% of the U.S. population served by community water systems should be receiving the benefits of optimally fluoridated water by the year 2010.[19]

> *"Former U.S. Surgeon General David Satcher, noted that water fluoridation is a powerful strategy in efforts to eliminate health disparities among populations."*

In 1999, the Centers for Disease Control and Prevention named fluoridation of drinking water one of ten great public health achievements of the 20th century noting that it is a major factor responsible for the decline in dental decay.[1,2] Former U.S. Surgeon General David Satcher, issued the first ever Surgeon General report on oral health in May 2000. In *Oral Health in America: A Report of the Surgeon General*, Dr. Satcher stated that community water fluoridation continues to be the most cost-effective, practical and safe means for reducing and controlling the occurrence of dental decay in a community. Additionally, Dr. Satcher noted that water fluoridation is a powerful strategy in efforts to eliminate health disparities among populations. Studies have shown that fluoridation may be the most significant step we can take toward reducing the disparities in dental decay.[21-24] In the 2003 *National Call to Action to Promote Oral Health*, U.S. Surgeon General Richard Carmona called on policymakers, community leaders, private industry, health professionals, the media and the public to affirm that oral health is essential to general health and well being. Additionally, Surgeon General Carmona urged these groups to apply strategies to enhance the adoption and maintenance of proven community-based interventions such as community water fluoridation.[25]

Community water fluoridation is a most valuable public health measure because:

- Optimally fluoridated water is accessible to the entire community regardless of socioeconomic status, educational attainment or other social variables;[26]
- Individuals do not need to change their behavior to obtain the benefits of fluoridation.
- Frequent exposure to small amounts of fluoride over time makes fluoridation effective through the life span in helping to prevent dental decay.
- Community water fluoridation is more cost effective than other forms of fluoride treatments or applications.[27]

QUESTION 51.

Has the legality of water fluoridation been upheld by the courts?

Answer.

Yes. Fluoridation has been thoroughly tested in the United States' court system, and found to be a proper means of furthering public health and welfare. No court of last resort has ever determined fluoridation to be unlawful. Moreover, fluoridation has been clearly held not to be an unconstitutional invasion of religious freedom or other individual rights guaranteed by the First, Fifth or Fourteenth Amendments to the U.S. Constitution. And while cases decided primarily on procedural grounds have been won and lost by both pro and anti fluoridation interests, to ADA's knowledge no final ruling in any of those cases has found fluoridation to be anything but safe and effective.

> *"No court of last resort has ever determined fluoridation to be unlawful. The highest courts of more than a dozen states have confirmed the constitutionality of fluoridation."*

Fact.

During the last sixty years, the legality of fluoridation in the United States has been thoroughly tested in our court systems. Fluoridation is viewed by the courts as a proper means of furthering public health and welfare.[324] No court of last resort has ever determined fluoridation to be unlawful. The highest courts of more than a dozen states have confirmed the constitutionality of fluoridation.[325] In 1984, the Illinois Supreme Court upheld the constitutionality of the state's mandatory fluoridation law, culminating 16 years of court action at a variety of judicial levels.[326] Moreover, the U.S. Supreme Court has denied review of fluoridation cases thirteen times, citing that no substantial federal or constitutional questions were involved.[325]

It has been the position of the American courts that a significant government interest in the health and welfare of the public generally overrides individual objections to public health regulation.[333] Consequently, the courts have rejected the contention that fluoridation ordinances are a deprivation of religious or individual freedoms guaranteed under the Constitution.[325,327] In reviewing the legal aspects of fluoridation, the courts have dealt with this concern by ruling that: (1) fluoride is a nutrient, not a medication, and is present naturally in the environment; (2) no one is forced to drink fluoridated water as alternative sources are available; and (3) in cases where a person believes that fluoridation interferes with religious beliefs, there is a difference between the freedom to believe, which is absolute, and the freedom to practice beliefs, which may be restricted in the public's interest.[328,329]

Fluoridation is the adjustment of a naturally occurring element found in water in order to prevent dental decay. Courts have consistently ruled that water fluoridation is not a form of compulsory mass medication or socialized medicine.[325,328,330] Fluoridation is simply the adjustment of a naturally occurring element found in water in order to prevent dental decay. In fact, water that has been fortified with fluoride is similar to fortifying salt with iodine, milk with vitamin D and orange juice with vitamin C – none of which are medications.

> *"To ADA's knowledge no final ruling in any of those cases has found fluoridation to be anything but safe and effective."*

In recent years, challenges to fluoridation have been dismissed for a variety of reasons, including that plaintiffs admitted they could not establish injury by virtue of fluoridation, and that state law supporting fluoridation prevailed over local attempts to oppose fluoridation. Interestingly, pro and anti fluoridation interests have each won and lost legal challenges regarding which state or local agency has regulatory authority over fluoridation, which of course varies by state and locality. State law variances have also led to different rulings on other issues, such as whether downstream end users of fluoridation must be given an opportunity to vote on whether to fluoridate. While cases decided primarily on procedural grounds have been won and lost by both pro and anti fluoridation interests, to ADA's knowledge no final ruling in any of those cases has found fluoridation to be anything but safe and effective.

QUESTION 52.

Why does opposition to community water fluoridation continue?

Answer.

Fluoridation is considered beneficial by the overwhelming majority of the health and scientific communities as well as the general public. However, a small faction continues to speak out against fluoridation of municipal water supplies. Some individuals may view fluoridation of public water as limiting their freedom of choice; other opposition can stem from misinterpretations or inappropriate extrapolations of the science behind the fluoridation issue.

Fact.

A vast body of scientific literature endorses water fluoridation as a safe means of reducing the incidence of dental decay. Support for fluoridation among scientists and health professionals, including physicians and dentists, is nearly universal. Recognition of the benefits of

fluoridation by the American Dental Association, the American Medical Association, governmental agencies and other national health and civic organizations continues as a result of published, peer-reviewed research. (See Compendium at back of booklet.)

The majority of Americans also approves of water fluoridation. In June 1998, the Gallup Organization conducted a national survey of just over 1,000 adults on their attitudes toward community water fluoridation. When asked, "Do you believe community water should be fluoridated?", 70% answered *yes*, 18% answered *no* and 12% responded *don't know* (Figure 5). Results characterized by U.S. Census Region showed the level of support for community water fluoridation to be relatively constant throughout the United States, with 73% in the Northeast, 72% in the Midwest, 68% in the South and 70% in the West favoring community water fluoridation.[331] These results are consistent with a December 1991 Gallup survey that asked 1,200 parents, "Whether or not you presently have fluoridated water, do you approve or disapprove of fluoridating drinking water?" More than three-quarters (78%) of the responding parents approved, 10% disapproved and 12% answered don't know or refused to answer the question (Figure 6). Disapproval ranged from 4% in communities where water was fluoridated to 16% in communities where it was not.[332]

52. Of the small faction that opposes water fluoridation for philosophical reasons, freedom of choice probably stands out as the most important single complaint.[333] Some individuals are opposed to community action on any health issue, others because of environmental or economic arguments and some because they are misinformed.

Opposition to fluoridation has existed since the initiation of the first community programs in 1945 and continues today with over 60 years of practical experience showing fluoridation to be safe and effective. An article that appeared in the local newspaper shortly after the first fluoridation program was implemented in Grand Rapids, Michigan, noted that the fluoridation program was slated to commence January 1 but did not actually begin until January 25. Interestingly, health officials in Grand Rapids began receiving complaints of physical ailments attributed to fluoridation from citizens weeks before fluoride was actually added to the water.[342]

Since that time, antifluoridation leaders and organizations have come and gone, but their basic beliefs have remained the same. These include: fluoride is toxic and causes numerous harmful health effects; fluoride does not prevent dental decay; fluoridation is costly; and fluoridation interferes with freedom of choice and infringes on individual rights.

While the arguments against fluoridation have remained relatively constant over the years, the antifluoridationists have used different approaches that play upon the popular concerns of the public at the time. For example, in the 1950s fluoridation was a Communist plot. With America's growing concern for environmental issues in the 1960s, fluoridation was pollution. After the Vietnam War in the 1970s, the antifluoridationists capitalized on the popularity of conspiracy theories by portraying fluoridation as a conspiracy between the U.S. government, the dental-medical establishment and industry. As Americans became more concerned about their health in the 1980s, antifluoridationists claimed fluoridation caused AIDS and Alzheimer's disease. In the 1990s, claims of hip fractures and cancer were designed to resonate with aging baby boomers. With the new millennium, overexposure and toxicity, in association with lead and arsenic poisoning, have surfaced as

Figure 5. 1998 Consumers' Opinions Regarding Community Water Fluoridation[331]

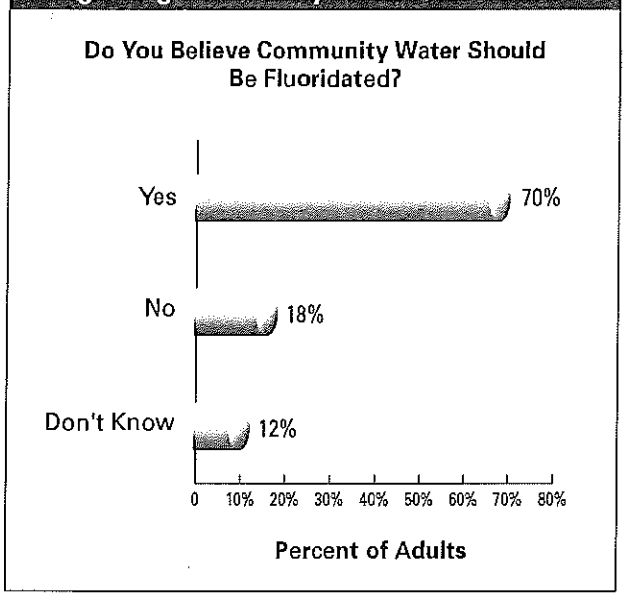
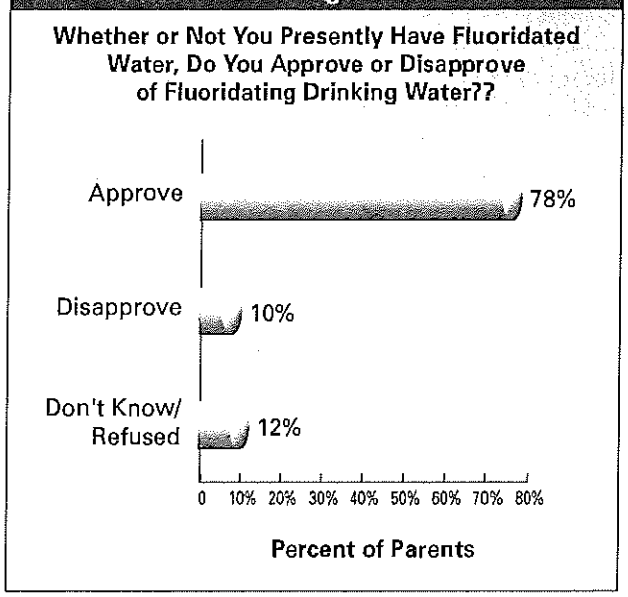


Figure 6. Approval of Fluoridating Drinking Water[332]



common themes. None of these approaches has ever really disappeared, but are often recycled as antifluoridationists choose which approach will have the most effect on the intended audience.[333]

Antifluoridationists have eagerly embraced technology such as videos and the Internet to spread their message to the public. These two venues have allowed the small faction of antifluoridationists to be linked across the country and around the world and promote their message economically.

A number of opposition videos are available from national antifluoridation organizations. These economically-priced videos make it affordable for every campaign to bring an antifluoridationist to the community via local cable access television. However, it has been the Internet that has breathed new life into the antifluoridation effort. The Internet has brought the antifluoridation message into voters' homes. With just a click of the mouse, search engines can locate hundreds of Web sites denouncing fluoridation, which may give the impression that this is a one-sided argument. Individuals who look to the Internet as a source of reliable information may fail to recognize that these sites often contain personal opinion rather than scientific fact. Newspaper stories, press releases and letters to the editor are often posted as documentation of the "science" behind antifluoridationists' claims. All too often, the public accepts this type of information as true simply because it is in print.

The techniques used by antifluoridationists are well known and have been discussed at length in a number of published articles that review the tactics used by antifluoridationists.[325,333,335-339] Examples of a few of the techniques can be viewed in Figure 7 on the next page.

> *"Reputable science is based on the scientific method of testing hypotheses in ways that can be reproduced and verified by others; junk science, which often provides too-simple answers to complex questions, often cannot be substantiated."*

"Junk science," a term coined by the press and used over the past decade to characterize data derived from atypical or questionable scientific techniques, also can play a role in provoking opposition to water fluoridation. In fact, decision makers have been persuaded to postpone action on several cost-effective public health measures after hypothetical risks have made their way into the public media.[340] Junk science impacts public policy and costs society in immeasurable ways. More people, especially those involved in policy decisions, need to be able to distinguish junk science from legitimate scientific research. Reputable science is based on the scientific method of testing hypotheses in ways that can be reproduced and verified by others; junk science, which often provides too-simple answers to complex questions, often cannot be substantiated.

In 1993 the U.S. Supreme Court issued a landmark decision that many view as likely to restrict the use of junk science in the federal courts and in those state courts which adopt this reasoning. The Court determined that while "general acceptance" is not needed for scientific evidence to be admissible, federal trial judges have the task of ensuring that an expert's testimony rests on a reasonable foundation and is relevant to the issue in question. According to the Supreme Court, many considerations will bear on whether the expert's underlying reasoning or methodology is scientifically valid and applicable in a given case. The Court set out four criteria judges could use when evaluating scientific testimony:

(1) whether the expert's theory or technique can be (and has been) tested, using the scientific method,
(2) whether it has been subject to peer review and publication (although failing this criteria alone is not necessarily grounds for disallowing the testimony),
(3) its known or potential error rate and the existence and maintenance of standards in controlling its operation and
(4) whether it has attracted widespread acceptance within a relevant scientific community, since a known technique that has been able to attract only minimal support may properly be viewed with skepticism.

The scientific validity and relevance of claims made by opponents of fluoridation might be best viewed when measured against these criteria.[341]

> *"Opinions are seldom unanimous on any scientific subject. In fact, there may be no such thing as 'final knowledge,' since new information is continuously emerging and being disseminated. As such, the benefit evidence must be continually weighed against risk evidence. Health professionals, decision makers and the public should be cooperating partners in the quest for accountability where decisions are based on proven benefits measured against verified risks."*

Opinions are seldom unanimous on any scientific subject. In fact, there may be no such thing as "final knowledge," since new information is continuously emerging and being disseminated. As such, the benefit evidence must be continually weighed against risk evidence. Health professionals, decision makers and the public should be cooperating partners in the quest for accountability where decisions are based on proven benefits measured against verified risks.[335]

Additional information on this topic may be found in the Introduction and Figure 1.

Figure 7. Opposition Tactics

Targeting Politicians and Community Leaders

Antifluoridation Web sites contain draft letters to be sent to newspaper publishers, water departments, and community public officials warning them of their "liability" should they support or endorse water fluoridation. Leaders are urged to remain "neutral" and allow fluoridation decisions to be put to a public vote therefore relieving the leaders of any and all responsibility in the matter. Antifluoridationists use the time gained to conduct a public referendum to bombard the public with misinformation designed to turn public opinion against fluoridation.

Unproven Claims

Antifluoridationists have repeatedly claimed fluoridation causes an entire laundry list of human illnesses including AIDS, Alzheimer's disease, cancer, Down Syndrome, genetic damage, heart disease, lower intelligence, kidney disease and osteoporosis (hip factures). These allegations are often repeated so frequently during campaigns that the public assumes they must be true. Their appearance in print, even if only in letters to the editor of the local newspaper, reinforces the allegation's credibility. With just a small amount of doubt established, the opposition slogan, "If in doubt, vote it out," may ring true with voters.

Innuendo

The statement, "Fifty years ago physicians and dentists posed for cigarette ads," is an example of innuendo or, more specifically, guilt by association. Even though fluoridation is not mentioned, individuals are expected to make the connection that the medical community changed its position on smoking so it is possible health professionals are wrong about fluoridation, too.

Outdated Studies and Statements from "Experts"

Antifluoridation Web sites often offer a list of "respected medical professionals and scientists" who have spoken out against fluoridation. One of those often quoted is Dr. Charles Gordon Heyd who is noted to be a Past President of the American Medical Association (AMA). What is not disclosed is the source of the quote or that Dr. Heyd was President of the AMA in 1936 – almost ten years before water fluoridation trials began. His decades-old quote certainly does not represent the current AMA position of support for water fluoridation and is characteristic of antifluoridationists' use of items that are out of date. Additionally, antifluoridationists have claimed that fourteen Nobel Prize winners have "opposed or expressed reservations about fluoridation." It should be noted that the vast majority of these individuals were awarded their prizes from 1929 through 1958.

Statements Out of Context

One of the most repeated antifluoridation statements is, "Fluoride is a toxic chemical. Don't let them put it in our water." This statement ignores the scientific principle that toxicity is related to dosage and not just to exposure to a substance. Examples of other substances that can be harmful in the wrong amounts but beneficial in the correct amounts are salt, vitamins A and D, iron, iodine, aspirin and even water itself.

In another example, a press release from the New York State Coalition Opposed to Fluoridation (NYSCOF) posted on the Internet in August 2001, and again in March 2005, stated, "Fluoridation is based more on unproven theories than scientific evidence, according to a revised dental textbook by leaders in the field." The press release also includes a number of items "quoted" from the textbook. The American Dental Association contacted the textbook authors who immediately wrote a letter responding to the press release. Drs. Brian A. Burt and Dr. Stephen A. Eklund responded, "The NYSCOF article takes a series of disconnected quotes from our textbook (Burt BA, Eklund SE. The Dentist, Dental Practice, and the Community 5th edition. Philadelphia: Saunders, 1999) and puts its own interpretation on them. The result is to portray Drs. Burt and Eklund as being opposed to fluoridation, which is most definitely not the case."

Moving Targets

In venues ranging from the media to the courts, opponents have been known to shift their theories of opposition frequently and mid-stream. This often appears to occur when one of their originally advanced points of opposition has been unveiled as being without merit. Some examples: A parent who told the media that he would need to move his family out of town because of past allergies to fluoride had to change his position after it was disclosed that the family had previously lived in a fluoridated community; and opponents filing repeated amendments to their legal complaints, in one case moving from an all out attack to the position that that they are not opposed to fluoridation, but just to one particular chemical - without telling the court that the chemical has been safely and extensively used for decades.

53.

54.

QUESTION 53.

Where can reliable information about water fluoridation be found on the Internet and World Wide Web?

Answer.

The American Dental Association, as well as other reputable health and science organizations, and government agencies have sites on the Internet/Web that provide information on fluorides and fluoridation. These sites provide information that is consistent with generally accepted scientific knowledge.

Fact.

The Internet and World Wide Web are evolving as accessible sources of information. However, not all "science" posted on the Internet and World Wide Web is based on scientific fact. Searching the Internet for "fluoride" or "water fluoridation" directs individuals to a number of Web sites. Some of the content found in the sites is scientifically sound. Other less scientific sites may look highly technical, but contain information based on science that is unconfirmed or has not gained widespread acceptance. Commercial interests, such as the sale of water filters, may also be promoted.

One of the most widely respected sources for information regarding fluoridation and fluorides is the American Dental Association's (ADA) Fluoride and Fluoridation Web site at http:www.ada.org/goto/fluoride (Figure 8). From the ADA Web site individuals can link to other Web sites, such as the Centers for Disease Control and Prevention, National Institute of Dental and Craniofacial Research, Institute of Medicine, National Cancer Institute, and state/local health departments for more information about fluoride and water fluoridation.

Figure 8. Fluoride and Fluoridation Web Page

FLUORIDATION AT YOUR FINGERTIPS!

http://www.ada.org/goto/fluoride

- ADA Fluoridation Resources
- Fluoridation Facts Online
- ADA Fluoridation News Stories
- ADA Policy and Statements
- Links to Additional Fluoridation Web Sites

ADA.

American Dental Association
www.ada.org

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Be resourceful. Visit ADA.org today!

QUESTION 54.

Why does community water fluoridation sometimes lose when it is put to a public vote?

Answer.

Voter apathy or low voter turnout due the vote being held as a special election or in an "off" year, confusing ballot language (a "no" vote translates to support for fluoridation), blurring of scientific issues, lack of leadership by elected officials and a lack of political campaign skills among health professionals are some of the reasons fluoridation votes are sometimes unsuccessful.

Fact.

Despite the continuing growth of fluoridation in this country over the past decades, millions of Americans do not yet receive the protective benefits of fluoride in their drinking water. Centers for Disease Control and Prevention (CDC) data from 2002 indicate, only two-thirds (67.3%) of the population served by public water systems have access to fluoridated water.[34] Forty-two of the 50 largest cities in the U.S. have adopted fluoridation. Another two have natural optimal levels of fluoride (Figure 9). The remaining six nonfluoridated cities are: Fresno, California; San Jose, California; Colorado Springs, Colorado; Honolulu, Hawaii; Wichita, Kansas and Portland, Oregon. In 1998, recognizing the ongoing need to improve health and well being, the U.S. Public Health Service revised national health objectives to be achieved by the year 2010. Included under oral health was an objective to significantly expand the fluoridation of public water supplies. Specifically, Objective 21-9 states that at least 75% of the U.S. population served by community water systems should be receiving the benefits of optimally fluoridated water by the year 2010.[19] Although water fluoridation reaches some residents in every state, 2002 data indicates that only 24 states are providing these benefits to 75% or more of their residents.[34] (Figure 10).

Social scientists have conducted studies to examine why fluoridation fails when put to a public vote. Among the factors noted are lack of funding, public and professional apathy, the failure of many legislators and community leaders to take a stand because of perceived controversy, low voter turnout and the difficulty faced by an electorate in evaluating scientific information in the midst of emotional charges by opponents. Unfortunately, citizens may mistakenly believe their water contains optimal levels of fluoride when, in fact, it does not.

"Clever use of emotionally charged 'scare' propaganda by fluoride opponents creates fear, confusion and doubt within a community when voters consider the

Figure 9. Forty-Two of the Fifty Largest Cities in the U.S. are Supplied with Fluoridated Water*

Two cities (Jacksonville, Florida and El Paso, Texas) are naturally fluoridated.

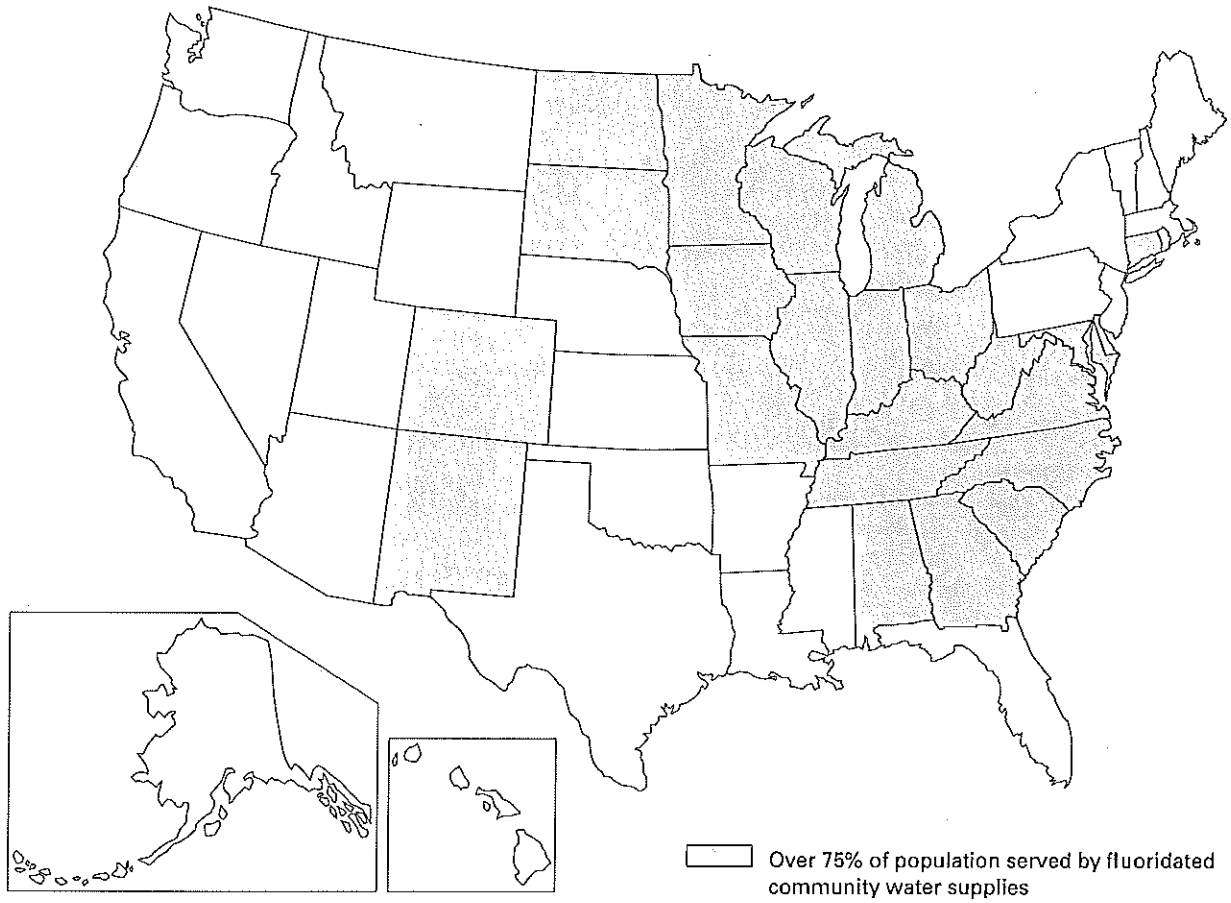
*Data compiled by the American Dental Association and Centers for Disease Control and Prevention/Division of Oral Health. Information current as of May 2005.

Clever use of emotionally charged "scare" propaganda by fluoride opponents creates fear, confusion and doubt within a community when voters consider the use of fluoridation.[342,343] Defeats of referenda or the discontinuance of fluoridation have occurred most often when a small, vocal and well organized group has used a barrage of fear-inspiring allegations designed to confuse the electorate. In addition to attempts to influence voters, opponents have also threatened community leaders with personal litigation.[344] While no court of last resort has ever ruled against fluoridation, community leaders may be swayed by the threat of litigation due to the cost and time involved in defending even a groundless suit, not to mention threats of political fallout. The American Dental Association (ADA) knows of no cases in which community leaders have been found liable for their pro-fluoridation efforts. In no instance has fluoridation been discontinued because it was proven harmful in any way.[343-345]

Adoption of fluoridation is ultimately a decision of state or local decision makers, whether determined by elected officials, health officers or the voting public. Fluoridation can be enacted through state legislation, administrative regulation or a public referendum. While fluoridation is not legislated at the federal level, it is legislated at the state and local level. As with any pubic health measure, a community has the right and obligation to protect the health and welfare of its citizens, even if it means overriding individual objections to implement fluoridation.

Figure 10. State Fluoridation Status

States Meeting the Healthy People 2010 Goal of 75% of the Population Served by Fluoridated Community Water Supplies*



*Data Source: Centers for Disease Control and Prevention/Division of Oral Health. "Percentage of U.S. Population on Public Water Supply Systems Receiving Fluoridated Water" 2002. Available at http://www2.cdc.gov/nohss/FluoridationV.asp.

"In the past five years (2000 through 2004), more than 125 communities in 36 states have decided to provide the benefits of fluoridation for their residents."

Each spring as part of the yearly Community Water Fluoridation Awards program, the ADA, Association of State and Territorial Dental Directors and the CDC Division of Oral Health compile a list of water systems/communities in the United States that have adopted community water fluoridation in the past year. This list is posted on the ADA Web site at http://www.ada.org/goto/fluoride. In the past five years (2000 through 2004), more than 125 communities in 36 states have decided to provide the benefits of fluoridation for their residents. The size of these water systems/communities varies greatly – from those with a few thousand residents to the Metropolitan Water District of Southern California which will provide fluoridated water to more than 18 million people.

Technical assistance with fluoridation efforts is available from the Council on Access, Prevention and Interprofessional Relations at the ADA. Additional support for fluoridation is available from ADA's Division of Legal Affairs, Division of Communications and Department of State Government Affairs.

QUESTION 55.

Is community water fluoridation accepted by other countries?

Answer.

Over 405 million people in more than 60 countries worldwide enjoy the benefits of fluoridated water.[132]

> *"The value of water fluoridation is recognized internationally...Considering the extent to which fluoridation has already been implemented throughout the world, the lack of documentation of adverse health effects is remarkable testimony to its safety."*

Fact.

The value of water fluoridation is recognized internationally. Countries and geographic regions with extensive water fluoridation include the U.S., Australia, Brazil, Canada, Chile, Columbia, Ireland, Israel, Malaysia, New Zealand, People's Republic of China (Hong Kong only), Singapore and the United Kingdom.[132] Thorough investigations of fluoridation have been conducted in Britain and Australia supporting the safety and effectiveness of water fluoridation.[163,165,346] Considering the extent to which fluoridation has already been implemented throughout the world, the lack of documentation of adverse health effects is remarkable testimony to its safety.[84,163-167,210] The World Health Organization (WHO) and the Pan American Health Organization have endorsed the practice of water fluoridation since 1964. In 1994, an expert committee of WHO published a report which reaffirmed its support of fluoridation as being safe and effective in the prevention of dental decay, and stated that "provided a community has a piped water supply, water fluoridation is the most effective method of reaching the whole population, so that all social classes benefit without the need for active participation on the part of individuals."[138] In many parts of the world, fluoridation is not feasible or a high priority, usually due to the lack of a central water supply, the existence of more life threatening health needs or the lack of trained technical personnel or sufficient funds for start-up and maintenance costs.

55.

56.

QUESTION 56.

Is community water fluoridation banned in Europe?

Answer.

No country in Europe has banned community water fluoridation.

Fact.

The claim that fluoridation is banned in Europe is frequently used by fluoridation opponents. In truth, European countries construct their own water quality regulations within the framework of the 1980 European Water Quality Directive. The Directive provides maximum admissible concentrations for many substances, one of which is fluoride. The Directive does not require or prohibit fluoridation, it merely requires that the fluoride concentration in water does not exceed the maximum permissible concentration.[347]

Many fluoridation systems that used to operate in Eastern and Central Europe did not function properly and, when the Iron Curtain fell in 1989-90, shut down because of obsolete technical equipment and lack of knowledge as to the benefits of fluoridated water.[348] Water fluoridation is not practical in some European countries because of complex water systems with numerous water sources. As an alternative to water fluoridation, many European countries have opted for the use of fluoride supplements or salt fluoridation.

Basel, Switzerland is one such example. Those opposed to water fluoridation claimed a large victory when Basel voted to cease water fluoridation in 2003. The facts are that Basel was the lone city with fluoridated water surrounded by communities that used fluoridated salt. In the mid 90s, trade barriers that had prevented fluoridated salt from being sold to those living in Basel fell and soon it was evident that residents were receiving fluoride from salt as well as through drinking water. The government voted to cease water fluoridation in 2003 in light of availability and use of fluoridated salt in the community. Basel, Switzerland did not stop fluoridating. Officials simply chose another type of fluoridation – salt fluoridation.[349]

Additional information on this topic may be found in Question 14.

> *"No European country has imposed a 'ban' on water fluoridation."*

Again, no European country has imposed a "ban" on water fluoridation, it has simply not been implemented for a variety of technical, legal, financial or political reasons.

Political actions contrary to the recommendations of health authorities should not be interpreted as a negative response to water fluoridation. For example, although fluoridation is not carried out in Sweden and the Netherlands, both countries support World Health Organization's recommendations regarding fluoridation as a preventive health measure, in addition to the use of fluoride toothpastes, mouthrinses and dietary fluoride supplements.[138,350]

Notes

COST EFFECTIVENESS

Q 57. Cost effective? p. 56

Q 58. Practical? p. 57

QUESTION 57.

Is water fluoridation a cost-effective means of preventing tooth decay?

Answer.

Yes. Fluoridation has substantial lifelong decay preventive effects and is a highly cost-effective means of preventing tooth decay in the United States, regardless of socioeconomic status.[97,103,104,351-353]

Fact.

The cost of community water fluoridation can vary in each community depending on the following factors.[354]

1. Size of the community (population and water usage);
2. Number of fluoride injection points where fluoride additives will be added to the water system;
3. Amount and type of equipment used to add and monitor fluoride additives;
4. Amount and type of fluoride compound used, its price, and its costs of transportation and storage; and
5. Expertise of personnel at the water plant.

The annual cost for a U.S. community to fluoridate its water is estimated to range from approximately $0.50 per person in large communities to approximately $3.00 per person in small communities.[355]

> *"For most cities, every $1 invested in water fluoridation saves $38 in dental treatment costs."*

It can be calculated from these data that the average lifetime cost per person to fluoridate a water system is less than the cost of one dental filling. When it comes to the cost of treating dental disease, everyone pays. Not just those who need treatment, but the entire community-through higher health insurance premiums and higher taxes. For most cities, every $1 invested in water fluoridation saves $38 in dental treatment costs.[355] Cutting dental care costs by decreasing dental decay is something a community can do to improve oral health and save money for everyone. With the escalating cost of health care, fluoridation remains a preventive measure that benefits members of the community at minimal cost.[25] Fluoridation is a community public health measures that saves money.

School-based dental disease prevention activities (such as fluoride mouthrinse or tablet programs), professionally applied topical fluorides and dental health education are beneficial but have not been found to be as cost-effective in preventing dental decay as community water fluoridation.[351] Fluoridation remains the most cost-effective and practical form of preventing decay in the United States and other countries with established municipal water systems.[17,97,104,355]

Because of the decay-reducing effects of fluoride, the need for restorative dental care is typically lower in fluoridated communities. Therefore, an individual residing in a fluoridated community will typically have fewer restorative dental expenditures during a lifetime. Health economists at a 1989 workshop concluded that fluoridation costs approximately $3.35 per tooth surface when decay is prevented, making fluoridation "one of the very few public health procedures that actually saves more money than it costs."[359] Considering the fact that the national average fee for a two surface amalgam (silver) restoration in a permanent tooth placed by a general dentist is $101.94*, fluoridation clearly demonstrates significant cost savings.[356]

In a study conducted in Louisiana, Medicaid-eligible children (ages 1-5) residing in communities without fluoridated water were three times more likely than Medicaid-eligible children residing in communities with fluoridated water to receive dental treatment in a hospital and the cost of dental treatment per eligible child was approximately twice as high. In addition to community water fluoridation status, the study took into account per capita income, population and number of dentists per county.[358]

> *"The economic importance of fluoridation is underscored by the fact that frequently the cost of treating dental disease is paid not only by the affected individual, but also by the general public through services provided by health departments, community health clinics, health insurance premiums, the military and other publicly supported medical programs."*

The economic importance of fluoridation is underscored by the fact that frequently the cost of treating dental disease is paid not only by the affected individual, but also by the general public through services provided by health departments, community health clinics, health insurance premiums, the military and other publicly supported medical programs.[103]

Indirect benefits from the prevention of dental decay may include:

- freedom from dental pain
- a more positive self image
- fewer missing teeth
- fewer cases of malocclusion aggravated by tooth loss
- fewer teeth requiring root canal treatment
- reduced need for dentures, bridges and implants
- less time lost from school or work because of dental pain or visits to the dentist

These intangible benefits are difficult to measure economically, but are extremely important.[97,257]

*The survey data should not be interpreted as constituting a fee schedule in any way, and should not be used for that purpose. Dentists must establish their own fees based on their individual practice and market considerations.

QUESTION 58.

Why fluoridate an entire water system when the vast majority of the water is not used for drinking?

Answer.

It is more practical to fluoridate an entire water supply than to attempt to treat individual water sources.

Fact.

It is technically difficult, perhaps impossible, and certainly more costly to fluoridate only the water used for drinking. Community water that is chlorinated, softened, or in other ways treated is also used for watering lawns, washing cars and for most industrial purposes. The cost of additives for fluoridating a community's water supply is inexpensive on a per capita basis; therefore, it is practical to fluoridate the entire water supply.

Fluoride is but one of more than 40 different chemicals/additives that may be used to treat water in the United States. Most are added for aesthetic or convenience purposes such as to improve the odor or taste, prevent natural cloudiness or prevent staining of clothes or porcelain.[36]

The American Water Works Association, an international nonprofit scientific and educational society dedicated to the improvement of drinking water quality and supply, supports the practice of fluoridation of public water supplies.[357]

Additional information on this topic may be found in Question 44.

CALL TO ACTION

In April 2003, Surgeon General Richard H. Carmona issued a National Call to Action to Promote Oral Health. The report was a wake-up call, raising a powerful voice against the silence. It called upon policymakers, community leaders, private industry, health professionals, the media, and the public to affirm that oral health is essential to general health and well-being and to take action.

While the effectiveness of preventive interventions such as community water fluoridation have been persuasively demonstrated, less than half of the fifty states have implemented fluoridation at the level to meet the national health objectives to be achieved by the year 2010. Specifically, Objective 21-9 states that at least 75% of the U.S. population served by community water systems should be receiving the benefits of optimally fluoridated water by the year 2010.

Fluoridation efforts at the local and state level can be greatly enhanced and the U.S. Healthy People 2010 Objective reached with the efforts of organizations, agencies and individuals who share a commitment to the benefits of community water fluoridation.

Technical assistance with fluoridation efforts is available from the Council on Access, Prevention and Interprofessional Relations at ADA. Additional support for fluoridation is available from ADA's Division of Legal Affairs, Division of Communications and Department of State Government Affairs.

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Statements from Five Leading Health Organizations Regarding Community Water Fluoridation

AMERICAN DENTAL ASSOCIATION (ADA)

"The Association endorses community water fluoridation as a safe, beneficial and cost-effective public health measure for preventing dental caries. This support has been the Association's policy since 1950."

— ADA Operational Policies and Recommendations Regarding Community Water Fluoridation (Trans.1997:673).

CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC)

"During the 20th century, the health and life expectancy of persons residing in the United States improved dramatically. To highlight these advances, MMWR will profile 10 public health achievements in a series of reports published through December 1999 (Fluoridation of drinking water was chosen as one of these achievements and profiled in the October 22, 1999 MMWR). Fluoridation safely and inexpensively benefits both children and adults by effectively preventing tooth decay, regardless of socioeconomic status or access to care. Fluoridation has played an important role in the reductions in tooth decay (40%-70% in children) and of tooth loss in adults (40%-60%)."

— CDC, Morbidity and Mortality Weekly Report. "Ten Great Public Health Achievements-United States 1900-1999" April 1999.

AMERICAN MEDICAL ASSOCIATION (AMA)

"The AMA recognizes the important public health benefits of drinking properly fluoridated water and encourages its member physicians and medical societies to work with local and state health departments, dental societies, and concerned citizens to assure the optimal fluoridation of community drinking water supplies."

— AMA Letter to the American Dental Association, March 10, 1995.

U.S. SURGEON GENERAL

"A significant advantage of water fluoridation is that all residents of a community can enjoy its protective benefit – at home, work, school or play – simply by drinking fluoridated water or beverages and foods prepared with it...Water fluoridation is a powerful strategy in our efforts to eliminate differences in health among people and is consistent with my emphasis on the importance of prevention...Fluoridation is the single most effective public health measure to prevent tooth decay and improve oral health over a lifetime, for both children and adults.

While we can be pleased with what has already been accomplished, it is clear that there is much yet to be done. Policymakers, community leaders, private industry, health professionals, the media, and the public should affirm that oral health is essential to general health and well being and *take action to make ourselves, our families, and our communities healthier. I join previous Surgeons General in acknowledging the continuing public health role for community water fluoridation in enhancing the oral health of all Americans."*

— Surgeon General Richard H. Carmona, Statement on Community Water Fluoridation, July 28, 2004.

NATIONAL INSTITUTE OF DENTAL & CRANIOFACIAL RESEARCH (NIDCR)

"The National Institute of Dental and Craniofacial Research continues to support water fluoridation as a safe and effective method of preventing tooth decay in people of all ages. Community water fluoridation is a public health effort that benefits millions of Americans. For more than half a century, water fluoridation has helped improve the quality of life in the U.S. through reduced pain and suffering related to tooth decay, reduced tooth loss, reduced time lost from school and work, and less money spent on dental care."

— NIDCR: Statement on Water Fluoridation, June 2000.

COMPENDIUM

National and International Organizations That Recognize the Public Health Benefits of Community Water Fluoridation for Preventing Dental Decay

Academy of Dentistry International
Academy of General Dentistry
Academy for Sports Dentistry
Alzheimer's Association
America's Health Insurance Plans
American Academy of Family Physicians
American Academy of Nurse Practitioners
American Academy of Oral and Maxillofacial Pathology
American Academy of Orthopaedic Surgeons
American Academy of Pediatrics
American Academy of Pediatric Dentistry
American Academy of Periodontology
American Academy of Physician Assistants
American Association for Community Dental Programs
American Association for Dental Research
American Association for Health Education
American Association for the Advancement of Science
American Association of Endodontists
American Association of Oral and Maxillofacial Surgeons
American Association of Orthodontists
American Association of Public Health Dentistry
American Association of Women Dentists
American Cancer Society
American College of Dentists
American College of Physicians–American Society of Internal Medicine
American College of Preventive Medicine
American College of Prosthodontists
American Council on Science and Health
American Dental Assistants Association
American Dental Association
American Dental Education Association
American Dental Hygienists' Association
American Dietetic Association
American Federation of Labor and Congress of Industrial Organizations
American Hospital Association
American Legislative Exchange Council
American Medical Association
American Nurses Association
American Osteopathic Association
American Pharmacists Association
American Public Health Association
American School Health Association
American Society for Clinical Nutrition
American Society for Nutritional Sciences
American Student Dental Association
American Veterinary Medical Association
American Water Works Association
Association for Academic Health Centers
Association of American Medical Colleges
Association of Clinicians for the Underserved
Association of Maternal and Child Health Programs
Association of State and Territorial Dental Directors
Association of State and Territorial Health Officials
Association of State and Territorial Public Health Nutrition Directors
British Fluoridation Society
Canadian Dental Association
Canadian Dental Hygienists Association
Canadian Medical Association
Canadian Nurses Association
Canadian Paediatric Society
Canadian Public Health Association
Child Welfare League of America
Children's Dental Health Project
Chocolate Manufacturers Association
Consumer Federation of America
Council of State and Territorial Epidemiologists
Delta Dental Plans Association
FDI World Dental Federation
Federation of American Hospitals
Hispanic Dental Association
Indian Dental Association (U.S.A.)
Institute of Medicine
International Association for Dental Research
International Association for Orthodontics
International College of Dentists
March of Dimes Birth Defects Foundation
National Association of Community Health Centers
National Association of County and City Health Officials
National Association of Dental Assistants
National Association of Local Boards of Health
National Association of Social Workers
National Confectioners Association
National Council Against Health Fraud
National Dental Assistants Association
National Dental Association
National Dental Hygienists' Association
National Down Syndrome Congress
National Down Syndrome Society
National Eating Disorders Association
National Foundation of Dentistry for the Handicapped
National Head Start Association
National Health Law Program
National Healthy Mothers, Healthy Babies Coalition
National Kidney Foundation
Oral Health America
Robert Wood Johnson Foundation
Society for Public Health Education
Society of American Indian Dentists
Special Care Dentistry
- Academy of Dentistry for Persons with Disabilities
- American Association of Hospital Dentists
- American Society for Geriatric Dentistry

The Children's Health Fund
The Dental Health Foundation (of California)
U.S. Department of Defense
U.S. Department of Veterans Affairs
U.S. Public Health Service
- Centers for Disease Control and Prevention (CDC)
- National Institute of Dental and Craniofacial Research (NIDCR)

World Federation of Orthodontists
World Health Organization

The list above was current at the time Fluoridation Facts went to press. As organizations and entities continue to be added to the Compendium, the most current Compendium can be viewed on ADA.org at http://www.ada.org/goto/ffcompendium.

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American Dental Association
www.ada.org

211 East Chicago Avenue
Chicago, Illinois 60611-2678

BUDGET WORKSHEET 2009-2010

					Current Year 2008-2009		Manager	Council
	Actual	Actual	Actual	Actual	Adopted	Estimated	Proposed	Adopted
	2005	2006	2007	2008	Budget	YE Position	2009-2010	2009-2010
Fund: 590 Sewer Enterprise Fund								
Revenues 590								
425.000 Delinquent Bills (Tax Roll)	13,834	2,751	5,602	4,097	2,000	4,717	3,000	
Use historical trend.								
633.002 Utility Bills - Sewer	702,686	713,470	717,431	841,255	861,200	841,115	860,000	
Estemated YE position lower than projected in rate study.								
634.000 Utility Bill Penalties	8,865	17,261	9,084	12,909	8,000	10,024	9,000	
Use historical trend.								
636.001 Sewer Tap In Fees	149,487	208,500	52,446	61,159	267,500	15,000	137,500	
Over estimated revenue, expected more tap fees than actual. Connections have slowed-uncertain. Estimate based on sewer rate study.								
665.000 Interest Earned	9,154	33,210	68,375	38,252	30,000	14,097	20,000	
Keeping interest slightly higher than FY 08/09 estimated due to incoming SRF reimbursement								
671.000 Other Revenue	5,657	9,269	1,970	6,817	10,000	20,129	5,000	
672.000 Reimbursements for Gasoline	-	-	3,131	3,674	3,800	2,729	3,000	
695.000 Transfer In		-			-	-	200,000	-
Reimbursement from SRF fund for prepaid expenses								
Total Revenues	1,230,358	1,625,302	1,031,131	968,164	1,182,500	907,811	1,237,500	-

AGENDA 5/26/09
ITEM L-2

BUDGET WORKSHEET 2009-2010

	Actual 2005	Actual 2006	Actual 2007	Actual 2008	Current Year 2008-2009 Adopted Budget	Current Year 2008-2009 Estimated YE Position	Manager Proposed 2009-2010	Council Adopted 2009-2010
Expenditures 590								
Dept: 248.000 Administration								
802.001 Financial Audit	2,000	2,500	2,814	2,500	2,500	2,500	2,500	
811.000 Attorney Fees	1,053	1,251	1,013	1,164	2,000	1,500	2,000	
840.000 Bank Service Charges	120	101	114	149	200	100	200	
841.000 Village Administrative Costs Per Rate Study	38,798	60,707	71,726	65,404	81,500	81,500	86,000	
Administration	41,971	64,560	75,666	69,217	86,200	85,600	90,700	-
Expenditures 590								
Dept: 548.000 Sewer Utilities Department								
703.000 Salaries - Non Union Includes portion of part-time summer help	30,787	28,547	20,975	21,792	22,500	22,556	25,000	
704.000 Salaries - Union	148,485	172,352	178,422	175,915	192,000	200,000	206,000	
705.000 Salaries - Overtime	6,620	8,538	8,754	8,827	9,000	10,611	10,000	
720.000 Social Security & Medicare Covers 7.45% of total gross wages	14,993	16,874	17,619	17,748	18,000	18,919	19,500	
721.000 Health & Dental Insurance	40,132	48,504	57,706	56,750	57,500	53,997	59,500	
722.000 Life & Short Term Disability Insurance Partial Coverage for Sewer/Water Employees				74	1,700	1,365	1,700	
723.000 Retirement Plan	23,544	23,892	28,154	30,340	31,000	30,333	32,000	
725.000 Longevity	7,656	7,851	10,741	15,976	7,500	15,316	2,500	
726.000 Vacation/Sick Time Cash Out Expect contractual level of vacation cash out. Include 1/3 sick leave cash out.	2,415	2,178	6,588	9,492	5,000	5,000	5,000	
728.000 Postage Portion of Utility Bill postage	1,664	1,146	1,061	1,947	2,000	1,500	2,000	
740.000 Operating Supplies Average calculated	2,396	1,523	2,009	2,092	2,000	2,000	2,000	
741.000 Road Repair Supplies	500	820	1,415	-	2,000	1,500	2,000	
742.000 Chemical Supplies - Plant Daily chemical cost rising, increasing MDEQ requirements	18,787	19,996	23,795	32,505	35,000	30,000	35,000	
743.000 Chemical Supplies - Lab Average monthly calculated plus extra for increases in cost	8,806	6,380	8,876	4,659	7,000	7,566	8,000	
745.000 Uniform Allowance	2,960	2,667	2,898	2,886	2,800	2,000	2,800	
751.000 Gasoline & Oil	3,227	4,143	8,356	13,787	10,000	10,049	11,000	

BUDGET WORKSHEET 2009-2010

	Actual 2005	Actual 2006	Actual 2007	Actual 2008	Current Year 2008-2009 Adopted Budget	Current Year 2008-2009 Estimated YE Position	Manager Proposed 2009-2010	Council Adopted 2009-2010
Average monthly calculated and additional expense for WAVE (reimbursed)								
802.000 Professional Services	83,576	89,877	86,588	109,521	95,000	95,000	95,000	
Sludge hauling, annual sewer cleaning contract, OHM, UIS, Synagro.								
824.000 Testing & Analysis	2,788	4,032	3,946	5,573	6,500	6,204	6,700	
861.000 Travel & Mileage	349	158	-	83	500	200	500	
901.000 Printing & Publishing	324	528	458	223	300	200	300	
910.000 Workers Compensation	7,602	7,447	5,944	7,252	6,500	4,570	6,000	
911.000 Liability Insurance	19,466	20,332	19,817	19,581	21,400	21,400	23,000	
920.000 Utilities	66,534	53,839	66,589	86,400	75,000	66,947	70,000	
920.001 Utilities - Telephones	6,264	6,749	8,841	11,363	12,000	9,567	11,000	
Land lines and Wireless communications. Includes cost for SCADA System, the phone line alarm communications on lift stations, and pump stations								
935.000 Building Maintenance & Repair	1,826	8,262	1,565	6,253	10,000	5,000	5,000	
937.000 Equipment Maintenance & Repair	3,629	2,881	704	2,241	4,000	3,000	3,000	
Unpredictable breakdown items								
939.000 Vehicle Maintenance & Repairs	-	104	616	937	1,500	100	1,000	
941.000 Equipment Rentals	-	-	-		-			-
Emergency safety equipment rental, jack hammer etc. cover cost of DPW equipment rental (Marie adjustment)								
955.000 Miscellaneous	916	16	-	36	300	61,121	300	
Reconciliation of previous fiscal year's receivables necessitated an accounting adjustment. This is where Marie placed it. Not an actual monitary expense.								
958.000 Memberships & Dues	185	-	149	245	200	100	200	
960.000 Education & Training	723	155	-	99	500	200	500	
970.000 Capital Improvements	-	4,500	-		-	-		-
977.000 Equipment	3,596	17,805	2,257	9,425	35,000	38,357	10,000	
977.001 Equipment Replacement	-	-	-		-	-		-
Use reserves for pump replacement								
981.000 Vehicles	45	-	-	20,000			-	
999.000 Transfer Out				34,556				
Sewer Utilities Department	549,307	588,437	1,059,477	710,603	673,700	724,678	656,500	-
Expenditures 590								

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BUDGET WORKSHEET 2009-2010

	Actual 2005	Actual 2006	Actual 2007	Actual 2008	Current Year 2008-2009 Adopted Budget	Current Year 2008-2009 Estimated YE Position	Manager Proposed 2009-2010	Council Adopted 2009-2010
Dept: 890.000 Contingencies								
955.000 Miscellaneous	-	-	-		25,000	-	25,000	
Used for health premium shortfall, and emergencies.								
Contingencies Total	-	-	-		25,000	-	25,000	-
Expenditures 590								
Dept: 901.000 CIP Plan								
974.000 Capital Improvements + Eng.	-	31,712	246,391	67,195	200,000	100,000	100,000	
Fund EQ Basin design and sewer rehabilitation project to be paid back with SRF Bond proceeds								
CIP Plan Total	-	31,712	246,391	67,195	200,000	100,000	100,000	-
Expenditures 590								
Dept: 850.000 Debt								
977.002 Equipment - Screw Pumps	8,369	38,333	3,597	1,842			-	
Pay off May 2008, discuss redirecting this amount in 2008/09 to a new bond payment or toward RD Principal.								
990.000 Debt Service	1,726	-	-		-	-		-
992.000 Bond Fees	560	300	300	-	400	400	400	
995.001 NE Sewer	-	180,000	180,000	180,000			-	
Principal paid in October								
995.002 RD Sewer Bond A&B Principal	-	38,000	40,000	42,000	43,000	43,000	47,000	
996.001 NE Sewer Interest	29,025	21,600	10,800	3,600			-	
996.002 RD Sewer Interest	130,598	128,914	126,186	124,258	125,000	125,000	120,500	
Debt Total	170,278	407,147	360,883	351,700	168,400	168,400	167,900	-
Total Expenditures	**761,556**	**1,091,856**	**1,742,417**	**1,198,714**	1,153,300	**1,078,678**	1,040,100	-
Sewer Enterprise Fund - Rev over Exp	**468,802**	**533,445**	**(711,286)**	**(230,550)**	29,200	**(170,867)**	197,400	-

Any shortfall is more than covered by Debt Reserves and RRI Reserves that are kept in reserve to cover debt & Capital Projects expenses

BUDGET WORKSHEET 2009-2010

	Actual 2005	Actual 2006	Actual 2007	Actual 2008	Current Year 2008-2009 Adopted Budget	Current Year 2008-2009 Estimated YE Position	Manager Proposed 2009-2010	Council Adopted 2009-2010
Fund: 591 Water Enterprise Fund								
Revenues 591								
425.000 Delinquent Utility Bills (Tax)	6,364	1,439	3,607	4,141	3,000	3,318	3,000	
579.000 MDOT Well Grant/RD Water	1,072	1,209	923		-	-	-	-
633.003 Utility Bills - Water	463,315	486,584	514,621	602,642	648,600	641,562	650,000	
Estemated YE position lower than projected in rate study.								
634.000 Utility Bill Penalties	5,842	8,766	6,112	8,862	8,000	8,052	8,000	
636.002 Water Tap In Fees	180,575	137,500	34,109	40,001	162,000	9,000	84,000	
Over estimated revenue, expected more tap fees than actual. Connections have slowed-uncertain. Estimate based on sewer rate study.								
646.000 Sales of 2nd Water Meters	14,921	11,025	5,845	4,375	2,000	2,000	2,000	
Over estimated revenue, expected more 2nd meters. 07/08 reduce expectation								
665.000 Interest Earned	6,062	26,083	49,454	39,789	30,000	17,070	10,000	
Reduced due to unfavorable interest rates								
671.000 Other Revenue	4,088	4,620	13,122	2,450	3,000	5,405	3,000	
Estimated YE includes sales of fixed assets								
672.000 Reimbursements for Gasoline	-	-	2,543	3,124	3,000	2,241	2,000	
New line item added in 2006/07 track fuel reimbursements from WAVE								
673.000 Insurance Reimbursement				15,340			-	
ADDED BY AMENDMENT 1/28/08								
675.003 LDFA Share of RD Water	176,775	176,775			-	-	-	-
NO MORE LDFA PAYMENTS								
Total Revenues	880,739	854,001	630,335	720,723	859,600	688,648	762,000	-

	Actual 2005	Actual 2006	Actual 2007	Actual 2008	Current Year 2008-2009 Adopted Budget	Current Year 2008-2009 Estimated YE Position	Manager Proposed 2009-2010	Council Adopted 2009-2010
Fund: 591 Water Enterprise Fund								
Expenditures 591								
Dept: 248.000 Administration								
802.001 Financial Audit	850	900	1,023	1,000	1,000	1,000	1,000	
811.000 Attorney Fees	-	-	4,680	1,164	5,000	4,200	3,000	
840.000 Bank Service Charges	9	97	129	242	200	200	200	
841.000 Village Administrative Costs	38,798	59,896	76,067	65,404	81,500	81,500	86,000	
Administration	39,657	60,892	81,899	67,810	87,700	86,900	90,200	-
Expenditures 591								
Dept: 556.000 Water Utilities Department								
703.000 Salaries - Non Union	29,036	28,303	16,780	17,434	18,200	18,027	20,000	
Includes portion of part-time summer help								
704.000 Salaries - Union	68,776	50,000	67,878	74,149	73,000	65,000	70,000	
705.000 Salaries - Overtime	3,374	1,649	4,492	6,249	5,000	5,180	5,300	
Water breaks unpredictable								
720.000 Social Security & Medicare	8,123	6,496	7,350	10,007	9,000	7,851	9,000	
721.000 Health & Dental Insurance	28,252	15,604	13,729	16,866	18,000	17,795	19,500	
722.000 Life & Short Term Disability Insurance				50	1,000	911	1,000	
Partial Coverage for Water/Sewer Employees								
723.000 Retirement Plan	12,548	9,200	12,022	16,852	15,000	13,000	15,000	
725.000 Longevity	2,044	2,656	3,470	24,480			-	
No further longevity payments due to cashouts								
726.000 Vacation/Sick Time Cash Out	481	-	5,605	5,505	5,000	5,000	500	
Expect contractual level of vacation cash out. Include 1/3 sick leave cash out.								
726.001 Vacation/Sick Accrual	(10,318)	13,205	(2,215)	(4,223)	-			
728.000 Postage	2,055	817	1,025	1,497	1,500	1,390	1,500	
Average monthly calculation plus increase in postage								
740.000 Operating Supplies	1,194	1,289	1,138	1,638	2,000	2,000	2,000	
741.000 Road Repair Supplies	5,415	3,678	8,696	5,683	7,000	3,500	7,000	
Dependent on water breaks, more water breaks than usual								
745.000 Uniform Allowance	2,201	1,958	2,172	2,776	2,100	2,000	2,100	
751.000 Gasoline & Oil	2,529	1,661	4,102	5,192	8,000	8,217	8,500	
Average monthly calculated, budget additional expense for WAVE (reimbursed)								

BUDGET WORKSHEET 2009-2010

	Actual 2005	Actual 2006	Actual 2007	Actual 2008	Current Year 2008-2009 Adopted Budget	Current Year 2008-2009 Estimated YE Position	Manager Proposed 2009-2010	Council Adopted 2009-2010
802.000 Professional Services	4,631	7,827	13,180	20,595	10,000	25,000	25,000	
Cover additional DEQ permit fees, and UIS calibrations. Perform water tower inspection								
824.000 Testing & Analysis	884	56	391	592	1,500	618	1,000	
MDEQ requirements								
830.000 Engineering Consulting	26,636	9,361	-		-			
861.000 Travel & Mileage	295	659	309	815	500	400	500	
901.000 Printing & Publishing	1,348	1,189	564	1,109	2,000	500	1,000	
910.000 Workers Compensation	3,098	4,463	2,411	2,941	2,800	2,200	2,500	
911.000 Liability Insurance	6,723	7,023	6,845	6,806	7,000	7,000	7,200	
Renewal projected at 7%								
920.000 Utilities	54,307	53,420	52,836	61,736	62,000	45,000	50,000	
920.001 Utilities - Telephones	4,206	3,286	4,100	5,627	6,000	4,568	5,500	
935.000 Building Maintenance & Repair	1,235	1,595	25	665	1,000	500	1,000	
Misc. repairs, painting, unexpected repair and upkeep of buildings. PM								
937.000 Equipment Maintenance & Repair	7,187	3,118	478	9,872	7,500	2,000	5,000	
Cover cost to fix whatever breaks down. Equipment is aging and needs aggressive PM.								
939.000 Vehicle Maintenance & Repairs	659	14	-	375	500	600	600	
Repair any breakdown, continue aggressive PM on vehicles.								
941.000 Equipment Rentals	2,264	1,932	3,227	2,345	2,000	2,000	2,000	
(Marie adjustment for fund 402)								
955.000 Miscellaneous	97	52	25		100	23,374	100	
Reconciliation of previous fiscal year's receivables necessitated an accounting adjustment. This is where Marie placed it. Not an actual monitary expense.								
958.000 Memberships & Dues	519	569	593	621	700	500	700	
960.000 Education & Training	125	200	50	60	200	100	200	
961.000 Wellhead Protection Program	1,903	2,083	1,484	208	2,500	2,500	2,500	
Continue wellhead protection grant.								
970.000 Capital Improvements	2,287	14,229	3,653	37,088	40,000	20,000	40,000	
Continue hydrant program until 2010, stortzs,								
977.000 Equipment	64,136	48,412	29,819	36,269	50,000	40,000	40,000	
Well house meters, domestic meters and appurtances - replace/upgrade locating equipment								
977.001 Equipment Replacement	4,283	-	2,040		-	-		
Commit to keep unrestricted reserves to cover expensive pump repair and replacement $30,000+ Do not budget annually for this, it does not function like an equipment replacement fund.								
981.000 Vehicles	-	-	-	4,986			-	
Water Utilities Department Total	620,227	296,004	561,248	376,863	361,100	326,729	346,200	-

BUDGET WORKSHEET 2009-2010

	Actual 2005	Actual 2006	Actual 2007	Actual 2008	Current Year 2008-2009 Adopted Budget	Current Year 2008-2009 Estimated YE Position	Manager Proposed 2009-2010	Council Adopted 2009-2010
Expenditures 591								
Dept: 890.000 Contingencies								
955.000 Miscellaneous	-	-			50,000	-	50,000	
ContingenciesTotal	-	-			50,000	-	50,000	-
Expenditures 591								
Dept: 901.000 CIP Plan								
974.000 Other Capital Improvements	-	-	65,079	101,828	150,000	70,000	80,000	
5th Well & Well House design - will be reimbursable if approved by DWRF								
974.001 CIP Capital Improvements	3,237	10,473	12,470	45,947	-	-	-	-
CIP Plan Total	3,237	10,473	77,549	147,776	150,000	70,000	80,000	-
Expenditures 591								
Dept: 850.000 Debt								
990.000 Debt Service	20,199	-	-		-	-	-	-
Bond paid off - Reduce Budget to 0								
992.000 Bond Fees	440	150	300	300	150	150	150	
995.003 RD Water Bond Principal	-	38,000	40,000	42,000	45,000	44,000	46,000	
995.004 1998 Bond Water Project	-	60,593	54,925	53,055	58,000	56,100	54,000	
996.003 RD Water Interest	99,269	97,650	95,113	93,319	93,000	93,000	90,000	
Debt Total	119,908	196,393	190,338	188,674	196,150	193,250	190,150	-
Total Expenditures Water Fund	783,029	563,761	911,033	781,123	844,950	676,879	756,550	-
Water Enterprise Fund - Rev over Exp	97,710	290,240	(280,698)	(60,399)	14,650	11,769	5,450	-

AGENDA 5-26-09
ITEM L-3

VILLAGE OF DEXTER

ddettling@villageofdexter.org
8140 Main Street Dexter, MI 48130-1092 Phone (734)426-8303 Fax (734)426-5614

MEMO

To: **President Keough and Council**
From: **Donna Dettling, Village Manager**
Date: **May 26, 2009**
Re: **Recommendation to Accept Proposal from Ferguson Advisory Services LLC**

One of the items discussed during our Budget Planning Work Session in March was the idea that Economic Development would be an important priority for the Village because it is the key to sustaining and increasing our tax base. Since March we've wrestled with what a suitable framework for Dexter's Economic Preparedness would look like and we continue to weigh the benefit of funding this effort.

I am recommending that we get started immediately with Ferguson Advisory Services (FAS). These days we have to run faster and harder just to stay in the same place and Dexter's goal is to sustain and hopefully increase our tax base. This is an investment by staff and elected officials that will lay a foundation backed by dependable Economic Profession tools we will learn from FAS over the next 8-months. A suggested work plan is included to illustrate how tasks will be organized and executed.

Attached is a Service Proposal from Ferguson Advisory Services. This proposal provides for: Business Expansion and Jobs Retention Program, Business Attraction and Jobs Creation Program, the creation of a "Market" Dexter component that draws on local strengths and resources, participation in State and Regional Economic Development meetings and seminars, and the ongoing reporting necessary to review program activities and evaluate results.

Priority:

- Develop relationships with local Business
- Generate innovative ideas, community support and resources to bolster success of existing businesses
- Develop solid, on-going relationships with Michigan Economic Development Commission, SPARK, County Planning, SEMCOG, Utility Companies, Commercial Real Estate Companies and other economic development support agencies
- Engage and educate staff, Council, Dexter Area Chamber of Commerce and Downtown Development Authority to expand and coordinate our collective Economic Development effort
- Develop true incubator opportunities using local partnerships
- Develop a solid action plan that will highlight, enhance and market Dexter's strengths to create job opportunities
- Position Dexter to be prepared for new opportunities
- Develop an environment that will attract investment
- Strategically Brand Dexter to create a sense of place and aggressively market what Dexter has to offer

How to pay for program:
I am recommending an immediate implementation for the month of June using funding available in Council Professional Services line item. Professional services were budgeted at $20,000 to cover Cityhood process costs and village office location research, which leaves room to cover one month of service $2,200.

For fiscal year 2009/10, the strategy is to budget 7-months of the agreement ($15,400) and evaluate buy-in from both the Dexter Area Chamber of Commerce and Dexter Downtown Development Authority. If the DACC and the DDA decide to financially support this program, their financial commitment for the remaining $11,000 would be used to continue the agreement with FAS, LLC through June 30, 2010. This strategy gives us eight months to evaluate results that the DACC and DDA can use to determine the value of the agreement and their willingness to participate. This strategy allows the Village to ease into an Economic Work Plan with a short-term financial commitment that allows us to measure the results as well.

Suggested motion: Authorize the Village Manger to execute the Consulting Agreement with Ferguson Advisory Services for an 8-month term, starting June 1, 2009 at a cost of $17,600.00.

	~~May~~	1 June	2 July	3 August	4 September	5 October	P125 6 Nov
Business Expansion and Jobs Retention Program							
Comprehensive Listings of Businesses							
Maintain Data Tracking System							
On-Site Company Visits							
Recellular							
Dapco							
Dexter Fastener Technologies							
Variety Die and Stamping							
Confidential Reports on Company Visits							
On-Site Company Visits							
Ann Arbor Machine 2							
Industrial Techtonics, Inc.							
Adair Printing							
Door Control Inc.							
Promatic Inc.							
Confidential Reports on Company Visits							
On-Site Company Visits							
Confidential Reports on Company Visits							
On-Site Company Visits							
Confidential Reports on Company Visits							
On-Site Company Visits							

Confidential Reports on Company Visits
On-Site Company Visits

Confidential Reports on Company Visits
On-Site Company Visits

Confidential Reports on Company Visits
On-Site Company Visits

Confidential Reports on Company Visits

Business Attraction and Jobs Creation Program

- Tour of Vacant Facilities
- Meet with Land Owners
- Target Market Industry Analysis
  - Review of Existing Industry
  - Existing Business Relationships / Oppor.
  - Review of State and Regional Objectives
  - Conclusions and Recommendations
- Target Market Company Study
  - Conclusions and Recommendations

Review Local Incentive Programs

- Information on State and Regional Programs
- Document Information From Visits
- Recommendations on New Programs

Assistance with Incubator Project

- Visit Spark Incubator Project

State and Regional ED Meetings

- SPARK
- SEMCOG
- MEDC

ED RELATED ACTIVITIES (OUTSIDE Agreement)

Marketing Program Development

- Identify Local Agency Participants
- Identify Target Audience
- Branding Identification

Ferguson Advisory Services, LLC
21 North Drive, Brooklyn, Michigan 49230
Consulting Agreement With:
Village of Dexter

Proposal:

- Start Date: June 1, 2009
- Term: 8 Months ends February 1, 2010
- Fees: $2,200 per month / $17,600 per term of agreement
- Payments on Monthly Basis
- Village Covers Following Expenses:
  - Printing Expenses Associated to all Marketing Activities
  - Travel Expenses Specific to all Projects and Meetings outside the Village of Dexter "With Prior Approval". Travel and Meeting Examples:
    - Meetings with SPARK, MEDC, and SEMCOG
    - Meetings with Washtenaw County Economic Development
    - Meetings with Utilities Companies
    - Meetings with Prospective Customers
  - Mileage Calculated at .55 per mile

Services and Products Delivered:

- **Business Expansion and Jobs Retention Program**
  - A comprehensive listing of companies within your community that also functions as an analysis tool to track business activity
  - On site visits to each company within your community with a primary focus on industrial activities, followed by service and retail
  - Specific follow-up with companies on potential projects generated from initial visits
  - Negotiation and packaging of expansion / job retention projects
  - A confidential report on each company visit

- **Business Attraction and Jobs Creation Program**
  - Target Market Industry Analysis
    - Review of existing industry
    - Identify potential opportunities that could enhance existing business activity
    - Review and align Village of Dexter potential targets with regional and state objectives
    - Conclusions and recommendations of specific target industries
  - Target Market Company Study
    - Identification of specific companies within industries identified per Target Market Industry Analysis

- Development of specific "Marketing Strategy" to approach select companies from Target Market Company Study using "existing" Dexter marketing materials
    - Creation and Implementation of "targeted" marketing mailings using various formats including hard copy and electronic communications
    - Follow up communication via phone conversations, e-mail, and hard copy correspondence
    - Brainstorming and "advisory" assistance with the creation of a long term branding and marketing strategy
- Assist with attracting new business to the community on a per project basis

- **Review and Recommendations on Local Incentive Programs**

- **Assistance with Development of Incubator Project**
    - Establish relationships with private sector investment
    - Identify new business growth opportunities

- **Participation as Requested for State and Regional Economic Development Meetings and Seminars**
    - SPARK, MEDC, SEMCOG, Washtenaw County Economic Development, Utility Companies

- **Reporting and Documentation**
    - Daily communication with Village of Dexter, Village Manager
    - Monthly written report to Village Council
    - Monthly and/or as needed verbal reporting to Village Council
    - Annual review of program activities and success

Reference Documents:

- Village of Dexter Master Plan
- Washtenaw County Economic Development Plan
- Michigan Economic Development Corporation
    - Strategic Action Plan
- Data and Information Available Through SPARK

Benefits to the Village of Dexter:

- Over 20 Years of Economic and Workforce Development Experience
- Assistance to existing Economic Enhancement Efforts
- Professional Services Delivered at Cost Effective Rates
- No Computer / Technology Costs
- No Office Expenses
- No Employment Taxes
- No Health Care Costs

Village of Dexter	**Ferguson Advisory Services, LLC**
_____	_____
Donna Dettling, Village Manager	Shawn Ferguson, Principle

AGENDA 5-26-09
ITEM L-4

VILLAGE OF DEXTER - COMMUNITY DEVELOPMENT OFFICE
8140 Main Street • Dexter, Michigan 48130-1092 • (734) 426-8303 • Fax (734) 426-5614

Memorandum

To: Village Council
Donna Dettling, Village Manager
From: Allison Bishop, AICP, Community Development Manager
Re: Ryan Drive Traffic Calming Update
Date: May 26, 2009

In early 2008 a speed study was conducted along Ryan Drive to evaluate the speed of vehicles traveling on Ryan Drive and near Community Park. The study, conducted by Midwestern Consulting the Village's Traffic Engineering Consultant, revealed that 44% of cars exceeded 30 mph (25 mph posted speed).

The Parks Commission and Village Council then authorized Midwestern Consulting to prepare a traffic calming plan and parking improvements along Ryan Drive to help slow traffic and provide designated on street parking for Community Park.

The construction plans and bid were budgeted by Council for FY 08-09 and a bid from GM & Sons was approved by Council on February 23, 2009.

A pre construction meeting was held on May 18, 2009 and a project schedule was provided (included). The project is scheduled for start on June 8, 2009 and be completed by June 30, 2009 in accordance with the FY 08-09 budget.

Notification letters were sent to approximately 20 residents located closest to the project, to Home Owners Association reps from Orchard River Hills and Huron Farms and to other contacts that were on file/email. Notification with the Orchard River Hills Home Owners Association had also occurred previously and the project was reported at their annual meeting several months ago. Huron Farms also had a meeting on Tuesday, May 19th and was provided with plans, etc of the project. I expect to have feedback from the Huron Farms meeting by Monday's meeting.

Notification of the project has also been provided to the Dexter Community Schools transportation department to coordinate bus transportation for the last 3 days of school and bus stop changes for next year.

Concerns from one resident that was notified included the narrowness of the roadway that would result from the installation of the bump outs. Typical lane widths on a highway are 12 feet. The plan as proposed has lane widths of slightly more than 10 feet with an additional drive-able gutter pan. Narrow road widths are necessary to calm traffic and reduce speeds, however to address the concern field adjustments will likely be made to increase the drive-able lane widths to approximately 11 feet.

The impacts of designating Ryan Drive as a major road following the traffic calming and parking improvements, as previously discussed by Council, should be none. Based on information

provided by Midwestern Consulting the proposed lane widths are consistent with major road designation and existing parking will not impact Ryan Drives ability to be declared a major road.

GM & Sons will mobilize on site on June 8, 2009.

Please feel free to contact me prior to the meeting if you have any questions.

Thank you.

GM & Sons, Inc
6784 Whitmore Lake Road
Whitmore Lake, MI 48189
Phone: 734/929-1259
Fax: 734/929-1265

16-Feb-09

Job Name: Ryan Drive- Dexter

PROPOSED SCHEDULE

			PHASE I							PHASE II										
			Month: June							Month: June						Month: June				
			Day							Day										
	Item of Work	Subcontractor	8-Jun	9-Jun	10-Jun	11-Jun	12-Jun	13-Jun		16-Jun	17-Jun	18-Jun	19-Jun	20-Jun		23-Jun	24-Jun	25-Jun	26-Jun	27-Jun
	Traffic Control	Spartan	X																	
	Removals	Bostwick	X	X						X	X									
	Concrete Work	GMSI			X							X								
	HMA Hand patching & Restoration	Bostwick						X						X						
	Signs	Spartan														X				
	Striping	PK															X			
	Clean-UP	GMSI																X	X	

* Schedule to change based on the weather

LEGEND

CW	12" SOLID WHITE CROSSWALK LINE
SY	4" SOLID YELLOW LINE
BY	4" BROKEN YELLOW LINE
SW	4" SOLID WHITE LINE
(S)	SIGN TO REMAIN
(R1)	SIGN TO BE RELOCATED PAID FOR AS Sign, Relocate
(R1)	SIGN TO BE RELOCATED TO NEW POST AND EXISTING POST TO BE REMOVED

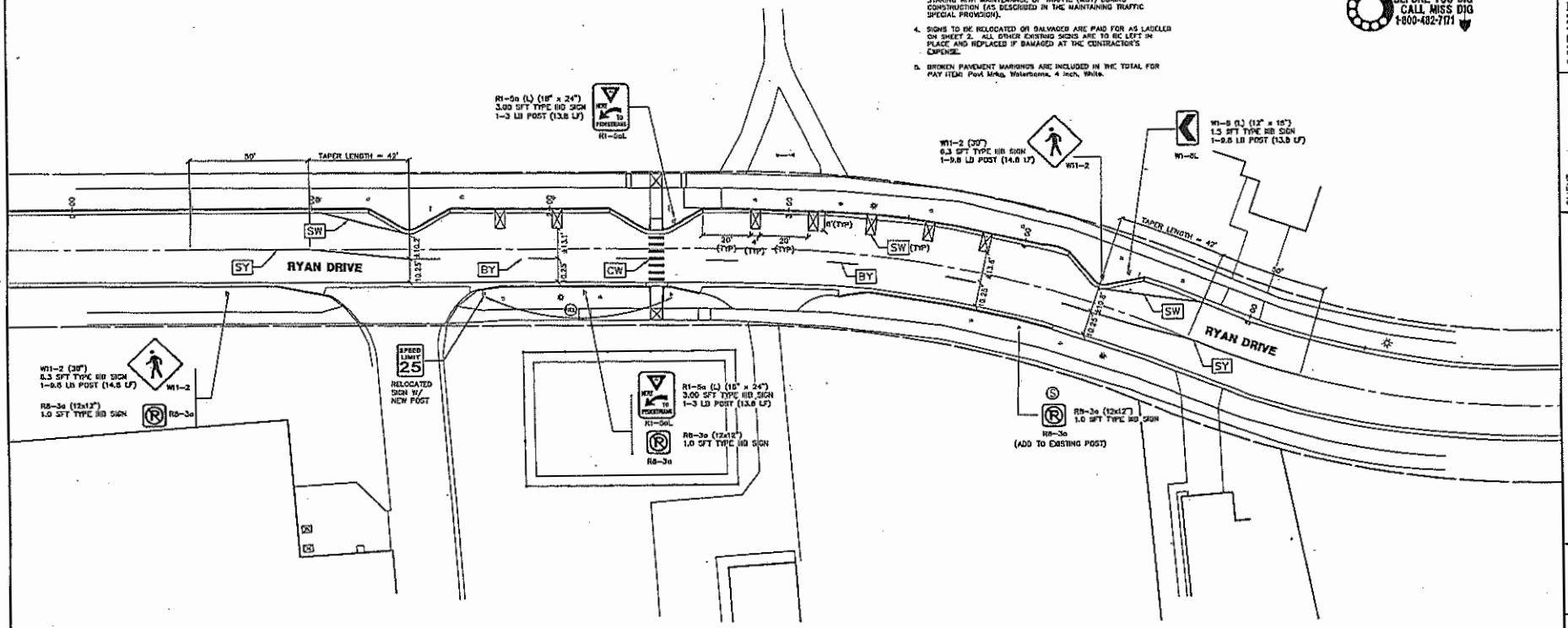
NOTES

1. THE ENGINEER MAY APPROVE THE USE OF POLYUREA PAINT AS A SUBSTITUTION IF THERMOPLASTIC CANNOT BE PLACED DUE TO TEMPERATURE OR SEASONAL LIMITATIONS. ALTERNATE PAVEMENT MARKING MATERIAL WILL NOT BE PAID FOR SEPARATELY, BUT WILL BE PAID FOR AT THE RESPECTIVE UNIT PRICE BID FOR THE THERMOPLASTIC PAVEMENT MARKING ITEM FOR WHICH REGULAR DRY PAINT IS SUBSTITUTED.
2. ALL LAYOUT WORK NECESSARY TO LOCATE AND PLACE PERMANENT PAVEMENT MARKINGS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THIS WORK SHALL BE REVIEWED AND APPROVED BY THE ENGINEER PRIOR TO THE PLACEMENT OF ANY PAVEMENT MARKINGS. THIS WORK WILL NOT BE PAID FOR SEPARATELY, BUT WILL BE INCLUDED IN THE UNIT PRICE BID FOR EACH RESPECTIVE PERMANENT PAVEMENT MARKING ITEM.
3. THE VILLAGE OF DEXTER AND THE ENGINEER WILL STAKE LOCATIONS OF PERMANENT SIGNING. THE CONTRACTOR SHALL COORDINATE THIS WORK WITH ALL AGENCIES AND COORDINATE STAKING WITH MAINTENANCE OF TRAFFIC (MOT) DURING CONSTRUCTION (AS DESCRIBED IN THE MAINTAINING TRAFFIC SPECIAL PROVISION).
4. SIGNS TO BE RELOCATED OR DAMAGED ARE PAID FOR AS LABELED ON SHEET 2. ALL OTHER EXISTING SIGNS ARE TO BE LEFT IN PLACE AND REPLACED IF DAMAGED AT THE CONTRACTOR'S EXPENSE.
5. BROKEN PAVEMENT MARKINGS ARE INCLUDED IN THE TOTAL FOR PAY ITEM: Pavt Mrkg, Waterborne, 4 Inch, White.

SCALE: 1" = 20'

0 20 40 60

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171



(FOR INFORMATIONAL PURPOSES ONLY)

Permanent Pavement Markings

DESCRIPTION	QTY.	UNIT
Pavt Mrkg, Thermoplastic, 12 Inch, Crosswalk	42	Ft.
Pavt Mrkg, Waterborne, 4 Inch, White	344	Ft.
Pavt Mrkg, Waterborne, 2nd Application, 4 Inch, White	344	Ft.
Pavt Mrkg, Waterborne, 4 Inch, Yellow	484	Ft.
Pavt Mrkg, Waterborne, 2nd Application, 4 Inch, Yellow	484	Ft.

(FOR INFORMATIONAL PURPOSES ONLY)

SIGN							SUPPORT			
SIGN DESCRIPTION	CODE	TYPE	SIZE	AREA (SFT-EA)	QTY.	AREA (TOTAL) (SFT)	No.	SIZE (Lbs)	LENGTH (Ft)	TOT. LENGTH (Ft)
YIELD TO PEDESTRIANS	R1-5a (L)	IIB	18"x24"	3.00	2	6.00	2	3	13	26
NO PARKING	R8-3a	IIB	12"x12"	1.00	3	3.00				
CROSWALK	W1-8 (L)	IIB	12"x18"	1.50	1	1.50	1	3	13	13
PEDESTRIAN CROSSWALK	W11-2	IIB	30"x30"	6.25	2	12.50	2	3	13	26
REPLACEMENT POST							1	3	13	13

MIDWESTERN CONSULTING
Civil Engineers and Transportation Engineers, Planners, Surveyors, Landscape Architects
3815 Plaza Drive, Ann Arbor, Michigan 48108
Phone: 734.995.0200
Fax: 734.973.1593

CLIENT
VILLAGE OF DEXTER
8140 MAIN STREET
DEXTER, MICHIGAN 48130
(734) 426-5303

RYAN DRIVE

PAVEMENT MARKINGS AND SIGNAGE PLAN

6

DATE 1/21/09
SHEET 6 OF 6
DRAWN SJF
DES. JJF
CHK. JJF
APP. JJF
CHANGE SUMMARY

JOB No. 03088

REVISIONS

AGENDA 5-26-09

ITEM L-5

VILLAGE OF DEXTER - COMMUNITY DEVELOPMENT OFFICE
8140 Main Street • Dexter, Michigan 48130-1092 • (734) 426-8303 • Fax (734) 426-5614

Memorandum

To: Village Council
Donna Dettling, Village Manager
From: Allison Bishop, AICP, Community Development Manager
Re: Tree Management Plan and Tree Specifications Manual
Date: May 26, 2009

It is with great pleasure that the Tree Board presents the Tree Management Plan and Tree Specifications Manual adopted by the Tree Board on March 17, 2009.

A resolution is presented for your approval of the document on June 8, 2009. The plan is being presented 2 weeks ahead of time to give Council adequate time to review the plan and get questions/comments to staff and/or the Tree Board.

The Tree Management Plan and Specifications Manual was created to establish a guide for planning and implementing goals and objectives of the Tree Program and to preserve the Village's community forest. The plan also established policies and procedures for managing the Village's community forest.

The plan has been developed over the last 2 years based on local expertise and experience the Village has gained through the annual tree removal and planting programs.

Please feel free to contact me in advance of the meeting if you have any questions.

Thank you.

VILLAGE OF DEXTER
WASHTENAW COUNTY, MICHIGAN

RESOLUTION REGARDING VILLAGE COUNCIL ADOPTION OF THE VILLAGE OF DEXTER TREE MANAGEMENT PLAN AND TREE SPECIFICATIONS MANUAL

WHEREAS, the Village of Dexter Council established a Tree Board to develop a written management plan that would provide a systematic approach to all tree-related activities within the Village and that would provide guidelines for Village staff to administer the tree program; and

WHEREAS, the Tree Board has reviewed and established a set of goals, objectives, and developed an action plan for the tree program; and

WHEREAS, the Tree Board has created a set of guidelines and policies, Tree Specifications Manual, for the administration of the Tree Management Plan; and

WHEREAS, the Tree Management Plan includes recommendations on tree planting, tree removal, pruning, trimming, budgeting and other necessary tree work to achieve a high quality, thriving community forest; and

WHEREAS, the management of the Village's community forest will assure tree health and survival and result in long term benefits and reduced liability through eliminating hazardous conditions; and

WHEREAS, trees are an important part of the community and provide many aesthetic, environmental, and economic benefits, their natural beauty and grace create a sense of place and soften the urban landscape, their shade creates pleasant environments in neighborhoods and business districts, and trees provide habitat for wildlife, reduce stormwater runoff, reduced air pollution and energy consumption;

WHEREAS, on March 17, 2009 the Village Tree Board adopted a resolution recommending that the Village Council adopt the Tree Management Plan and Tree Specifications Manual;

BE IT THEREFORE RESOLVED, that the Village Council accepts the Tree Management Plan and Tree Specifications Manual as a policy guide for tree related activities within the Village of Dexter.

MOVED BY: SECONDED BY:

YEAS:

NAYS:

ABSENT:

RESOLUTION DECLARED ADOPTED THIS 8th DAY June 2009.

_____

Shawn Keough, Village President

CERTIFIED BY:

_____

Carol Jones, Village Clerk

VILLAGE OF DEXTER

TREE MANAGEMENT PLAN

A guide for tree care and maintenance in the Village of Dexter

TREE BOARD

ADOPTED March 17, 2009

ACCEPTED BY VILLAGE COUNCIL
June 8, 2009

Tree Management Plan

Acknowledgments

The Village of Dexter Tree Board wishes to thank everyone who contributed to the preparation and development of the Village of Dexter Tree Management Plan. Many people have donated their time, energy, and enthusiasm to its creation. Special acknowledgment should be given to the members of the Dexter Tree Board: John Coy, Sandy Hansen, Cindy Henes, Jeff Peters, and Allison Bishop, Community Development Director-Village of Dexter.

Introduction

Trees are an important part of a community. They provide aesthetic, environmental, and economic benefits. Their natural beauty and grace create a sense of place and soften the urban landscape. Their shade creates pleasant walking environments in our neighborhoods and business districts. They are habitat for wildlife. Trees also produce economic benefits by reducing the costs associated with stormwater runoff, reduction of air pollution, and energy consumption. According to the article "22 Benefits of Urban Street Trees" by Dan Burden, senior urban designer, Summer 2006, "For a planting cost of $250-$600 (which includes the first 3 years of maintenance), a single street tree returns over $90,000 of direct benefits (not including aesthetics, social and natural) in a lifetime of the tree."

A Tree Management Plan is the method of implementing a Tree Program. The Village has been developing a Tree Program over several years; but had not yet established important goals and objectives for the program. The plan will provide guidance for tree management within the Village of Dexter and strategies for implementing the stated goals and objectives of the plan. The plan will guide the implementation of the Village's community tree program, including planting, removal, pruning, trimming and other tree work necessary to achieve a quality, thriving community forest.

The Tree Management Plan shall also serve as the basis for prioritization, scheduling and budgeting for the management of the Village's community forest, assure tree health and survival and bring long term benefits and reduced liability through eliminating hazardous conditions.

It is the intention of the Tree Board that the Tree Management Plan and the goals and objectives of the plan be reviewed every five (5) years.

The Village of Dexter Tree Board

In order to protect the Village of Dexter's community forest and to ensure that it remains one of Dexter's finest assets, the Dexter Village Council created the Village of Dexter Tree Board in 2005 to develop a written management plan that would provide a systematic approach to all tree-related activities within the Village and that would provide guidelines for Village staff to administer the tree program. The tree board also advises Village Council on matters regarding Dexter's community forest.

2006 Established Mission Statement

It is the mission of the Dexter Tree Board to promote the well being of the residents of the Village of Dexter by preserving, enhancing, and fostering the growth of a variety of trees within the Village.

Tree Inventory

In 2004 the Village of Dexter created a tree inventory and a GIS database. The Village hired a qualified consultant to determine the location, species, size, health, and replacement value of trees with a dbh greater than two inches within the street rights-of-way and parks. Each tree was tagged with a numbered metal identification tag. All data was entered into a computerized tree inventory accessible to Village staff via the Internet.

The tree board recommends that the following inventory data be reviewed annually and that the inventory be updated as changes occur*:

1. Species Composition and Diversity
2. Health Assessment
3. Size - DBH – Diameter at Breast Height (4 feet)

In addition, the tree board recommends an annual windshield assessment of the health of all trees in the community forest.

The Tree Board also recommends that the computerized tree inventory be reviewed every five (5) years due to the speed in which the health of a tree can

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change. Re-evaluation of the tree inventory in parks and along streets should be recorded separately.

*Updates to the tree inventory occur as trees are removed and replaced. The DPW is responsible for removing tree tags and reordering or replacing the tags with the new information. A tree work order is also created and forwarded to the tree inventory database manager. Tree work orders are typically completed bi-annually as part of the fall and spring tree plantings. Upon reassessment of the tree inventory (anticipated 2009) trees will be located by address. Locating trees by address will reduce the Village's dependence on a consultant to update the inventory and the tag system can be eliminated.

Tree Inventory and Analysis

Species Composition*

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Maple	50%	52%	50%							
Honeylocust	8%	8.4%	8%							
Callery Pear	7%	7%	7%							
Green Ash	4%	1%	1%							
White Ash	1%	<1%	<1%							
Colorado Spruce	3%	3.5%	3.3%							
Flowering Crab	3%	2.7%	2.7%							
Littleleaf Linden	2%	2.5%	2.4%							
London Plane	-	-	<1%							
Oak	-	5%	5.4%							
Japanese Zelkova	-	<1%	<1%							
Sweetgum	-	2.5%	2.7%							
Tulip Tree	-	1.7%	2%							
Yellowwood	-	-	<1%							

* Removal and replacement factored annually.

In 2006 there were sixty-six tree species in Dexter's street rights-of-way and parks; in 2007 there were sixty-eight species. Approximately 50% are some type of maple. The sugar maple (Acer saccharum) is the most common species comprising 17% of Dexter's community forest. It is followed by the red maple (Acer rubrum), 13%; Norway maple (Acer platanoides), 12%; and silver maple (Acer saccharinum), 9%. The top ten species in the Village are rounded out by honeylocust (Gleditsia tricanthos), 8.4%; callery pear (Pyrus calleryana), 7%; oaks (Quercus sp.), 5%; Colorado spruce (Picea pungens), 3.5%; flowering crab (Malus sp.), 2.7%; littleleaf linden (Tilia cordata), 2.5% and American sweetgum (Liquidambar styraciflua), 2.5%.

In 2006 ash trees comprised 5% of Dexter's community forest. With assistance from the State of Michigan Emerald Ash Borer tree planting grant over 130 ash trees were removed due to emerald ash borer infestation, reducing their percentage of total population down to less than 2%.

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Health Assessment

	2006*	2007*	2008*	2009	2010	2011	2012	2013	2014	2015
Excellent	71%	74.6%	73%							
Average	17%	15.6%	14.8%							
Poor	5%	4%	3.7%							
Physically Damaged	5%	4%	4.2%							
Under Stress	<1%	<1%	<1%							

*Based on 2005 tree inventory data, changes in health overtime not factored.

The overall condition of the trees was described as (1) excellent, (2) average, (3) poor, (4) insect damaged, (5) physically damaged, or (6) under stress. In 2006, 71% of the trees were in excellent condition, 17% were average, 5% were in poor or damaged condition; and less than 1% were under stress or had been subjected to insect damage.

Average dbh*

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
dbh	11.5	10.3	10.7							

* Removals and Replacements factored annually, based on 2005 tree inventory data, growth overtime not factored.

The age and size of the trees within Dexter's community forest range from the small, young trees in the neighborhoods built within the last decade to the much larger, older trees within "old" Dexter. The dbh data show that the sugar maples, Norway maples, and silver maples are likely the oldest trees within the Village. The average dbh for the sugar maple is eighteen inches; for the silver maple it is fifteen inches. Diameters for the remaining trees range from two to fifty-seven inches.

The tree inventory is a useful body of information on Dexter's community forest is. The inventories, updated at regular intervals, provide a useful measure of the composition and condition of the public trees within the community. This information can be worked in various ways to assist in the tree management program.

- Data showing the distribution of different species within the Village can be referenced in selecting species for the planting programs to assure a healthy mix of diverse species along Dexter's streets, in parks and other public spaces.
- Inventory information on the dbh, or trunk diameter at breast height (4 feet) can be sorted to show where there are concentrations of the largest

(oldest, aging) trees, the areas and neighborhoods of newest (youngest, smallest) street trees, and the distribution of a large middle category of mature community forest – well established, substantial trees.

- The dbh (size/age) information is informative at the 'big picture' level. It can be useful in projecting zones of corridors in the community where different tree maintenance techniques and practices may apply. It is not a diagnostic tool; a young tree is not healthy by virtue of its youth, nor is a noble old specimen automatically in decline because of its size and age.

Annual Work Plan

A work plan will be developed annually using the tree inventory and the general policies established by the tree board regarding tree removal, planting, and maintenance. Since there are many needs throughout the Village, a priority list and their funding sources was created:

- Trees that are dead, dying or diseased will be removed.
- Trees that obstruct visibility on streets and at intersections will be pruned or removed.
- Trees that interfere with pedestrian safety on sidewalks will be pruned or removed.
- Planting
    - Entrances to the Village (Baker Road, Dexter-Ann Arbor Road, Main Street and Central Street)
    - Homes of resident cost-share program participants
    - Spring planting lottery

All new trees planted should be a minimum of 2.5" caliper and should be included in the list of recommended plantings in Article 6, Landscaping Standards of the Village of Dexter Zoning Ordinance. Street trees should be planted a maximum of thirty (30) feet apart.

Funding

Funding for the tree program comes from a variety of sources:

- General Fund, Tree Program Department, Line Item 101.285.000.000.000
- Resident cost-share planting program

- Donations of money and time from local businesses and community organizations
- Tree Replacement Restricted Account established by Article IV, Section 6.14 of the Village of Dexter Zoning Ordinance
- Grants (DTE, Community Forestry, Arbor Day, Emerald Ash Borer, Tree City, etc.)

Budgeting

Budget amounts in the tree management plan are based on past expenditures for removal, tree planting, general maintenance and storm-damage clean up, and on recommendations from the Community Development Manager and Department of Public Services Superintendent. The Tree Board will review budgets annually in May and June and make recommendations to Village Council for incorporation into the Dexter Village Annual Budget (July 1 – June 30). The following table is the recommended funding allocation for annual tree related activities:

ACTIVITY	% of annual budget
Removal of hazardous, dead, and declining trees	30%
Tree maintenance activities (trimming, pruning, etc.)	35%
Tree Planting*	30%
Administrative activities	5%

*Funding can fluctuate due to resident cost share participation and grant awards

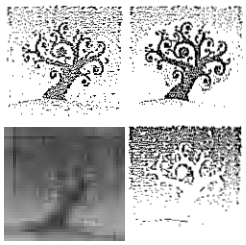
Vision for Dexter's Community Forest

Using the Tree Management Plan as a guide, by 2020 Dexter's community forest will be well stocked, diverse, and properly maintained. The Village of Dexter will be a certified Tree City USA.

The Tree Management Plan will recommend annual budgets as well as long range capital improvements, maintenance and care schedules, planting and removal priorities, and species selection recommendations.

The Tree Management Plan will provide information to Village residents on the benefits of trees and the role residents play in keeping the community forest vital and safe.

2009 Village of Dexter Tree Board
John Coy
Sandy Hansen
Cindy Henes
Jeff Peters
Allison Bishop



Program Goals

Consistent with the Vision Statement the Dexter Tree Board established a number of goals to preserve, maintain, and develop its community forest.

Goal 1
Educate Village officials and staff on the importance of trees in a community.

Goal 2
Provide education on the importance of trees in a community and their impacts on property values.

Goal 3
Reduce the Village's exposure to liability by maintaining the community forest.

Goal 4
Manage the Village's community forest through the use of the Tree Management Plan and the computerized tree inventory.

Goal 5
Develop partnerships with professionals to ensure effectiveness and efficiency in managing the community forest.

Goal 6
Promote and improve species diversity throughout Dexter's community forest to minimize potential for disease or insect infestation and forestry devastation.

Goal 7
Create an effective and adaptable Tree Management Plan.

Goal 8
Obtain funding for the implementation of the Tree Program.

Goal 1

Educate Village officials and staff on the importance of trees in a community.

Objectives

- Develop a tree education program.
- Encourage proper planting and maintenance techniques.
- Provide proper training for in-house personnel on planting and maintenance.
- Apply for DTE tree planting grants, Emerald Ash Borer grants, community forestry grants, and all other available funding or grants.
- Participate in National Arbor Day celebrations.
- Become s Tree City USA.
- Provide on-going guidance to Village officials and staff on tree care.
- Update the Village Tree Ordinance and Landscaping Standards as needed.

Strategies

- Create a list of materials that to be included in a tree education program and determine how best to distribute to make the information available.
- Adopt guidelines for planting and maintenance, including guidelines for tree selection and placement near overhead and underground utility lines. Include diagrams illustrating recommended tree spacing.
- Meet the Tree City USA qualifications and apply for certification.
- Report to Dexter Village Council annually on the Tree Board's activities and accomplishments.

Goal 2

Provide education on the importance of trees in a community and their impact on property values.

Objectives

- Develop a tree education program for Village residents which includes tree selection, planting, and care information.
- Inform the public about the Tree Management Plan and the Tree Replacement Program and the importance of the tree inventory.
- Foster a sense of ownership of the community forest by offering a resident participation tree-planting program.
- Encourage residents to report hazardous trees to the Village.
- Encourage community organizations such as the Rotary Club, Lions Club, Kiwanis Club, Scouts, and school groups to participate in tree-related activities sponsored by the Village.

Strategies

- Create a printed materials for residents on:
  - Selecting the right tree
  - Tree planting and care
  - Participation in the tree planting program.
  - The Tree Management Plan and the lottery system used by the Tree Board to determine planting locations.
  - Information on how to report damaged or hazardous trees, tree conflicts with overhead wires, impediments to visibility, clearance problems, etc.
- Invite community organizations to participate in tree-related activities when appropriate, i.e., National Arbor Day celebration.
- Use the Village website and quarterly newsletter to educate the public on the importance of tree and to advertise community forestry milestones and successes.

Goal 3

Reduce the Village of Dexter's exposure to liability through on-going tree maintenance.

Objectives

- Promote and protect the health, safety and welfare of the public by providing for maintenance of trees in the community.
- Prune or remove hazardous trees that are on public property or that overhang public property.
- Address hazardous conditions created by tree roots under sidewalks or in public utilities.

Strategies

- Use the "International Society of Arboriculture (ISA) Tree Hazard Evaluation Form" to identify tree hazards.
- The Tree Board and/or staff will inspect public trees or trees on private property that overhang public property for hazardous conditions. Inspections will occur annually and written records of the inspection will be maintained. Abatement work will be prioritized and addressed efficiently.
- The pruning or removal of trees that interfere with visibility of signs or at intersections will be a priority.
- Respond quickly to requests by property owners regarding tree hazards.
- The Village will contract for tree work only with qualified and insured arborists or tree maintenance firms experienced in structural maintenance of trees.

Goal 4

Manage the Village's community forest through the use of the Tree Management Plan and the computerized tree inventory.

Objectives

- Promote and protect the health, safety and general welfare of the public by providing for the maintenance of trees in the community forest and public rights-of-way and to create a well-stocked, diverse and properly maintained community forest.
- Identify hazardous trees and prioritize their removal.
- Track the condition of individual trees and provide for their maintenance.
- Identify locations needing trees.
- Assure a healthy mix of diverse species in Dexter's community forest.
- Monitor the health of individual trees in the community forest.
- Develop criteria for the removal and replacement of trees.

Strategies-Tree Management Plan

- Establish an annual schedule for assessment (structural, health, safety) of all public trees.
- Establish a priority list for the pruning or removal of hazardous trees.
- Develop a plan for on-going tree trimming and deadwood removal to achieve a well-maintained look throughout the Village.
- Develop a bidding process for annual tree trimming and deadwood removal within established budgets.
- Create a tree work bid template that includes planting, maintenance, and tree stock specifications.
- Use the Tree Management Plan, the Tree Specifications Manual, the 5-year Action Plan and CIP to make annual funding recommendations to Village Council.

Strategies-Computerized Tree Inventory

- Maintain, update, and improve the computerized tree inventory.
- Tag newly planted trees and record tree data.
- Develop the mapping capabilities of the tree inventory.
- Make the tree inventory available online.
- Bring the tree inventory's management in-house.

Goal 5

Make use of professional publications resources and standards in managing Dexter's community forest.

Objectives

- Ensure the effectiveness and efficiency in community tree care.

Strategies

- Adopt Detroit Edison's "Right Tree, Right Location" standards.
- Adopt the Michigan Department of Natural Resources "Three-Year Maintenance Guidelines" and Annual Maintenance Checklist".
- Adopt the planting standards recommended by the Michigan Department of Natural Resources and the National Arbor Day Foundation.
- Use the resources of the International Society of Arboriculture.
- Buy tree stock that meets the standards set forth in the Michigan Insect Pest and Plant Disease Act, Public Act 189, 1931.
- Purchase trees grown and dug in conformance with the America Standard for Nursery Stock published by the American Association of Nurserymen.
- Work with qualified local foresters, arborists and other municipal staff to determine the most efficient and cost effective operations for community tree care.

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Goal 6

Promote and improve species diversity throughout Dexter's community forest to minimize potential for disease or insect infestation and forest devastation.

Objectives

- Encourage the planting of native species or species suitable for southeastern Michigan's climate and soils.

Strategies

- Develop and revise, at regular intervals lists of recommended and preferred trees species and cultivars for various public planting applications in the Village.
- Develop a photo book of recommended species to help residents select trees that will succeed in the growing conditions on their property.
- Use the Landscaping Standards, Article 6, of the Village of Dexter Zoning Ordinance to promote species diversity and native plantings.

Goal 7
Create an effective and adaptable Tree Management Plan.

Objectives

- Create a management plan that is supported by the Village Council and that can be implemented by staff and the Tree Board.
- Update the management plan as necessary.

Strategies

- Improve the tree inventory using state-of-the-art technology.
- Develop a 5-Year Capital Improvements Plan.
- Execute the 5-Year Action Plan.

Goal 8
Obtain funding for the implementation of the Tree Program.

Objectives

- Research funding sources for tree management.
- To extend the life of the resident cost-share program.
- To supplement the annual budget.
- To develop creative approaches to tree replacement.

Strategies

- Create a list of available grants and deadlines and apply for funding.
- Encourage private donations to the tree endowment for tree replacement.
- Develop ways to contribution to the tree endowment so that it can last into perpetuity.

Implementation

The Tree Management Plan was drafted to help with the management of the Village of Dexter's urban forest. Without a commitment of the resources necessary to implement the components of the plan the goals and objectives of the Tree Board, within the Management Plan, will not be achieved. It is imperative to implement the management plan in order to protect and enrich the Village's urban forest which is essential to the preservation of the quality and community character of the Village.

The following annual action plan will guarantee implementation of the Tree Management Plan and the Tree Board's goals and objectives for a healthy and thriving urban forest in the Village of Dexter.

5 Year Action Plan

YEAR 1 ACTION

1. **Identify the responsibilities of the Village Tree Board**
   A. Develop a prioritized list and map for Village tree maintenance and planting.
   B. Recommend updates to the Village of Dexter Zoning Ordinance, Article 6, Landscaping Regulations.
   C. Compile the annual list of trees to be offered in the Village tree planting program.
   D. Compile a tree selection, planting and maintenance handbook for residents. Include planting, spacing standards, etc.
   E. Apply for available grants.

2. **Develop a Village tree management program**
   A. Prepare a tree inventory map; update annually.
   B. Prepare a checklist for tree maintenance and replacement.
   C. Assess hazardous trees, using the ISA tree hazard evaluation form.
      a. Estimate time for annual tree assessment.
      b. Determine skills, time and budget required to perform the maintenance and/or removal work.
   D. Prepare a tree maintenance manual; update, amend periodically.
   E. Carry out maintenance work, with visual clearance on streets and at intersections a top priority.

3. **Join and become active in the National Arbor Day Foundation**
   A. Prepare and submit application.
   B. Identify potential funding sources and propose an annual budget to Council
   C. Organize, in partication with local organizations, National Arbor Day observances and celebrations
      a. National Arbor Day events
      b. Identify and enlist the participation of schools, service clubs, churches, Scouts, 4-H and other community organizations.
      c. Determine, with community partners, the date, location and time of Arbor Day event(s).
      d. Establish a planning committee to organize Arbor Day events.

4. **Become a Tree City USA**
   A. Prepare and submit application.
   B. Prepare a resolution for Council committing $2 per capita ($2x3558 = $7116)

5. **Develop a Tree Planting and Replacement Program**
   A. Prepare a descriptive statement on the community tree planting program.
   B. Develop an information sheet for distribution to community residents
      a. Describe the requirements for participation
      b. Prepare/provide a form for application to the program, including a hardship case form.
      c. Prepare an information piece that describes the details of how the program work
      d. Distribute to all households and property owners in the Village
      e. Identity and use existing publications from public sources that can be distributed to the community.
      f. Identify ways to distribute information to the community, i.e. newsletter, website, welcome packets, resident handbook.
      g. Identify groups and community organizations that would use the information and the best way to get the information to the groups, i.e. schools, Lions Club, Rotary Club, Boards and Commissions, Boy and Girl Scouts, etc.

YEAR 2 ACTION

1. **Apply for available grants**
   A. Develop a list of available grants and timelines for submittal.

2. **Annual update of inventory street trees and public park trees.**
   A. Determine if it is necessary to re-analyze the tree data based on the plantings and removals completed in the previous year.
   B. Prepare a list of hazard trees identified per the annual tree hazard inspection to be removed.

3. **Begin ongoing, routine tree management schedule**
   A. Evaluate inspection procedures to determine that hazards are being properly identified. Modify procedures as necessary.
   B. Continue the maintenance of trees as prioritized or per the areas identified on the maintenance map quadrant schedule.

4. **Evaluate and implement necessary changes to Arbor Day and Tree City USA requirements.**
   A. Continue the celebrations organization by subcommittee.
   B. Schedule and organize the events for the year.
   C. Reapply for Tree City USA.

5. **Advertise community forestry milestones and successes.**
   A. Establish a community relations leader.
   B. Identify a list of press opportunities and contacts.
   C. Establish key facts about the tree inventory in the newspaper and at the Arbor Day celebration.
   D. Promote the Arbor Day celebration and the Tree City USA designation.

YEAR 3 ACTION

1. **Apply for available grants.**
   A. Develop a list of available grants and timelines for submittal.

2. **Annual update of inventory street trees and public park trees.**
   A. Determine if it is necessary to re-analyze the tree data based on the plantings and removals completed in the previous year.
   B. Provide a list of hazard trees identified per the annual tree hazard inspection.

3. **Begin ongoing, routine tree management schedule.**
   A. Evaluate inspection procedures to determine that hazards are being properly identified. Modify procedures as necessary.
   B. Continue the maintenance of trees as prioritized or per the areas identified on the maintenance map quadrant schedule.

4. **Evaluate and implement necessary changes to Arbor Day and Tree City USA requirements.**
   A. Continue the celebrations organization by subcommittee.
   B. Schedule and organize the events for the year.
   C. Reapply for Tree City USA.

5. **Advertise community forestry milestones and successes**
   A. Designate a community relations leader.
   B. Identify a list of press opportunities and contacts.
   C. Establish key facts about the tree inventory in the newspaper and at the Arbor Day celebration.
   D. Promote the Arbor Day celebration and the Tree City USA designation.

6. **Disseminate information about tree care and pruning in the community.**
   A. Circulate information prepared and developed in year one to the community, etc.

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YEAR 4 ACTION

1. **Apply for available grants.**
   A. Develop a list of available grants and timelines for submittal.

2. **Annual update of inventory street trees and public park trees.**
   A. Determine if it is necessary to re-analyze the tree data based on the plantings and removals completed in the previous year.
   B. Provide a list of hazard trees identified per the annual tree hazard inspection.

3. **Begin ongoing, routine tree management schedule.**
   A. Evaluate inspection procedures to determine that hazards are being properly identified. Modify procedures as necessary.
   B. Continue the maintenance of trees as prioritized or per the areas identified on the maintenance map quadrant schedule.

4. **Evaluate and implement necessary changes to Arbor Day and Tree City USA requirements.**
   A. Continue the celebrations organization by subcommittee.
   B. Schedule and organize the events for the year.
   C. Reapply for Tree City USA.

5. **Advertise community forestry milestones and successes.**
   A. Establish a community relations leader.
   B. Identify a list of press opportunities and contacts.
   C. Establish key facts about the tree inventory in the newspaper and at the Arbor Day celebration.
   D. Promote the Arbor Day celebration and the Tree City USA designation.

6. **Disseminate information about tree care and pruning in the community.**
   A. Circulate information prepared and developed in year one to the community, etc.

YEAR 5 ACTION

1. **Apply for available grants.**
   A. Develop a list of available grants and timelines for submittal.

2. **Annual update of inventory street trees and public park trees.**
   A. Determine if it is necessary to re-analyze the tree data based on the plantings and removals completed in the previous year.
   B. Provide a list of hazard trees identified per the annual tree hazard inspection.

3. **Begin ongoing, routine tree management schedule.**
   A. Evaluate inspection procedures to determine that hazards are being properly identified. Modify procedures as necessary.
   B. Continue the maintenance of trees as prioritized or per the areas identified on the maintenance map quadrant schedule.

4. **Evaluate and implement necessary changes to Arbor Day and Tree City USA requirements.**
   A. Continue the celebrations organization by subcommittee.
   B. Schedule and organize the events for the year.
   C. Reapply for Tree City USA.

5. **Advertise community forestry milestones and successes.**
   A. Establish a community relations leader.
   B. Identify a list of press opportunities and contacts.
   C. Establish key facts about the tree inventory in the newspaper and at the Arbor Day celebration.
   D. Promote the Arbor Day celebration and the Tree City USA designation.

6. **Disseminate information about tree care and pruning in the community.**
   A. Circulate information prepared and developed in year one to the community, etc.

7. **Review the 5-year action plan and the goals and objectives of the Tree Management Plan.**
   A. Provide updated plan to Commissions and Board and prepare resolution to readopt plan to assure commitment to the goals and objectives of the plan.

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VILLAGE OF DEXTER

TREE SPECIFICATIONS MANUAL

Policies and Procedures Manual

TREE BOARD

ADOPTED March 17, 2009

ACCEPTED BY VILLAGE COUNCIL
June 8, 2009

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TREE SPECIFICATIONS MANUAL

AUTHORITY

Pursuant to authority granted under the "Municipal Tree Ordinance", Ordinance #15-2005, adopted by the Dexter Village Council, Dexter, Michigan, on April 28, 2005, the Community Development Manager having had the advice and assistance of the Tree Board, established in the said Ordinance, hereby promulgates the following Arboriculture Specifications and Standards of Practice for the Village of Dexter, Michigan, hereinafter called the Village of Dexter Tree Specifications Manual.

1. POLICY

   A. GENERAL POLICY - To reduce the unnecessary expense and unnecessary removal of healthy trees, the Tree Board recommends removal of only those trees that are dead, dying, or diseased and trees that are determined by the Tree Board or designee to be hazardous to the public.
      i. All work on public trees shall comply with the "Municipal Tree Ordinance" (Appendix 1) of the Village of Dexter, Michigan, and this Tree Specifications Manual.
      ii. The Tree Specifications Manual shall be adhered to at all times, but may be amended at any time that experience, new research, or laws indicate that improved methods or circumstances make it advisable, and only then with the advice and assistance of the Village of Dexter Tree Board, all as provided for in the above said Ordinance.
      iii. The policy of the Village of Dexter Tree Board, the Village of Dexter Department of Public Works, and the Village of Dexter shall be to cooperate with the public, property owners, and with appropriate non-profit organizations.

2. SPECIES, CULTIVARS AND VARIETIES

   A. A list of tree species and/or their varieties acceptable and approved for planting on Village property has been compiled with the assistance of the Village Tree Board and approved by Village Council, Article 6, Landscaping Standards, of the Village of Dexter Zoning Ordinance (Appendix 2).

B. Prohibited tree species and their varieties are listed in Article 6, Section 6.11C of the Landscaping Standards (Appendix 2).

C. Other tree species and their varieties may be planted on Village owned property, but only trees of good appearance, beauty, and adaptability that are free from injurious insects, diseases, or other limitations and that have been approved by the Tree Board.

D. The Tree Board, in conjunction with the Community Development Manager or Department of Public Services Superintendent, shall review at least once every two years the species, cultivars, and varieties list in Appendix 2 to determine whether any should be removed or whether certain species, cultivars, or varieties of proven adaptability and value should be added; and the Tree Board shall similarly review the trees listed in Article 6, Landscaping Standards, to determine whether any should be removed or whether certain new species, cultivars, or varieties should be added.

3. PLANTING STOCK REQUIREMENTS

A. GENERAL - Trees shall be Michigan State Agriculture Department inspected and certified. Trees shall be nursery grown and dug for sale in conformance with the American Standard for Nursery Stock (Appendix 3), published by the American Association of Nurserymen. Nursery of origin of all trees shall be noted on the bid as plant material may be inspected. A Michigan Department of Agriculture certificate will be required for all planting from out-of-state. Stock obtained from municipal or government nurseries must meet relevant standards per the Michigan Insect Pest and Plant Disease Act, Public Act 189, 1931.

B. SIZE – Unless otherwise specified all tree planting stock shall conform to American Association of Nurserymen Standards and shall be at least 2-2 ½ inch caliper.

C. GRADE – Unless otherwise allowed for specific reasons, all trees shall have comparatively straight trunks, well developed leaders and crowns and shall exhibit evidence of proper nursery pruning practices. Trees shall have acceptable balance and at the time of planting must be free from mechanical injuries and other objectionable features that affect future form and beauty of the plant.

D. SPACING AND LOCATION

i. Trees shall be planted at least 10 feet from driveways and alleys, and at street intersections the distance shall be 15 feet pursuant to Section 3.08A3, Clear Vision Areas.

ii. No tree shall be planted closer than 30 feet to a utility pole or within 15 feet of a streetlight to allow for maintenance and light penetration.

iii. Spacing of trees shall be 30-60 feet depending on the species planted and the width of the lot. Generally all large trees, at maturity, shall be spaced 40-60 feet; all medium trees shall be spaced 35 feet and all small trees shall be placed 25 feet apart.

iv. No street tree shall be planted under or within 10 lateral feet of any overhead utility wire, or over or within 8 lateral feet of any underground utility wire.

v. All planting on streets without curbs or sidewalks must be approved by the Village, who shall determine the location of the tree to avoid future injury or damage when the street is curbed or when sidewalks are constructed.

4. PLANTING METHOD AND SUPPORT

A. Tree planting within the Village of Dexter should follow the American National Standards Institute (ANSI) standards for tree planting, Tree City USA Bulletin No. 19 - How to Select and Plant a Tree (Appendix 4), OR Michigan Department of Natural Resources Tree Planting Guide (IC 4108) (Appendix 5).

B. Planting holes for balled and burlapped trees all be a minimum of 24 inches greater than the diameter of the ball of soil to allow proper backfill. The hole shall be the depth of the root ball.

C. Root balls shall be placed on undisturbed subgrade to prevent settling. Care should be taken not to over excavate the planting hole depth.

D. In poorly drained soil, artificial drainage may be provided for wet sites and species selection should be tolerant of poor drainage conditions. Soil amendments may be added to the backfill on sites where existing soils are not ideal for proper root development. Amendments should be added at a rate of one-third to two-thirds existing soil to minimize the effects of soil interface. Acceptable soil amendments are topsoil, compost, or peat moss.

E. Wire baskets and burlap shall be removed from the top one-third of the root ball prior to backfilling to prevent future girdling.

F. Tree trunks shall be suitably wrapped and guyed, or supported in an upright position, according to standard arboriculture practice. Guys or supports installed shall not girdle or cause serious injury to the tree nor endanger public safety.

G. Planting method information can be found in Appendix 6 of this manual.

5. EARLY MAINTENANCE

A. GENERAL

i. Maintenance for Village trees should follow the Michigan Department of Natural Resources Tree Maintenance Guidelines detailing the first three years of maintenance (Appendix 7) and the Michigan Department of Natural Resources Tree Maintenance Checklist (Appendix 8).

ii. Although top pruning should be done to develop a balance with the root system, excessive pruning at the time of transplanting should be avoided. Properly selected plants at the nursery will minimize the need for excessive pruning.

iii. Newly planted trees, shrubs, or other plants require special maintenance for three growing seasons following planting. All maintenance practices shall follow approved arboriculture standards.

B. WATERING - Ample soil moisture shall be maintained following planting. A thorough watering once in five (5) to ten (10) days, depending on soil type and drainage provisions, is usually adequate during the growing season. A soil probe can be used to check the moisture in the soil ball and/or backfill. Over watering should be avoided. Information on watering from the Urban and Community Forestry Division of the Conservation Commission of the State of Missouri can be found in Appendix 9.

C. FERTILIZATION - Fertilization of newly-planted trees and shrubs is NOT recommended. Adequate quantities of the essential nutrients should be available for new root growth in existing soils. However, provision of good drainage and adequate moisture of the backfill and soil ball is essential. To increase vigor of existing trees, a pre-approved fertilizer may be applied when needed.

D. INSECT DISEASE AND CONTROL - Frequent and thorough inspections shall be made to determine when measures for the control of insects and disease shall be taken. Plants are in a weakened

condition following transplanting, and they are more susceptible to insects (especially borers) and disease than are vigorously growing trees. Where control is deemed necessary, pesticides will be used that are target specific and have been formulated to provide acceptable control. All pesticides shall be applied using the most recently approved federal guidelines. Where more than one pesticide is recommended for control, the less toxic formulation shall be used.

E. PRUNING - Pruning of newly-planted trees shall consist of removing dead, broken, or injured branches; and the pruning out of rank, uneven growth that affects form. Water sprouts shall be removed when they reach the diameter of a pencil. Pruning shall be practiced in accordance with the Village of Dexter Tree Ordinance. Newly planted trees are to be correctively pruned annually for three (3) years.

6. GENERAL MAINTENANCE

A. All pruning of Village-owned trees shall be performed in accordance with the United States Department of Agriculture Forest Service (NA-FR-01-95), Appendix 10. Appendix 10 also includes a deciduous tree pruning calendar prepared by the Virginia Cooperative Extension.

B. In order to efficiently use available personnel to effectively provide required tree maintenance for Village-owned trees, the following pruning cycles have been established:

i. The following maintenance shall be performed on a five-year cycle, village-wide, block by block:
   a. Sidewalk clearance for pedestrians to a minimum of seven feet.
   b. Street clearance for trucks and buses to a minimum of 14 feet.
   c. Corrective pruning of trees less than eight inches in diameter.
   d. Clearance for traffic signage and lighting.
   e. Clearance within the clear vision zone of intersections (pursuant to Section 3.08A3).

ii. Once a year, public and private overhanging trees within the public right-of-way in the Village of Dexter will be surveyed for potential hazards. This tree survey will be conducted in a systematic manner so that every street tree is visually examined via a "windshield" survey. The Community Development

Manager or the Department of Public Services Superintendent or Village Manager designee will be looking primarily for deadwood greater than 2 inches in diameter or poorly formed crotches that show evidence of splitting or decay. Simultaneously, low limbs posing pedestrian or vehicular hazards will also be identified. Insect, disease, or environmental problems shall also be identified for initiation of integrated pest management practices.

iii. Records and Ratings – A record of all hazardous situations will be developed, each tree being identified by:
   a. Section
   b. Priority
   c. Address
   d. Size and Species
   e. Description of Work Required
   f. Time
   g. Material
   h. Additional Comments

Priority shall be assigned on a nine-point scale. Three points will be assigned to each of the following aspects of the potentially hazardous situation.

Size of Limb

- 1 Point – limbs up to two inches
- 2 Points – limbs 2" to 6"
- 3 Points – limbs greater than 6"

Target Area

- Primary pedestrian/vehicular corridors. Examples of this being areas around parks, schools, churches, and public buildings (3 points).
- Secondary pedestrian/vehicular corridors. Examples of this being minor arterial roadways, primarily all other residential areas.

iv. Species and Hazard Interaction – Evaluation of characteristics of the individual species structural strength and the speed at which wood decays. (For example – Fast growing species such as willows and cottonwoods are weak wooded and as such are more susceptible to fail, splitting and branch drop, once decay has begun. Oaks, being a hardwood, will hold their deadwood much longer.)

v. Posting – All work scheduled to remove trees or large limbs originating on private property will be publicized to the property owner by "doorknob" message or first class mail. Care all be taken that only legally permissible work on or above the public right-of-way will be scheduled without permission from property owners directly affected by maintenance procedures. If a property owner disputes the planned work, the Village shall retain a certified arborist to assess the tree prior to removal, pruning, or other maintenance work.

7. PRUNING POLICY

Pruning Classifications of Village trees shall be performed in accordance with the United States Department of Agriculture Forestry Service (NA-FR-01-95). Pruning classifications are to be determined by size and significance as determined by the Village.

A. Class I or Fine Prune
   i. All trees eight inches in diameter or less
   ii. Any other tree as determined by the Village.

B. Class II or Medium Prune
   i. Trees with diameters in excess of eight inches but less than 25 inches.
   ii. Any other tree as determined by the Village.

C. Class III or Coarse Prune
   i. All trees in excess of 25 inches in diameter.

D. Class IV or Safety Reduction Prune
   i. In the event a tree is determined hazardous by the Village, cutting back or drop crotching may be performed to eliminate the hazard provided the useful life of the tree will be extended long enough to warrant doing so. If the expected pruning cost exceeds the tree's value, removal and replacement shall be considered.

8. WOOD DISPOSAL POLICY –Woodchips will not be left at homes immediately following tree removal. Woodchips will be made available to residents/property owners free of charge and can be picked up directly from the Department of Public Works. The wood chips shall not be stock piled in the public right of ways fronting private properties.

9. STREET CLOSING – To protect the public from danger, suitable street and sidewalk barriers or signs shall be used. Right-of-way permits must be applied for and approved through the Village Offices and details of the closures must be provided. Signals, flares or flashing lights shall be placed on all barriers or obstructions remaining in the street after dark.

10. TREE REMOVAL POLICY –

The Village recognizes the significant contribution made by street trees to both the aesthetic and environmental aspects of existing streetscapes within the Village. It also recognizes that in some cases tree retention may not be desirable, feasible, or reasonable owing to the condition, location, or species of the tree or its implications for development of an abutting site and/or the achievement of other Village objectives.

The Village wishes to avoid removal of street trees except where retention is considered undesirable or unreasonable, such as:

- exceptional circumstances exist relating to public risk and safety
- the species is not an approved variety and is not acceptable to the Village
- the tree precludes redevelopment of an adjoining site with no reasonable alternative to removal.

Owing to the hazardous nature of the task, residents/occupants will not be permitted to remove street trees themselves. Where removal is approved as a result of a development application, replacement of the tree with an approved variety will be required and its maintenance for the first two summers following its planting also required to assure the establishment of the replacement tree(s).

PROCEDURE

A. The Village shall normally undertake the removal of street trees (based on a quotation from its preferred contractor through an approved bid process) under the following circumstances:
   i. The tree is diseased and beyond remedial treatment, or dead;
   ii. The tree has been assessed by the Village as structurally weak and dangerous, placing the public at risk.
   iii. The tree has been irreparably damaged by a storm;
   iv. The tree is hazardous to motorists / pedestrians owing to interference with intersection sightlines presented by the tree's alignment or spacing;

v. The tree is affected by road widening, service modification / relocation, or other infrastructure works and all other options to retain the tree have been deemed by the Village to be infeasible;

vi. The tree is dangerously in contact with overhead power lines or distributor wires to properties and where, for reasons of growth habit pertaining to the variety, selective pruning is not practical with the only option being severe lopping.

B. The following are not considered sufficient reasons for the removal of street trees:

i. The tree obscures or potentially obscures views (other than traffic or pedestrian)

ii. The tree variety is disliked;

iii. The tree variety causes nuisance by way of leaf, fruit and/or bark shedding or the like;

iv. The tree causes allergy or health problems;

v. The tree shades private gardens, solar hot water installations or the like.

The guiding principles of the tree removal policy are:

- To maintain public safety by reducing risk to people and/or by mitigating dead, dying, deteriorating, damaged, diseased and/or hazardous Village street trees on the public right-of-way in a timely and reasonable manner.
- To maintain publicly-owned tree resources by ensuring that professional standards are met, reasonable care is demonstrated, and corrective actions are taken when necessary for the welfare and safety of the public.
- To notify in a timely and reasonable manner the owner of the property that directly abuts the public right-of-way where a Village street tree is marked for removal.

The notification policy shall be as follows:

- The Village will give 14 calendar days' notice prior to the removal of the a street trees to the occupant and owner of the property abutting the Village right-of-way upon which a trees is slated for removal unless it is determined that the tree is hazardous and poses an imminent danger to the welfare and safety of the public or has a non-treatable contagious disease that poses imminent danger to the health of surrounding trees or the community forest, in which case no

notification shall be required. 14 days' shall commence based on the date of the written correspondence.

- If 14 days' notice is required, then for any size street trees marked for removal, the Village shall mail a letter, first class, to the occupant and owner of the address that directly abuts the public right-of-way upon which the street tree is located. The Village shall also notify by email any active home owners' association, is available, of trees marked for removal in the association's jurisdiction.
- Abutting occupants/property owners or home owners' associations shall have 14 days to dispute the removal.
- If abutting occupants/property owners or home owners' associations object to the removal of the tree, then removal work will cease until the Tree Board can take action on the dispute. The Village will consult at least two (2) certified arborists for structural health assessments. It will be the Tree Board's responsibility to determine whether the tree meets the standards for removal as stated in the Tree Removal Policy.

NOTIFICATION FOR WORK TO TAKE PLACE ON PRIVATE PROPERTY

All work scheduled to remove trees or large limbs originating on private property should be publicized in accordance with the Tree Removal Policy noted above. Care should be taken that only legally permissible work on or above the public right-of-way will be scheduled without permission from property owners directly affected by maintenance procedures.

11. TREE DAMAGE POLICY - Immediately upon receiving information indicating damage to a Village tree, the Village or a qualified contractor shall inspect the tree and complete a "Tree Evaluation" form, Appendix 11, to determine a course of remediation for the tree. If the tree warrants removal OR trimming, etc. to eliminate a health, safety, and welfare concern, the Department of Public Works and or qualified designee shall schedule the remediation activity.

12. RESIDENT PARTICIPATION POLICY – Annually the Village of Dexter will offer a Resident Cost Share Tree Planting. Residents can share in the cost to purchase a tree for planting in the extension and/or public right of way. The cost is typically 50/50. The cost will be determined annually based on pricing from a contractor. A contractor shall be selected based on the low bid. A contractor may be used in subsequent years if pricing stays the same. All trees are warrantied for one year. Participating

residents will receive information on proper maintenance and care of the tree.

13 TREE PLANTING LOTTERY POLICY – Locations around the Village will be selected for annual tree planting, when funding is available. The locations have been identified by the Tree Board as needing trees. Locations have also been added at the request of property owners. Property owners may request that their address be added to the lottery if they would like a tree, but cannot participate in the cost share program. The Tree Board will then select a species for each location. All trees are warrantied for one year. Recipients of a lottery tree will receive information on proper maintenance and care of the tree.

14. TREE BOARD PLANTING LOCATION POLICY - Budget dependent the Tree Board will select locations around the village to plant trees. These locations have been identified in the lottery or have been identified as a top priority planting location. Locations have been selected based on the following:

A. Tree removal location
B. Public Property (Schools, Parks, etc)
C. Major thoroughfares
D. Secondary thoroughfares
E. Minor thoroughfares

15. MAPLE TREE TAPPING POLICY – The Village's street and parks trees yield aesthetic and environmental benefits and are not crops or food sources. It is therefore the policy of the Village of Dexter to PROHIBIT the tapping of street trees in the Village right-of-way for the following reasons:

A. Street trees are currently under stress due to compacted soils around root zones;
B. Roads, driveways and sidewalks reduce water infiltration caused by impervious surfaces;
C. Salt, lawn chemicals, heat from pavement and poor soils contribute to increased stress;
D. Maple trees are not among the most urban tolerant species;
E. Many maple trees within the Village are old and their health is on the decline; introducing additional stresses could increase rate of decline.

AMENDMENTS

The Community Development Manager OR the Department of Public Services Superintendent shall have the authority to modify, amend, or extend with the advice and assistance of the Village of Dexter Tree Board, the Tree Specifications Manual at any time that experience indicates improved methods or whenever circumstances make it advisable.

AGENDA 5-26-09

ITEM L-6

VILLAGE OF DEXTER

cnicholls@villageofdexter.org

8140 Main Street Dexter, MI 48130-1092 Phone (734)426-8303 ext 17 Fax (734)426-5614

MEMO

To: **President Keough and Council Members**
From: **Courtney Nicholls, Assistant Village Manager**
Date: **May 26, 2009**
Re: **Asset Management**

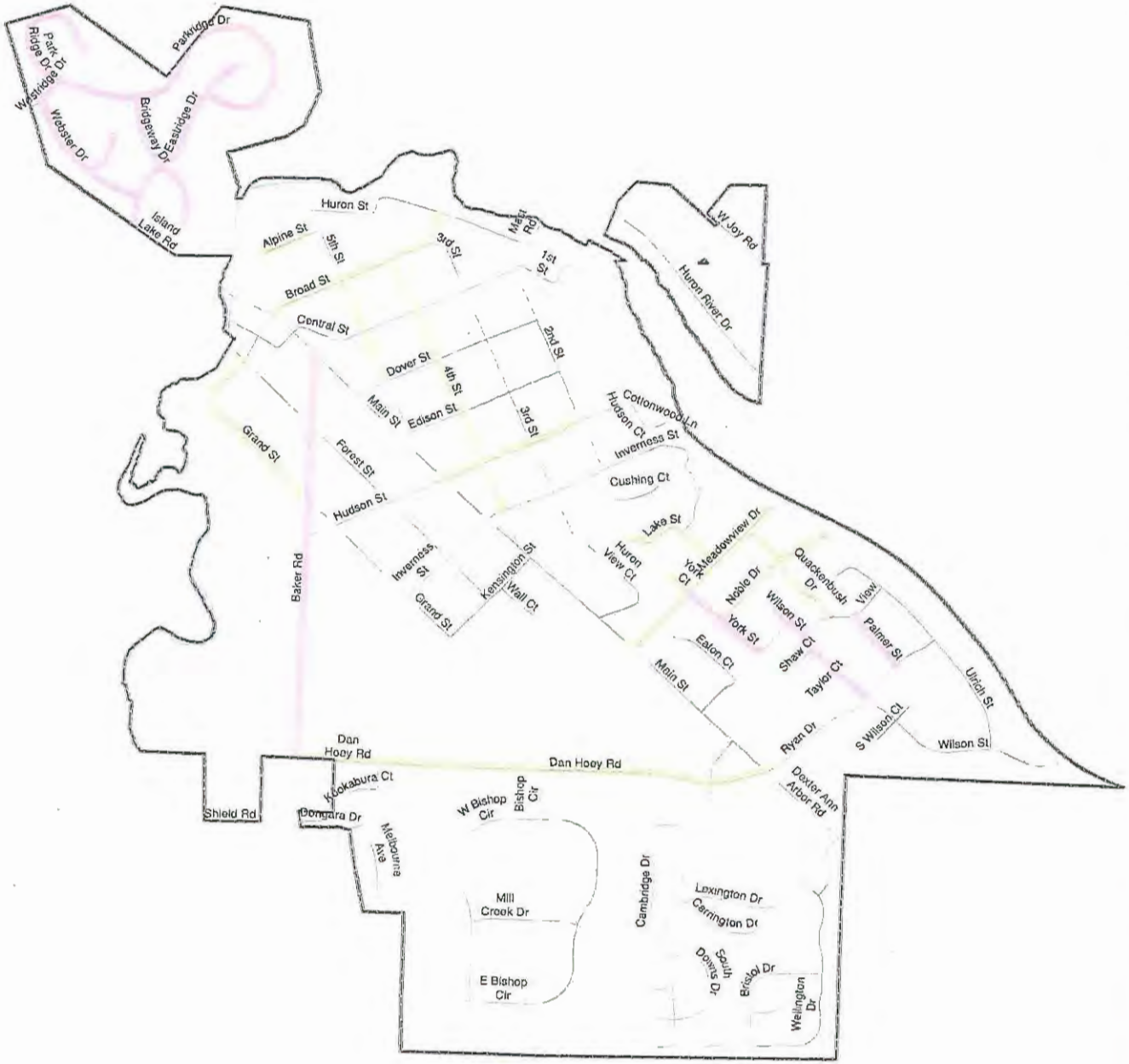
The bids for our 2009 Asset Management program were due on Monday, May 18. By the bid deadline only one bid was received. The contractor was present and provided us with information on a local area he recently cape sealed (Huron Ct & Greenook Blvd in Loch Alpine).

At the Transportation Asset Management Conference I attended on Tuesday, May 19 several of the presenters explained that they use cape sealing – which is a chip seal with a micro-surface – as the main preventative maintenance treatment for their neighborhood streets. The micro-surface on top of the chip seal prevents the complaints about roughness common after a chip seal is applied.

If Council is comfortable that the cape seal is appropriate for our local streets, we will move forward with an invitation to bid process that lists crack sealing and cape sealing as the two methods that will be used for our preventative maintenance program. Using cape sealing will also allow us to complete a majority of the work in our asset management plan.

VILLAGE OF DEXTER

OHM Engineering Advisors OHM Engineering Advisors OHM Engineering Advisors OHM Engineering Advisors OHM Engineering Advisors



CRACK AND CAPE SEAL RECOMMENDATIONS

ROAD MAINTENANCE PLAN
FY 08/09 - FY 09/10

- Crack Seal
- Cape Seal
- Road
- River/Stream
- Municipal Boundary

N
W E
S

Feet
500 0 500 1,000

OHM
34000 PLYMOUTH ROAD
LIVONIA, MI 48150
734.522.6711
734.522.6427 (fax)

Data provided by Orchard, Hiltz and McCliment and the Washtenaw County Information Technology Department. Orchard, Hiltz and McCliment does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Village and all use is strictly at the user's own risk.

PUBLISHED 08.01.2008

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Coordinate System: Michigan South NAD 83 International Feet