HB

128

ANCH. DAILY NEWS - Nov 10, 1996

SECTION C

TIM BRADNER

Mining's a growth industry

Zinc, gold, silver draw investors

Alaska miners in town last week for the annual meeting of the Alaska Miners Association were in a jolly mood. Mining is seeing a real renaissance in Alaska after slumbering for decades.

Three significant events in mining are occurring. Two new mines will start producing by the end of the year. These are the big Fort Knox gold mine near Fairbanks and Illinois Creek, a medium-sized gold mine near Galena on the Yukon River.

Also, the Greens Creek mine near Juneau, closed in 1992 when silver prices dropped, reopened. Greens Creek is the largest U.S. silver mine.

The mining firms moving into Alaska are solid companies. Fort Knox was developed by Amax Gold, a large and experienced U.S. minerals company. Illinois Creek was developed by USMX Inc., a small but aggressive Colorado-based company.

Anchorage-based Kuskokwim Inlet Region Inc., the leaseholder at Illinois Creek, says it selected USMX to develop the mine partly because of the company's good operating and environmental record with several small western state mines.

Kennecott Minerals, an international company long established in Alaska, is the operating partner at Greens Creek. Kennecott is a part of the RTZ international minerals group of London.

Another positive development is that a relatively small mining project, opened in late 1995, continued producing through the year. Nixon Fork, an underground mine, is a signal to the industry that small mines also can do well in Alaska.

There will be more mining work in 1997 and 1998. A full-blown expansion of the big Red Dog Mine in Northwest Alaska will be under way. This $200 million project, involving up to 300 construction workers, will let the mine expand its production by a third. Red Dog already is the largest lead-zinc mine in the world. The mine is a partnership between Cominco Alaska Inc., a Canadian minerals company, and NANA Regional Corp., the landowner.

In Southeast, Coeur D'A-

Please see Page C-8, BRADNER

Post-it® Fax Note 7671	Date	# of pages ▶ 2
To Diana	From Nancy	
Co./Dept.	Co.	
Phone #	Phone #	
Fax #	Fax #	

MEMORANDUM

State of Alaska
Department of Law

TO: Al Ewing
Deputy Commissioner
Department of Environmental Conservation

DATE: March 4, 1997

FILE NO:

TEL NO: 465-3600

SUBJECT: HB 128 (water science oversight board)

FROM: James L. Baldwin
Assistant Attorney General
Governmental Affairs - Juneau

You requested me to review a version of HB 128 which proposes the establishment of a water science oversight board. The board would consist of one member appointed by the Chancellor of the University of Alaska and three members appointed by the governor. Two of the governor's appointments would be from a slate of persons nominated by the presiding offices of each house of the legislature. Specifically, you ask whether this scheme violates the Alaska Constitution.

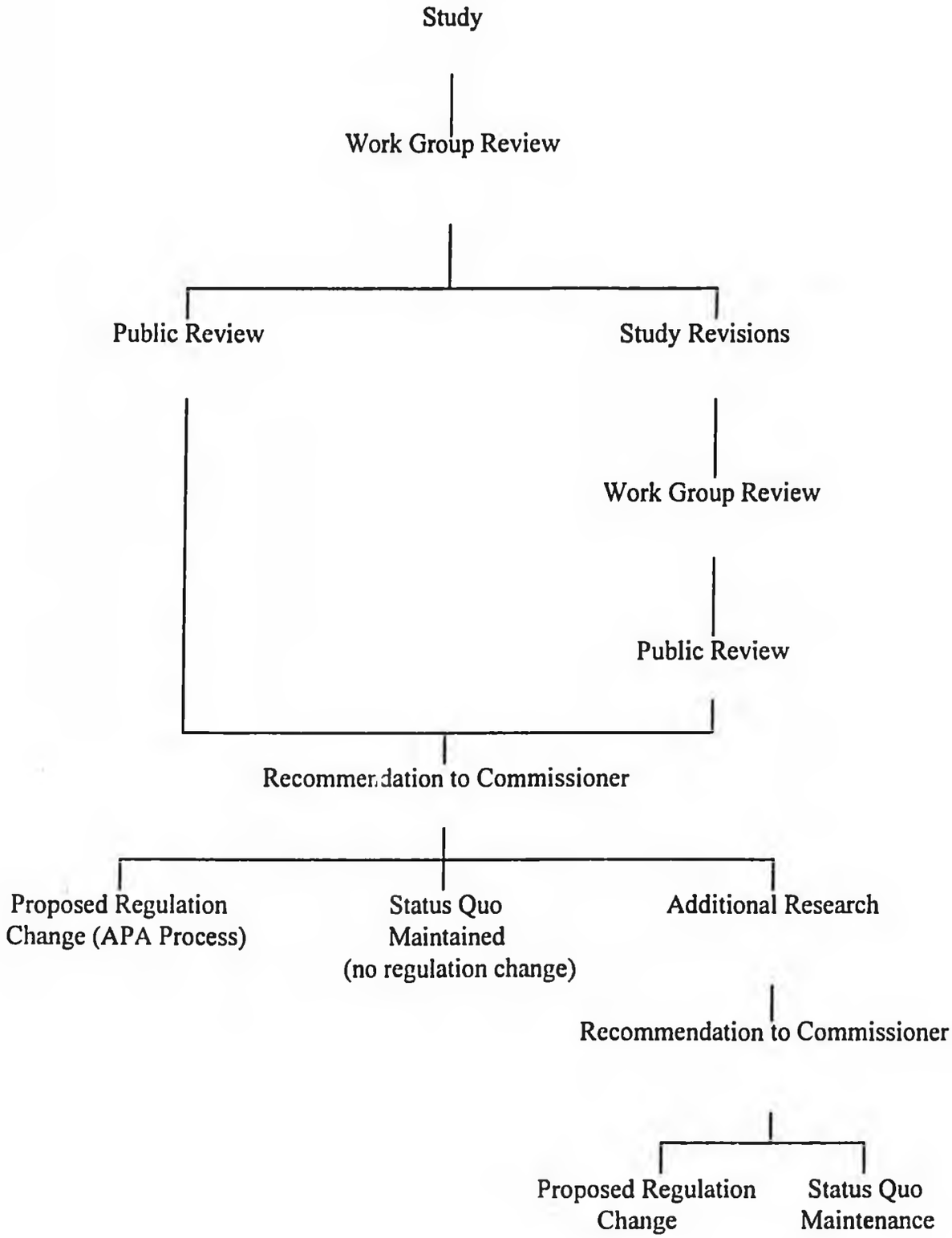
In my opinion, the involvement of other officers in appointing or nominating candidates and limiting the governor to appointing from those nominated constitutes an unreasonable limitation on the executive power of appointment. This would be a usurpation of the governor's power of appointment by officers of the legislature. While there is no Alaska case directly on point, I believe that a court would find that proposed sec. 46.03.085 violates the separation of powers doctrine by granting legislators control over the discretion of the governor to this extent. See Bradner v. Hammond, 553 P.2d 1 (Alaska 1976) (power of appointment of executive branch officers is vested in governor to prevent diffusion of executive power and vesting too great a concentration of power in legislative branch). It is appropriate to prescribe by law objective professional qualifications for persons appointed by the governor. These qualifications must be reasonable so that the governor's discretion is not unduly restricted.

JLB:cln

ISSUE	APPROACH	TO WQWG	TO COMMISSIONER
petroleum hydrocarbons -- re-evaluate Total Aromatic Hydrocarbon, Total Aqueous Hydrocarbon, and oil & greese standard	Research and report available information, including background of current standards, alternative compound specific data, and other states' criteria.	4/30/97	5/15/97
dissolved metals -- criteria for metals should be based on dissolved meta and bioavailable metal species	Research and report on derivation of EPA criteria, federal guidance, evolution of EPA conversion factors, and bioavailability of dissolve vs. Particulate metals.	3/31/97	4/15/97
reclassification -- define in detail the process and requirements for petitioners to follow	Draft reclassification guidance document for petitioners, including a decision treee and application information.	5/1/97	5/15/97
fecal coliform -- sampling frequency should be changed from 5/month to once/week.	Review origin of fecal coliform sampling requirements in permits and make changes in DEC written guidance on monitoring requirements, as appropriate.	2/3/97	3/5/97
total dissolved solids -- State should re-evaluate the TDS standards	Review TDS information on other states, Canada, DEC paper, and DPA TDS research ... look at differences between WQS and DW regs, review in-state TDS studies ... report results and recommendations for TDS changes to consider regs changes.	5/15/97	6/5/97
compliance schedules -- change regulations to allow DEC and/or EPA to enter into water quality compliance schedules in permits	Review court decisions on need for compliance schedule language in standards and propose language for regulation change.	2/3/97	2/28/97
National Toxics Rule -- Alaska needs to get out from under the NTR	DEC to discuss approaches with EPA and make appropriate request, after conceptual approval given.	12/19/96	letter signed by Commissioner
303(d) Listing -- develop science-based criteria and guidelines for adding and removing streams from the listing of impaired water bodies	Review federal and other states regulations and guidance ... develop guidance document for Alaska.	4/22/97	5/6/97
Arsenic -- State should adopt its own human health criteria	Petition EPA for exemption during interim period of EPA research, allowing Alaska standard to be in effect.	Advised @ 12/19 meeting	ongoing Commissioner discussions w/EPA
acute toxicity -- consider an acute whole effluent toxicity criterion for effluents	Review and report on whole effluent toxicity information and make recommendations for changes.	2/1/97	2/15/97
pH -- re-evaluate the State's pH criteria	Review regulations and resolve discrepancies with State and federal regulations.	2/14/97	3/5/97
non-indigenous species -- address this issue and consider adopting WQS to protect State waters from such a threat	Assemble information about the issue and consult with federal agencies on situation ... make recommendations.	1/20/97	2/21/97

wqwglist.wpd (2/18/97)

WQS Review Process



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Alaska State Legislature

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COMMITTEES

CO-CHAIR
Resources Committee

MEMBER
Transportation Committee
Labor & Commerce Committee

SSHB 128
SPONSOR STATEMENT

"An Act relating to water quality; directing the Department of Environmental Conservation to conduct water quality research; establishing the Water Science Oversight Board; and providing for an effective date."

HB 128 provides a mechanism for DEC to form partnerships with interested parties to seek funding for water quality research for the state of Alaska leading to improved water quality regulations. The bill establishes a temporary Water Science Oversight Board to oversee the research.

The goal of this bill is to the greatest extent possible, substitute science for the emotion and political debate that characterizes consideration of water quality regulations. The Alaska Science and Technology Foundation has expressed interest in funding such research, but will only accept applications from a public agency if it is in partnership with private organizations.

Another potential source of funding would be federal dollars. Without such research to provide scientific backing, the Environmental Protection Agency will not accept changes to Alaska's water quality regulations to reflect Alaska specific conditions.

The Water Science Oversight Board which will oversee this research is to be composed of the department commissioner or a commissioner's designee and four additional members, each of whom has academic credentials and Alaska-based expertise in the field of water quality. The board will expire at the end of the five year research program.

HB 128 will lead to continued protection of Alaska's clean waters while encouraging responsible economic development in the state. I urge the support of the committee on this bill.

Council of Alaska Producers

PO Box 22653 Juneau, Alaska 99802

March 24, 1997

Alaska State Legislature
House of Representatives
c/o Rep. Bill Hudson
Co-Chair, Resources Committee

Dear Members of the House Resources Committee

On behalf of the Council of Alaska Producers I urge your support of HB 128, the water research bill. The Council of Alaska Producers is a non-profit organization composed of all the major mining companies working in Alaska. Our members are:

Alaska Gold Company
American Copper & Nickel Company, Inc./INCO
Coeur Alaska, Inc.
Cominco Alaska, Inc.
Echo Bay Mines
Fairbanks Gold Mining, Inc.
Greens Creek Mining Company
Kennecott Exploration
Nevada Goldfields, Inc.
Newmont Mining Corporation
North Pacific Mining Company/CIRI
Placer Dome, U.S., Inc.
USMX, Inc.

We believe mining can be a bright growth industry for Alaska, but like other natural resource industries, our future depends on environmental regulations that protect Alaska's air and water while allowing responsible development.

Under the provisions of the federal Clean Water Act, when DEC changes a water quality regulation it must submit that regulation to the Environmental Protection Agency. The EPA is then required to examine both the public process and the science behind the regulation change. If EPA finds either the public process or the science lacking, it is required to promulgate substitute federal regulations.

We believe HB 128 encourages the scientific research necessary to allow DEC to consider the most appropriate water quality regulations for Alaska. HB 128 provides a framework for DEC to form partnerships with interested parties to seek funding for water quality research leading to improved water quality regulations and it temporarily establishes a Water Science Oversight Board to oversee the research.

We believe HB 128 will lead to continued protection of Alaska's clean waters while encouraging responsible economic development in the state. I urge the committee's support on this bill.

Sincerely,

David G. Stone

David Stone
President

FISCAL NOTE

STATE OF ALASKA
1997 LEGISLATIVE SESSION

BILL NO. SSHB 128

Revision Date:
Title: An Act relating to water quality; directing DEC to conduct water quality research...
Sponsor: Representative Hudson
Requestor: House Resources Committee

Department Affected: Environmental Conservation
BRU: Air & Water
Component: Water Quality 2062

COMPONENT SERIAL NO. 2062

Expenditures/Revenues: (Thousands of Dollars)

OPERATING EXPENDITURES	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03
PERSONAL SERVICES	100.0	100.0	100.0	100.0	100.0	100.0
TRAVEL	16.0	16.0	16.0	16.0	16.0	16.0
CONTRACTUAL	28.7	28.7	28.7	28.7	28.7	60.5
SUPPLIES	0.5	0.5	0.5	0.5	0.5	0.5
EQUIPMENT	0.0	0.0	0.0	0.0	0.0	0.0
LAND&STRUCTURES	0.0	0.0	0.0	0.0	0.0	0.0
GRANTS,CLAIMS	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL OPERATING	145.2	145.2	145.2	145.2	145.2	177.0
CAPITAL EXPENDITURES	0.0	0.0	0.0	0.0	0.0	0.0
CHANGE IN REVENUES ( )	0.0	0.0	0.0	0.0	0.0	0.0
FUND SOURCE						
1002 Federal Receipts	0.0	0.0	0.0	0.0	0.0	0.0
1003 GF Match	0.0	0.0	0.0	0.0	0.0	0.0
1004 GF	145.2	145.2	145.2	145.2	145.2	177.0
1005 GF/Program Receipt	0.0	0.0	0.0	0.0	0.0	0.0
1006 GF/MHTIA	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	145.2	145.2	145.2	145.2	145.2	177.0

Estimate of any current year (FY97) cost: $ 0.0

POSITIONS:

FULL-TIME	1	1	1	1	1	1
PART-TIME	0	0	0	0	0	0
TEMPORARY	0	0	0	0	0	0

ANALYSIS: (Attach a separate page if necessary.)

See attachment

Prepared by: Carl Schrader
Phone: 465-5307
Division: Air & Water Quality
Date: 3/24/97

Approved by Commissioner:
Agency: Department of Environmental Conservation
Date: 3/24/97

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Attachment to Fiscal Note, SSHB 128

The break out of the fiscal note for SSHB 128 includes costs to the department associated with developing one research plan per year, administering the Water Science Oversight Board (board) and legal costs associated with the proposed regulation package. These costs do not include funding the research detailed in the research plan.

DEC Staff Position

One full-time Environmental Specialist III position would be required to: develop and finalize the research plans; administer the board; administer the grant to fund the research; hire a contractor to perform the research; and administer and manage the research contract. Developing the research plan will involve working with technical experts in the department, industry, the board, and the public to determine the highest priority issue to research; develop the technical scope of the work; and detail the products required from the research. Many technical issues are likely to arise during the course of the research that will need direction and resolution by department staff to assure that goals of the research plan are met. Besides the personal service costs, annual costs include travel costs (meetings with contractors to supervise the research contract, meetings with interest groups, etc., and one out-of-state trip for technical meeting/training) and contractual costs (peer review of research results, public notices, copying, and other costs associated with holding public meetings):

Line 100	Personal Services:	1 FTE (Environmental Specialist III)	$100,000
Line 200	Travel:	4 trips to Anchorage @ $600 1 out-of-state trip @ $1,600	$4,000
Line 300	Contractual:	public notices, copying, meetings, peer review, etc.	$9,500
Line 400	Supplies		$ 500
Line 500	Equipment		$ 0
TOTAL STAFF COSTS PER YEAR			**$114,000**

Board Expenses

Four public members would be eligible for reimbursement for board work at $400/day. Assumes that each member would attend four meetings per year in Juneau, with each meeting being two days, plus 1 day to prepare for each meeting.

Each member: 4 meetings X 3 days X $400/day = $4,800 ea.
Contractual Costs (4 x $4,800) = $19,200

Board Travel: Four meetings per year in Juneau
Airfare: 4 people X 4 trips X $450 (Anch/Jnu) = $7,200
Per diem: 4 people X 4 trips X 2 days @ $150 = $4,800
Travel Costs = $12,000

Legal Services

With the promulgation of a presumably large package of new regulations in FY 03, additional legal resources would be necessary. The Department of Law anticipates needing approximately 1/4 of an attorney's time, 317 hours, at a cost of $31,755. The cost estimate is based on the department's FY 97 standard attorney cost schedule ($87/hr) and includes the clerical support, communications, space, supplies, data processing, and other normal overhead expenses. Funding would be through a reimbursable services agreement with DOL.

Contractual Costs for Legal Services $31,755

HB 128

ACWA

Alaska Clean Water Alliance
Conservation Fishing Subsistence Tourism Public Health
Box 1441 Haines, Alaska, 99827 Phone (907) 766-2296 FAX - 2290 E-mail <acwa@seaknet.alaska.edu

2/17/97

Re: HB 128

Dear Representative Hudson and Members of the House Resources Committee,

The Alaska Clean Water Alliance is a statewide non-profit organization dedicated to the protection of Alaska's waters and watersheds.

Mr. Chairman, ACWA agrees with your findings that the State has a responsibility to protect the natural aquatic resources of the State, and that sound science should be the foundation of the State's resource management policies. We do not believe however that this legislation will result in the achievement of prudent management policies, or the establishment of toxics criteria that will adequately protect human health or the environment.

Our concerns with HB 128 can be summarized as follows:

We do not believe that the legislature should write the State's Water Quality Standards. Under 46.03.083 (b), (c), and (d), the responsibility for drafting the State's standards for mixing zones, arsenic, dissolved solids, site-specific criteria, toxicity testing, and reclassification are shifted from ADEC, an agency of scientists and natural resource policy managers, to the legislature, a body of politicians.

This adoption of ADEC's duties by the Legislature sets a significant and very negative precedent for the State.

When ADEC proposes regulations, they are reviewed and commented on by a broad cross-section of the public, including State and federal scientists with no financial stake in the results of the rule making. In contrast, this legislation was drafted behind closed doors with no public process. The proposed changes in the standards listed above are a wish list for regulatory relaxation requested by a subset of the State's natural resource extraction community. This bill ignores fundamental principles of the Clean Water Act, hamstrings State regulators from accomplishing appropriate and necessary monitoring and enforcement duties, and eliminates years of significant and prudent public input by thousands of Alaskans concerned about toxic pollution.

These are very serious issues that will effect the health and welfare of this generation and of generations to come. A few hearings, with brief testimony by

invitation, is grossly inadequate to do justice to the debate that should accompany such sweeping reforms.

In fact, this bill is a reflection of the failure of some of the State's major polluters to convince the public over the past five years that major relaxation of the State's regulations governing toxic discharges were defensible, prudent for the protection of human health and aquatic life, or necessary for the maintenance of the State's economy.

This legislation will in the end also be unsuccessful because it is inconsistent with State and federal law. If it accomplishes anything, it might be to initiate the beginning of the end of the State's primacy over the Water Quality Standards program. If Alaska cannot manage the WQS program consistent with the Clean Water Act, the Federal government will have no choice but to administer the setting of standards for us. I doubt that there are many people in the State who wish to see this occur.

As to the second portion of this bill, the establishment of a Water Science Oversight Board:

As proposed, this Board has too few members, and represents too narrow a sector of the public. It will be inadequate to represent the breadth of constituencies and public concerns that have every right to be involved in any open and fair analysis of the policies governing the release of toxic chemicals into public waters.

In conclusion, we must urge the committee to reject this legislation.

Gershon Cohen

Gershon Cohen
Executive Director

FISCAL NOTE

STATE OF ALASKA
1997 LEGISLATIVE SESSION

BILL NO. SSHB 128(

Revision Date: -
Dept. Affected: Department of Law
Title: "An Act relating to water quality; directing the
BRU: Civil Division
Department of Environmental Conservation to conduct . . .research . . .
Component: Environmental Law
Sponsor: Representative Hudson
Requester: House Resources Committee
COMPONENT SERIAL NO. 2092

Expenditures/Revenues (Thousands of Dollars)

OPERATING EXPENDITURES	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03
PERSONAL SERVICES						26.9
TRAVEL						0.4
CONTRACTUAL						4.0
SUPPLIES						0.5
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	31.8
CAPITAL EXPENDITURES						
CHANGE IN REVENUES ( )						

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts						
1003 GF Match						
1004 GF						
1005 GF/Program Receipts						
1006 GF/MHTIA						
1007 Interagency Receipts						31.8
TOTAL	0.0	0.0	0.0	0.0	0.0	31.8

Estimate of any current year (FY97) cost: $ 0.0

POSITIONS

FULL-TIME	0.0	0.0	0.0	0.0	0.0	0.0
PART-TIME						
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

HB 128 directs the Department of Environmental Conservation (DEC) to conduct research and adopt new regulations based on that research in order "to reconcile the sometimes conflicting demands of protecting water quality and encouraging the economic use of the state's water." Research results must be submitted to the Water Science Oversight Board for review and recommendation by June 30, 2002. After the Board's recommendations are received, the regulations development process would begin. Under the bill, the regulations proposed and adopted would be part of one process, with the same effective date for all.

The Department of Law anticipates no fiscal impact from this bill until FY 03. With the promulgation of a presumably large package of new regulations all at once, some additional legal resources would be necessary. While it is somewhat speculative to project what might be necessary in the fall of 2002, the department anticipates needing approximately 1/4 of an attorney's time, 375 hours, at a cost of $31,755. Funding would be interagency receipts from a reimbursable services agreement with DEC.

Prepared by: Joan M. Kasson — Phone: 465-5370
Division: Administrative Services Division — Date: 3/20/97

Approved by Commissioner: Bruce M. Botelho, Attorney General — Date: 3/20/97
Agency: Department of Law

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STATE OF ALASKA
1997 LEGISLATIVE SESSION

BILL NO. SSHB 128

ANALYSIS CONTINUATION:

The cost estimate is based on the department's FY 97standard attorney cost schedule ($87/hour) and includes clerical support, communications, space, supplies, data processing, and other normal overhead expenses.

Alaska State Legislature

REPRESENTATIVE BILL HUDSON

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COMMITTEES

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Resources Committee

MEMBER
Transportation Committee
Labor & Commerce Committee

SSHB 128
Sponsor's Sectional Analysis
Water Science Board: Water Quality Research

"An Act relating to water quality; directing the Department of Environmental Conservation to conduct water quality research; establishing the Water Science Oversight Board; and providing for an effective date."

The history of water quality standards in Alaska has at times been a painful one, marked by emotional and political battles. The goal of House Bill 128 is, to the greatest extent possible, provide for scientific research to serve as the basis for future discussions and decisions on water quality standards and criteria. Section 1 of the bill, Findings and Intent, sets forth this goal.

Section 2, AS 46.083.082 of the bill instructs the Department of Environmental Conservation to work cooperatively with interested parties affected by water quality regulations to seek funds to perform water quality research. The Council of Alaska Producers has approached the Department of Environmental Conservation and proposed a joint application to the Alaska Science and Technology Foundation to fund research in the procedures for whole effluent toxicity (WET) testing as a first step in this research.

ASTF has expressed keen interest in funding such research, but will not provide funding to a public agency without a private partner. ASTF is willing to accept multiple applications for different aspects of water quality research. If the application for ASTF funding is not successful, federal funds will be considered for this proposal. The department could contract with the University of Alaska or other appropriate entities and individuals to carry out this research.

AS 46.03.083 requires the department, after receiving the results of the research and consulting with the Water Science Oversight Board, to propose water quality regulations.

AS 46.03.085 (a) temporarily establishes a Water Science Oversight Board composed of the Commissioner or her designee and four additional members, each of whom has academic credentials and Alaska based expertise in the field of water quality.

(b) establishes compensation for those board members who are not public employees, and sets forth the board's duties.

Sec. 3. Timelines for Actions -
(a) The department must submit to the Water Science Oversight Board at least one research plan by October 1, 1997.
(b) The department shall adopt the interim regulations required by AS 46.03.083 (b) by December 31, 1997.
(c) The department shall submit its research results to the board by June 30, 2002.
(d) AS 46.03.082 (research plans), and .085 (Water Science Oversight Board) are repealed on the effective date of regulations adopted as a result of the research process.

MAR 1 4 1997

LEGAL SERVICES

DIVISION OF LEGAL AND RESEARCH SERVICES
LEGISLATIVE AFFAIRS AGENCY
STATE OF ALASKA

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Juneau, Alaska 99801-2105

MEMORANDUM March 14, 1997

SUBJECT: Appointment of Members of the Water Science Oversight Board (HB 128)

TO: Representative Bill Hudson
Attn: Marieke

FROM: Terri Lauterbach
Legislative Counsel

You have asked me to review a March 4, 1997, memo from James Baldwin, Assistant Attorney General, to Al Ewing, Deputy Commissioner of DEC, concerning the proposed membership of the Water Science Oversight Board that would be established by HB 128. Mr. Baldwin suggests that the way HB 128 sets the parameters for the composition of the board violates the separations of powers doctrine because the legislature would be infringing upon executive functions.

In my opinion, there's a very good chance that a court would not agree with Mr. Baldwin's suggestion because this board would have only an advisory role, no power to execute or enforce a law. Since no executive function would be exercised by the board, I believe a court could easily find that strict parameters for its composition would not encroach on an executive function.

As Mr. Baldwin notes, there is no Alaska case directly on point, so the issue is still an open one. If you want the safest course of action, then the governor should make all of the appointments without being restricted to a slate of candidates. However, I think the composition of the board is quite defensible as long as the bill is not changed later in the legislative process to give the board more than an advisory role.

If you [illegible] additional [illegible] let me know.

TML:jdr:gle
97-177:jdr

Arsenic Criteria for the Protection of Human Health

Introduction and Summary:

The purpose of this paper is to give the outlines of why the Department of Environmental Conservation should promulgate regulations containing an expressly-designated human health criterion for arsenic at the 50 micrograms/liter level. This criterion, identical to the current drinking water standard, is protective of human health and, if promulgated as recommended here, would put the State of Alaska in a better legal position to request that EPA rescind the unworkable and unnecessary arsenic criteria that EPA has imposed in Alaska. In a nutshell, the idea is that promulgating an expressly-designated human health criterion for arsenic would create a more explicit state policy supported by a public rulemaking record, thus making it harder for EPA to ignore, dismiss, or refuse to implement Alaska's considered choice.

Explanation and History:

In 1987, Alaska adopted the last set of water quality standards that were approved by EPA. For toxics such as arsenic, those regulations adopted EPA numeric water quality criteria by reference and, if EPA criteria did not exist for a particular substance, required use of the drinking water standard for that substance. For arsenic, it turned out that EPA had not yet promulgated numeric human health criteria. Accordingly, for fresh water uses Alaska adopted the drinking water standard of 50 micrograms/liter. For salt water uses, the more stringent EPA chronic aquatic life criterion (36 micrograms/liter) was adopted.

Also in 1987, Congress passed an amendment to the Clean Water Act addressing toxic substances. In essence, the amendment required states to adopt "specific numerical criteria" for toxic pollutants as necessary to support designated uses. Congress also gave EPA the authority to promulgate such numeric criteria for any state that failed to do so.

Shortly thereafter, EPA began a review of water quality standards nationwide to determine which states were in compliance with the newly-amended Clean Water Act. In 1992, the agency promulgated the National Toxics Rule (NTR), determining in the process that Alaska's numeric arsenic criterion for the protection of human health was not adequate. The agency's stated reason was that states (such as Alaska) that have adopted criteria based on water consumption (the drinking water standard) do not have standards that are sufficiently protective of human health because the drinking water standard does not consider exposure to arsenic through fish consumption. Accordingly, EPA imposed human health criteria for arsenic on Alaska at levels of .18 micrograms/liter for fresh water (calculated based on exposure through drinking water as well as fish consumption) and 1.4 micrograms/liter for salt water (calculated based on fish consumption only).

Since 1992, the science EPA used to derive the above numbers has come under increasing attack. EPA's own Office of Science and Technology has concluded that EPA's human health criteria need to be reevaluated, and has recommended that the drinking water standard of 50 micrograms/liter be used as an "interim value for protection of human health." Based on this recommendation, EPA Region III recommended that Pennsylvania use the 50 micrograms/liter criterion in lieu of its proposed .02 micrograms/liter criterion for water and organism consumption.

One of the chief reasons EPA's NTR numbers do not make sense is that the fish consumption pathway for arsenic ignores a critical distinction between the chemistry of various arsenical forms. There is a growing body of evidence that the organic forms of arsenic found in fish and other aquatic life do not pose the carcinogenic risks posed by inorganic arsenic commonly found in drinking water. As a consequence, there appears to be little value in considering fish consumption when setting human health criteria for arsenic. Thus, there is no justification for a number other than the 50 micrograms/liter number already used for drinking water to protect human health. (Of course, Alaska's more

stringent 36 micrograms/liter number for the protection of aquatic life in saltwater would control for marine water uses, since it is more stringent.)

Where Do We Go From Here?

Although EPA Region 10 is rumored to be opposed to a 50 micrograms/liter human health number, and may not approve such a number, Alaska could enhance the likelihood of EPA approval by expressly stating by regulation that the criterion for protection of human health is 50 micrograms/liter. Such a regulation, and the accompanying public record discussing the science justifying the regulation, would make it much harder for EPA to refuse to approve the criterion. EPA has stated that:

> EPA will withdraw the Federal rule [The NTR] without a notice and comment rulemaking when the state adopts standards no less stringent than the federal rule (i.e., standards which provide, at least, equivalent environmental and human health protection).

57 FR 60848, 60860. This language is critical. EPA imposed its very low arsenic numbers in order to protect against arsenic from fish consumption. If fish consumption is irrelevant to human health protection, than a standard based on water consumption (the 50 micrograms/liter drinking water standard) provides the same level of human health protection as EPA's number and is "no less stringent" by EPA's own definition.

Even if the 50 micrograms/liter number is considered less stringent than EPA's lower numbers, EPA can still approve the standard if it "fully meets the standards" of the Clean Water Act. 57 FR 60868, 60860. The science suggests that the 50 micrograms/liter standard currently in effect in Alaska is protective of human health uses as the CWA requires, but EPA has so far refused to acknowledge this. The value of a regulation aimed directly at arsenic is that such a regulation

will take away EPA's last excuse. If the State of Alaska says "This is our arsenic criterion for protection of human health, and here is the science behind our choice," EPA can be forced (judicially if necessary) to evaluate the criterion. If the agency refuses to approve it, the refusal will also be subject to judicial review.

To be sure, explicit promulation of the arsenic number as a human health criterion (as opposed to the current adoption by reference) may not make a substantial legal difference. However, it will make a substantial practical difference, because it will create an administrative record on the science that EPA cannot ignore. Currently, EPA can say with some justice that the State of Alaska promulgated (adopted by reference) the current number without considering the human health implications of fish consumption in detail. Once Alaska says "we considered the implications and here is our choice" EPA will have a much harder time ignoring DEC's position.

Accordingly, DEC should be urged (or, if necessary, required) to adopt the 50 micrograms/liter number for arsenic, and to expressly identify the number as the criterion for protection of human health.

FACT SHEET
ARSENIC HUMAN HEALTH CRITERIA
Division of Air & Water Quality
Department of Environmental Conservation
June, 1996

The U.S. Environmental Protection Agency (EPA) is currently re-evaluating the human health criteria established for arsenic under the federal National Toxics Rule. The National Toxics Rule applies in Alaska, which means that numeric limits for arsenic are taken from the Rule when making decisions that require a federal wastewater permit. The Alaska Department of Environmental Conservation (ADEC) is recommending to EPA that the federal limitations be put on hold until EPA is able to scientifically validate a numeric criteria for arsenic. In the interim, the State suggests that the current state-adopted water quality standards for arsenic be applied in permitting decisions for Alaska. The following information provides background facts on arsenic and related human health criteria.

How is Arsenic found in the environment?

*Arsenic is naturally present in the earth's crust and is found in all living organisms.

* Nationally, the Environmental Protection Agency (EPA) estimates that about 89 percent of arsenic input into the environment comes from industries that use arsenic in their process: smelters, glass manufacturing and in pesticides for grapefruit, grapes, and cotton crops. The remaining 11 percent comes from naturally occurring sources.

* In Alaska, naturally occurring arsenic is found throughout the state in soils and water. Alaska's geologic terrain contains precious metals which are commonly associated with arsenic. For example, Fairbanks, Alaska, has some of the highest documented natural levels of arsenic in the nation, with arsenic levels measured at up to 10,000 parts per billion in wells and up to 4000 parts per billion in stream sediments. By comparison, up to 50 parts per billion is typically considered a safe drinking water level for arsenic.

What are health risks from arsenic in Alaska?

* Since Alaska does not have industries introducing arsenic into the environment, Alaskans face risk of arsenic exposure principally from naturally occurring sources. Alaska does have industries that cause resuspension of sediment that has natural arsenic attached to it.

* To protect human health and aquatic life, Alaska has adopted and used the drinking water Maximum Contaminant Level (MCL) of 50 parts per billion for arsenic since 1979 and the aquatic life criteria of 36 parts per billion for arsenic since 1985, based on human health criteria recommended by EPA at that time.

* Under the federal Safe Drinking Water Act, public drinking water supply systems in Alaska must currently meet the arsenic limit of 50 parts per billion for protection of public health.

* Two comprehensive studies conducted in Fairbanks in 1976 and 1979 concluded that there was no evidence of toxic effects from arsenic in the exposed population. Researchers recommended that the drinking water standard of 50 parts per billion for fresh water was both conservative and protective of human health. The studies were conducted by the Center for Disease Control and EPA.

What is the Problem with Human Health Criteria established by EPA for arsenic?

* In 1992, EPA imposed the National Toxics Rule on Alaska and other states, which included a human health criteria limit for arsenic. These imposed criteria are used to set limits for both monitoring and permitting of industrial wastewater discharges through the "National Pollutant Discharge Elimination System" (NPDES).

* The criterion limit in the National Toxics Rule for arsenic in fresh waters is 0.18 parts per billion and is much lower than many areas in Alaska with naturally occurring arsenic. The criterion for salt waters is 1.4 parts per billion and is the same as the natural amount of arsenic found in many of Alaska's salt waters.

* ADEC has expressed concerns with the National Toxics Rule limits for arsenic. These limits are many times lower than the state and federal drinking water standard. Levels of naturally occurring arsenic in Alaska often exceed the National Toxics Rule limits. There is also no evidence to suggest that these restrictive limits provide added protection or benefit to aquatic life or human health. Other states have expressed equal concerns with the low numbers in the National Toxics Rule.

* Since the imposition of the National Toxics Rule, EPA's Science Advisory Board has raised concerns about the data and research used by EPA to set the human health criteria for arsenic, and questioned the scientific defensibility of the extremely low limits imposed by the Rule. In February 1995, the Assistant Administrator of EPA acknowledged the uncertainties involved in the regulation of arsenic, and indicated that EPA would reassess the information used to determine health effects before establishing drinking water criteria for arsenic.

What Action Is the State Requesting for Arsenic?

* ADEC is requesting that EPA's Region 10 (based in Seattle, WA) develop an interim solution for the State of Alaska to deal with permit issues relating to human health criteria for arsenic. ADEC believes a logical interim measure would be for EPA to suspend imposition and enforcement of the Toxics Rule criteria for arsenic, pending EPA's final decision on the validity of that number, and use the state-adopted arsenic standards in the interim. These numbers are currently used in state permitting decisions involving arsenic, and are defensible.

How can I get more information on this issue?

Contact the Water Quality Protection Section of DEC in Juneau at 465-5310 for more information on arsenic and other issues relating to water quality.

3

TONY KNOWLES, GOVERNOR
410 Willoughby Ave., Ste 105
Juneau, AK 99801-1795
PHONE: (907) 465-5065
FAX: (907) 465-5070
http://www.state.ak.us/dec/home.htm

DEPT. OF ENVIRONMENTAL CONSERVATION
OFFICE OF THE COMMISSIONER

May 31, 1996

Mr. Chuck Clarke
Regional Administrator
EPA Region 10
1200 Sixth Avenue
Seattle, Washington 98101

Dear Mr. Clark:

The human health criteria standard for arsenic, as promulgated in the National Toxics Rule, presents an ongoing dilemma for permitting Alaska operations due to the high levels of naturally occuring arsenic in Alaska waters. The governing state water quality standards for arsenic are 50 ug/l for fresh water (derived from the drinking water MCL), and 36 ug/l for salt water (the aquatic life criterion). However, EPA determined in 1992 that the state standard was superseded by the National Toxics Rule, resulting in an arsenic criteria of .18 ug/l. See 40 CFR §131.36. The method detection limit is .5 ug/l.

In 1994, EPA's Science Advisory Board questioned the data and research used by EPA to set the human health criteria for arsenic, and questioned the scientific validity of the extremely low limits imposed by the Rule. Since then, EPA has acknowledged a need to reevaluate the arsenic criteria, and Region III advised Pennsylvania to use the MCL of 50 ug/l as an interim value. The State of Alaska has followed the debate on arsenic with great interest, and had anticipated a decision from EPA Headquarters by November of 1995. We attempted to put arsenic decisions on hold pending EPA's updated position.

I am writing now to request that Region X adopt an interim solution for the State of Alaska, since a decision on arsenic has not been issued from EPA headquarters and we can no longer hold up decisions affected by the arsenic criteria. The human health criteria for arsenic currently in the National Toxics Rule is scientifically indefensible. It simply does not make sense to continue to impose criteria on Alaska that EPA won't defend, and that the Science Advisory Board cannot support.

This is particularly true when it creates a situation where an operator cannot discharge intake water even though no constituents are added to the wastewater. We have reviewed the arsenic criteria adopted by other states and have found that several states have adopted 50 ug/l for human health criteria. Furthermore, we are aware of several states which have human health criteria for arsenic based on the Toxics Rule number and are seeking relief (e.g. Pennsylvania, California). In our view, a logical interim measure would be for Region X to suspend imposition and enforcement of

the Toxics Rule criteria for arsenic, pending EPA's final decision on the validity of that number, and use the state-adopted arsenic standards in the interim. These numbers are currently used in state permitting decisions involving arsenic, and are defensible.

We are preparing a fact sheet on arsenic which will describe in more detail the basis for recommending that the current State-adopted standards for arsenic apply during the interim. I know that you are familiar with the problem, and I trust that we can expeditiously resolve this issue. I will call you to set up a teleconference to discuss this further.

Sincerely,

Michele Brown
Commissioner

SB/MB/sl (G:\COMMMS\WORDPROC\ARS-FIN.WPD)

cc: Phil Millam, Acting Director, Office of Water, Seattle
Len Verrelli, AWQ Director, ADEC, Juneau

Bob Perciasepe letter

Best copy available

703 416 [illegible]

Attn: John S [illegible]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 8 1995

FILE COPY

OFFICE OF WATER

MEMORANDUM

SUBJECT: Arsenic Decision

FROM: Robert Perciasepe
Assistant Administrator

TO: Addressees

I appreciate the time and helpful input from you and your staffs as I made the difficult decision on how to proceed with the drinking water standard for arsenic.

As became apparent during our deliberations, there are many issues and uncertainties involved in the regulation of arsenic. Given the potentially very high cost of this rule, I believe it most prudent for the Agency to get as much information as reasonably possible to accurately quantify the health effects and to assess the possible technologies which could be applied to implement the rule. The level of uncertainty in the current risk assessment justifies additional research before we impose the substantial costs [illegible] lower than the current standard of 50 ug/l. The standard to which the Agency is being held for the adequacy of both risk and cost assessments is higher now than in the past. Therefore, I have decided to request a deferral in the November 1995 court ordered proposal date in order to provide time for additional information to be developed.

In drinking water, the principle health effects of arsenic, at levels we are likely to see, are long-term chronic effects. Thus, the risk increases as exposure accrues. I believe the incremental risk resulting from a delay of a couple of years is offset by the benefit of research to reduce the uncertainty of our risk assessments and provide further data on treatment technologies. If insufficient progress has been made on the research front in that timeframe, it would be appropriate to proceed with rulemaking rather than wait for open-ended research results.

My staff will be working with key Agency staff to develop a plan to obtain the information and to develop a new schedule for the rule. Without question, most of the funding for the additional research will need to come from outside the Agency since our own funding limitations preclude substantial Agency investment. I have been assured that outside parties will help fund the necessary work. We will be formalizing those commitments of support.

In the interim, it is important that we recognize that some people have been exposed to high arsenic levels for a long time. I believe it is important that the current standard be enforced to assure that these people are protected from high arsenic levels. I encourage all of you to help communicate the importance of compliance with the existing arsenic standard.

Addressees:

Mary D. Nichols, OAR
Steven A. Herman, OECA
Jean C. Nelson, OGC
David M. Gardiner, OPPE
Lynn R. Goldman, OPPTS
Robert J. Huggett, ORD
Elliott P. Laws, OSWER
John P. DeVillars, Region 1
Jeanne M. Fox, Region 2
Peter H. Kostmayer, Region 3
John Hankinson, Jr., Region 4
Valdas V. Adamkus, Region 5
Jane N. Saginaw, Region 6
Dennis D. Grams, Region 7
William P. Yellowtail, Region 8
Felicia Marcus, Region 9
Charles C. Clarke, Region 10

cc: Regional Water Division Directors
Regional GW and DW Branch Chiefs
Phil Metzger
Mark Luttner
Mahesh Podar
Cynthia Puskar
Cynthia Dougherty
Tudor Davies
Margaret Stasikowski
Peter Cook
Bill Diamond

ALVIN MORRIS Letter

Charles D 7

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107-4431

June 2, 1995

FILE COPY

Dr. Hugh Archer, Ph.D.
Deputy Secretary for Water Management
Department of Environmental Resources
P. O. Box 2063
Harrisburg, PA 17105-2063

Dear Dr. ~~Archer~~ Hugh:

The purpose of this letter is to provide information regarding the United States Environmental Protection Agency's (EPA) current position regarding the human health criterion for arsenic. As you know, EPA was unable to provide an expert witness to defend Pennsylvania's adoption of the human health criterion for water and organism consumption of 0.02 ug/l. We apologize for any impact that this may have had on Pennsylvania's water quality program.

The ambient water quality criterion for arsenic has been the subject of much deliberation within EPA's Office of Water and will be the subject of continuing discussion and research. Given the uncertainties identified in the current risk assessment for arsenic in the drinking water program (e.g. see enclosed memorandum from Robert Perciasepe, Assistant Administrator for Water) and the need for additional data, EPA has decided to reevaluate the existing recommended human health criteria for all programs. We have consulted with staff from EPA Headquarters' Office of Science and Technology and have been advised that during the period of reevaluation of the arsenic criteria, the use of the current Maximum Contaminant Level (MCL) value of 50 ug/l is EPA's current recommended level as an interim value for protection of human health. EPA would also support a risk based management decision by the State to adopt a more stringent criterion.

I hope that this clarifies EPA's position. If you would like any additional information, please feel free to contact me

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at (215) 597-9410 or have your staff contact Evelyn MacKnight at (215) 597-4491.

Sincerely,

Alvin R. Morris, Director
Water Management Division

Enclosure

cc: Tudor Davies, EPA
Daniel Drawbaugh, PADER

9

Agency Faces Court-Ordered Deadline For New Regs

SCIENCE ADVISORS SAY EPA DATA INSUFFICIENT FOR NEW ARSENIC STANDARD

EPA's Science Advisory Board has told the agency that it lacks sufficient data to promulgate a new standard for arsenic in drinking water, a finding that could impede agency efforts to meet a court-ordered deadline for issuing a new standard.

The science advisors are urging the agency to increase its understanding of the relationship between arsenic exposure and cancer risk before finalizing a risk assessment criteria document that will be used to set a new drinking water standard for arsenic. The advisors concede that the agency has enough evidence to support an association between cancer risk and exposure to "high levels" of arsenic, but warn that EPA does not have sufficient data in its quantitative risk assessment to support promulgation of a new arsenic drinking water standard.

The agency is under a court-ordered deadline to propose a new arsenic drinking water standard by September 1994, and to issue a final standard by September 1996. EPA had been under a November 1992 court-ordered deadline to propose a new standard, but negotiated the new deadline in order to consider recent studies on the risks of arsenic to internal organs (Water Policy Report, Feb. 17, p6). The agency, which originally promulgated a 50 micrograms per liter (ug/l) arsenic standard, had previously used skin cancer as its primary health concern in setting the arsenic standard. EPA drinking water staff are reportedly considering a new arsenic standard of between 20 to 2 ug/l.

The SAB drinking water committee made their recommendations in a draft report – *Review of the Draft Drinking Water Criteria Document on Inorganic Arsenic* – on the agency's draft arsenic health criteria documents. EPA uses health criteria documents to set a health effects basis for consideration of drinking water standards.

A key question posed by the advisors is whether the agency can justify using epidemiologic data gleaned from arsenic exposure studies done on a specific population to set an arsenic standard. These studies, conducted on a large population of Taiwanese people, represent the bulk of EPA's data on cancer risks to internal organs from arsenic. The SAB draft review says the studies support the relationship between cancer risks and high levels of arsenic exposure, but question whether they can be used to calculate a limit that would cause harm to U.S. populations.

SAB recommends that EPA "carefully take into account the differences between Taiwanese and U.S. populations, including differences in nutrition and in background blood levels of arsenic in the Taiwanese population." The advisors also recommended that EPA should "reconcile contradictory findings" of a study done on U.S. smelter workers. "The sources of arsenic exposure for the Taiwanese population must be characterized more thoroughly before meaningful estimates of risk from arsenic in drinking water can be prepared for the U.S. population," states the SAB draft review.

Another concern expressed by the advisors is that EPA's draft risk assessment fails to include data from other studies that show that arsenic blood concentrations are only elevated with very high levels of water arsenic. According to the SAB draft report, "[t]hese data suggest strongly that until arsenic levels in water exceed 100 ug/l, water is only a minor source contributing to increased blood levels. The potential implication of these findings is that setting standards for water at a level lower than 100 ug/l would not be expected to significantly change the blood levels and body burden of arsenic in people."

Drinking water suppliers support SAB's findings and warn that the arsenic in drinking water debate will be as contentious as the radon in drinking water debate.

One drinking water supplier characterizes EPA's arsenic rulemaking as "a sleeping giant," noting that most potential arsenic intake comes from food, much as most exposure to radon comes from indoor air. This fact, combined with an incomplete understanding of health risks and potential for large economic impacts, will make the regulation of arsenic an extremely controversial issue, says this source. "Billions and billions of dollars could be expended to correct what may not even be a problem," adds the source.

Another drinking water supplier says the industry agrees with the findings in SAB's report, but fears that EPA may not heed its recommendations. "SAB is strictly an advisory body, so EPA is not bound by their findings," says this source, who adds that because the agency is short on drinking water office resources, and running out of time to conduct additional arsenic research, they will "likely ignore" the SAB

recommendations. This source adds that the public's perception of arsenic "as a known poison" will make it difficult for Congress to intervene in the rulemaking the way it did with EPA's radon rulemaking.

An environmentalist says there is more than enough available data on the risks of arsenic in drinking water to justify promulgation of a lower standard. "If you want to be absolutely certain about the numbers of people dying from cancer because of arsenic in drinking water, then sure, let's do more research," says this source. The environmentalist adds that much of the available data on arsenic in drinking water was derived from studies of human health, not through animal studies, which is the case with many drinking water contaminants.

An EPA official says the drinking water office is "nowhere near" determining whether it has enough information to proceed with rulemaking, but refused to discuss this in relation to rulemaking activities. This source adds that EPA concurs that arsenic in drinking water will be a contentious issue with potential difficulties rivaling those posed by the agency's efforts to regulate radon. It is "naturally occurring, shows up everywhere in levels which the agency is considering regulating, could affect numerous water systems, and could mean tremendous treatment costs," says the official.

According to EPA estimates, lowering the maximum contaminant level (MCL) of arsenic to 20 ug/l would affect an estimated 600 water systems, cost about $140-million in capital costs and about $22-million annually. Lowering the standard to 5 ug/l would affect an estimated 4,850 water systems, and cost about $1.32-billion in capital costs and about $210-million per year. With a 2 ug/l limit, an estimated 12,675 water systems would need treatment, at a capital cost of about $6.22-billion and yearly costs of about $1-billion. Drinking water suppliers consider these cost figures to be "significantly underestimated."

volunteers to assist towns in identifying source waters, and relying on state and local efforts to inform interested parties of opportunities to take voluntary steps to protect the sources. USEPA plans to develop the initiative through partnerships with organizations such as the National Association of Counties and the American Water Works Association. The initiative would begin with efforts in three states, which would be used as a model for other state programs. Currently, agency sources say, source water protection initiatives vary from state to state.

At pressume, agency staff were expected to brief USEPA Water Office chief Robert Perciasepe on the details of the plan in early May.

ARIZONA RELAXES WATER STANDARD FOR ARSENIC BASED ON USEPA DATA

Arizona has proposed relaxing its water quality standard for arsenic based on new USEPA data which indicate that, when it accumulates in fish tissue, the toxic substance is a non-carcinogen. The USEPA "screening value" for arsenic may prod other states to follow Arizona's lead, particularly in Western states with naturally high arsenic levels in water.

In 1995, USEPA established a new screening value for arsenic in fish tissue, which concluded that organic arsenic in fish tissue is not a carcinogen when consumed by humans. Arizona's Department of Environmental Quality took this change as a cue to propose raising its arsenic standard from 3.1 milligrams/liter to 1450 mg/liter. This change could allow for water discharge permits in the state with significantly relaxed arsenic limits, source say.

units are actually micrograms per liter

"Arizona has naturally high background levels of arsenic," a USEPA regional source says, and the state's move to raise its arsenic limits could prompt other Western states to follow suit. Modifying the standard "gives relief to our most stringent standard," an Arizona DEQ staffer says, and the change will "help dischargers meet their permit requirements."

USEPA's Region IX office is expected to approve the Arizona standard shortly.

EXXON FILES 'TAKINGS' CHALLENGES TO ALASKA BAN ON VALDEZ

Arguing that a federal law banning the infamous Exxon Valdez oil tanker from Alaskan waters constitutes a regulatory "taking" of its property, Exxon Corp.'s shipping subsidiary, SeaRiver Maritime, has filed lawsuits in Houston and Washington, D.C., arguing the federal law is unconstitutional.

In the lawsuits filed in March, the plaintiffs are seeking to restore the rights of the Exxon Valdez tanker to sail in Alaska waters. The 1990 Oil Pollution Control Act banned the tanker from Alaska after the March 24, 1989, incident in which the 987-foot tanker spilled more than 11 million gallons of crude oil into Prince William Sound after running aground on Bligh Reef.

Exxon's lawsuit comes as the Senate prepares to debate S. 605, the Property Rights Act, which would change the definition of a "taking" to allow property owners denied any economic use of their property under virtually all federal programs to file for compensation. State and local organizations adamantly oppose such a revision to takings law, fearing a huge economic burden as tax revenues are diverted to pay out takings claims, according to a source with American Resource Information Network, a coalition of state, local, environmental, union, and other interests that have banded together to oppose the Senate bill and a comparable bill already passed in the House.

The Exxon Valdez was renamed the Mediterranean Sea and now carries oil from Egypt to other nearby countries, but SeaRiver Maritime cannot make much money, according to the company's vice president, Pete Rupp, because the Jones Act requires American crews, whose higher wages make the vessel's operation uncompetitive. To make the vessel more competitive, the company had applied for a $1 million year subsidy two years ago, but was turned down and decided to go to court to get sailing rights in Alaska.

NEW HAMPSHIRE RCRA INSPECTION STRATEGY SEEKS TO MAXIMIZE RESOURCES

The New Hampshire Department of Environmental Services has launched a risk-based Resource Conservation & Recovery Act inspection targeting program that state agency staff say will help the department protect key water resources while maximizing use of the state's resources.

According to state sources, DES is now focusing its RCRA inspections on companies in wellhead protection areas, with an eye in particular toward those companies that handle chlorinated solvents. In the future, DES staff say, the department is likely to shift its focus toward facilities in key watershed areas, and staff say the department is also considering taking a closer look at facilities that are located near schools.

DES staff say New Hampshire has had to reduce its number of RCRA inspections because of dwindling resources; the targeted RCRA inspection strategy will help ensure that the most significant threats from RCRA facilities are still monitored. In addition, state staff say the department has stepped up its use of "fenceline" inspections, where DES looks quickly at a facility to judge its potential for non-compliance before launching a full inspection. If the facility appears on its face to be in compliance, the department will likely move on to another company. "If it looks good on the outside, we'll move on to the next guy," a DES source says, explaining that these "screening" inspections allow the department to cover more facilities with less resources.

One unique provision of New Hampshire's RCRA inspection strategy, state staff say, is that DES gives local communities reports detailing information gleaned from facility inspections. While not much has come of the reports to date, state sources say, DES hopes that towns can use this information to foster continued compliance. "A town can take a report and run with it," a state source says, "If they see that a facility has a clean bill of health, the town can try to maintain compliance."

SIX STATES DEVELOPING ENVIRONMENTAL TECHNOLOGY APPROVAL SYSTEM

Six states are planning to sign a new agreement in June to develop and exchange data on a dozen environmental technologies in hopes of ultimately developing a joint certification system for new technologies.

The EPA has established a new human health screening value (SV) for arsenic in fish tissue that considers only the inorganic fraction, rather than total arsenic (USEPA, 1995). This change in how arsenic is considered is due to the probability that organic arsenic is an order of magnitude less toxic and teratogenic than the inorganic form (Marcus and Rispin, 1988). The new SV also does not consider a carcinogenic endpoint in its calculation. This change only applies to the consumption of fish tissue, and not the consumption of water.

For non-carcinogens the EPA recommends that the fish tissue screening values be calculated according to the following equation:

$SV = (RfD \times BW)/CR$

where, SV = Screening value (mg/kg; ppm)
RfD = Oral reference dose (mg/kg/d)
BW = Mean body weight of the general population (kg)
CR = Mean daily consumption rate over a 70 year lifetime (kg/d)

For the fish consumption water quality standard ADEQ uses the same equation, but incorporates a bioconcentration factor (BCF) to address the concentration of a toxicant in tissue above that in the water column:

$SV = (RFD \times BW)/(CR \times BCF)$

where, BW = 70 kg
CR = 0.0065 kg/d for 70 year lifetime

Currently, ADEQ calculates the FC standard on the basis of its classification for this use as a carcinogen. Because EPA is publishing new information that changes the status for arsenic for the consumption of tissue from carcinogen to non-carcinogen, ADEQ appropriately should change the method of calculation of the fish consumption standard from carcinogen to non-carcinogen. Explicit in the EPA decision is the fact that arsenic in tissue is at least 90% comprised of organic arsenic (USEPA, 1993). This fact coupled with the low assumed consumption rate for fish tissue (6.5 g/D) and the strong probability of non-linear carcinogenic dose response curve, having a low slope at low dose (where most of the dose is methylated) and a high slope at high dose (where methylation capacity is saturated) (USEPA, 1993) favors this change.

Because there is a possibility of some inorganic arsenic in fish tissue, ADEQ proposes to calculate the new FC arsenic standard according to the following equation:

$SV = ((RFD \times BW)/(CR \times BCF)) \times 0.9$

The addition of the 0.9 multiplier is a margin of safety/uncertainty factor that allows for the possibility of some inorganic arsenic in fish tissue. However, regardless of the value of the multiplier this change in status for arsenic results in such a high FC standard for arsenic that DWS and FBC standards for arsenic become the driving standard.

Cited Literature:

Marcus, W.L. and A.S. Rispin. 1988. Threshold carcinogenicity using arsenic as an example. In: Advances in Modern Environmental Toxicology, Vol. XV. Risk Assessment and Risk Management of Industrial and Environmental Chemicals, C.R. Cothern, M.A. Mehlman and W.L. Marcus, Ed. Princeton Scientific Publishing Company, Princeton, NJ. p. 133-158.

USEPA, 1993. Draft Drinking Water Criteria Document for Arsenic. Human Risk Assessment Branch.

USEPA, 1995. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories Volume I: Fish Sampling and Analysis. Second Edition. (EPA 823-R-95-007)

M E M O R A N D U M

TO: Steven J. Koorse, Esquire DATE: June 1, 1995

FROM: S. Hayes Smith FILE: 99999.000306

Human Health Water Quality Standards for Arsenic

1) Alabama: 50 ug/l Alabama Water Quality Criteria Standards. Ala. Admin. Code r.335-6-10-.07, tbl. 1 (1991).

2) Alaska: 0.018 ug/l One of 14 states/territories that failed to adopt sufficient numeric criteria to meet § 303(c)(2)(B) of the Federal Clean Water Act. (33 U.S.C. § 1313(c)(2)(B)). 0.018 ug/l was promulgated by the EPA pursuant to § 303(c)(4)(A) of the Clean Water Act. (33 U.S.C. § 1313(c)(4)(A)). Notice of this was published in Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance; Final Rule, 57 Fed. Reg. 246 (1992). (to be codified at 26 C.F.R. § 131).

3) Arizona: 50 ug/l Arizona Water Quality Standards. Ariz. Admin. R. & Regs. § R18-11-121, app. A (1992).

4) Arkansas: 0.018 ug/l Promulgated by the EPA. See Alaska.

5) California: 0.018 ug/l Promulgated by the EPA. See Alaska.

6) Colorado: 50 ug/l Colorado Water Quality Standards. Colo. Code Regs. tit. 5, ch. 1002, art. 8 § 3.1.16, tbl. III (1991).

7) Connecticut: There is no numeric human health criteria for arsenic in Connecticut. Connecticut Water Quality Standards.

SS II-III (1987). The Connecticut drinking water limit is 0.05 mg/l. (Reg. of Conn. § 19-13-B102(a) (1990).

8) Delaware: 50 ug/l Delaware Water Quality Standards § 9.3(b), tbl. 2 (1990).

9) Washington D.C.: 0.018 ug/l Promulgated by the EPA. See Alaska.

10) Florida: 0.018 ug/l Promulgated by the EPA. See Alaska.

11) Georgia: 50 ug/l Georgia Water Quality Control Regulations and Standards. Ga. R & Regs. § 391-3-6-.03 (1993).

12) Hawaii: No standard has been developed for human health/fish consumption. Hawaii Water Quality Standards. Haw. Admin. R. § 11-54-04 (1992).

13) Idaho: 0.018 ug/l Promulgated by the EPA. See Alaska.

14) Illinois: There is no human health/fish consumption criteria for arsenic in Illinois. The Public and Food Processing Water supply Standard is 0.05 mg/l. Illinois Water Pollution Control Rules. Ill. Admin. Code tit. 35 § 302.304 (1994).

15) Indiana: 0.022 ug/l (Where public drinking water intake is present), and 0.175 ug/l (Outside of mixing zone where there is no public drinking water intake). Indiana Water Quality Standards. Ind. Admin. Code tit. 327 § 2-1-6, tbl. 1 (1990).

16) Iowa: 50 ug/l Iowa Water Quality Standards. Iowa Admin. Code tit. IV r. 61.3(455B), tbl. 1 (1990).

17) Kansas: 0.018 ug/l Promulgated by the EPA. See Alaska.

18) Kentucky: No arsenic standard for Human Health protection. 401 Ky. Admin. Reg. 5:031 § 2(2), tbl. 2 (1992). For warm water aquatic habitat creatures, it is 50 ug/l under 5:031 § 4(5), tbl. 2 (1992).

19) Louisiana: 50 ug/l Louisiana Water Quality Standards. La. Admin. Code tit. 33, pt. IX, ch. 11 § 113(C), tbl. 1 (1992).

20) Maine: 0.018 ug/l Based on § 304(a) of Federal Clean Water Act. Maine Water Quality Control Regulations, ch. 584 (1989).

21) Maryland: 50 ug/l Maryland Water Pollution Control Regulations. Md. Regs. Code, tit. 26, subtit. 08, ch. 02 § .03-2, tbl. I (1990).

22) Massachusetts: 0.018 ug/l Pursuant to § 304(a) of Federal Clean Water Act. Massachusetts Surface Water Quality Standards. Mass. Regs. Code tit. 314 § 4.05(5)(e) (1990).

23) Michigan: 0.018 ug/l Promulgated by the EPA. See Alaska.

24) Minnesota: 50 ug/l Minnesota Water Quality Standards. Minn. R. 7050.0220, subpt. 3(A) (1983).

25) Mississippi: 0.0175 ug/l Mississippi Water Quality Standards § 4, app. A. (Available on infobase).

26) Missouri: 50 ug/l for drinking water supply. Mo. does not have an arsenic criteria for human health protection/fish consumption Missouri Water Quality Standards. Mo. Code Regs. tit. 10 § 20-7.031, tbl. A (1991).

27) Montana: 0.05 mg/l Based on 40 CFR part 141. Montana Surface Water Quality Standards. Mont Admin. Code §§ 6.20.617 to 6.20.624 (1985).

28) Nebraska: 0.05 mg/l Nebraska Water Quality Standards. Dept. of Environmental Control tit. 117, ch. 4 § .004.01B (1990).

29) Nevada: 0.018 ug/l Promulgated by the EPA. See Alaska.

30) New Hampshire: 2.2 ng/l New Hampshire Water Quality Standards. N. H. Code Admin. R. Env-Ws 432.03, tbl. 1 (1990).

31) New Jersey: 0.018 ug/l Promulgated by the EPA. See Alaska.

32) New Mexico: New Mexico has no human health/fish consumption limit for arsenic. The Domestic Water Supply Limit is 0.05 mg/l. New Mexico Water Quality Standards § 3-101(B) (1991).

33) New York: 50 ug/l New York Water Classifications and Quality Standards. N. Y. Comp. Codes. R & Regs. tit. 6, ch. V § 703.5, tbl. 1 (1994).

34) North Carolina: North Carolina does not have a human health/ fish consumption numeric quality for arsenic. 50 ug/l is the standard to protect aquatic life. North Carolina Water Quality Standards. N.C. Admin. Code tit. 15A, ch. 2, subch. 2B §§ .0211(b)(3)(L), .0211(c) (1991).

35) North Dakota: 0.018 ug/l North Dakota Water Quality Standards. N. D. Admin. Code § 33-16-02-06. (Available on info base).

36) Ohio: 50 ug/l Ohio Water Quality Standards. Ohio Admin. Code § 3745-1-07, tbl. 7-1 (1993).

37) Oklahoma: 0.175 ug/l Oklahoma Water Quality Standards. Okla. Admin. Code tit. § 785:45-5-10(6)(B) (1993).

38) Oregon: 0.018 ug/l Based on EPA standards. Oregon Water Quality Standards. Or. Admin. R. § 340-41-205(2)(p)(B) (1990).

39) Pennsylvania: 0.02 ug/l Pennsylvania Water Quality Standards. 25 Pa. Code § 16.102, App. A (1994). (Available on infobase).

40) Rhode Island: 0.018 ug/l Promulgated by the EPA. See Alaska.

41) South Carolina: 0.018 ug/l Incorporated by reference from EPA. South Carolina Water Classification Standards. S. C. Code Regs. § 61-68 E(7) (1992).

42) South Dakota: 0.05 mg/l South Dakota Water Quality Standards. S. D. Admin. Code § 74:03:02:33 (1987).

43) Tennessee: 50 ug/l Tennessee Water Quality Standards. Tenn. R. & Regs. § 1200-4-3.03(1)(j) (1991).

44) Texas: 50 ug/l Texas Water Quality Standards. Tex. Admin. Codes tit. 30 § 307.6(d)(2)(B), tbl. 3 (1992).

45) Utah: 0.002 ug/l Utah Water Quality Standards. Utah Admin. Code R 317-2-14, tbl. 2.14.6 (1992).

46) Vermont: 0.018 ug/l Promulgated by the EPA. See Alaska.

47) Virginia: 50 ug/l Virginia Water Quality Standards. VR680-21-00 Water Quality Standards. VR680-21-01.14 (1992).

48) Washington: 0.018 ug/l Promulgated by the EPA. See Alaska.

49) West Virginia: 2.2 ng/l West Virginia Water Quality Standards. W. Va. Code Regs. § 46-1-9, app. E (1991).

50) Wisconsin: 50 ug/l Human Cancer Criterion. (Similar to Human Health). Wisconsin Water Quality Standards. Wisc. Admin. Code § NR 105.09, tbl. 9 (1993).

51) Wyoming: 0.018 ug/l Wyoming Water Quality Standards. Wyoming Department of Environmental Quality, Water Division-ch. 1 § 31, app. B. (Old ch. 1 § 21 on Toxic Material applied EPA numeric standard (1985)).

52) Puerto Rico: 0.018 ug/l Promulgated by the EPA. See Alaska.

Arsenic Human Health Surface Water Quality Standards: A Snapshot of State Standards, Summer 1996

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Summary

In 1992, EPA adopted human health based surface water quality standards for arsenic for a number of states that did not have their own standards. The standards were quite stringent, varying from 0.018 ug/l to 1.4 ug/l depending on exposure assumptions and the states' preferred risk levels. Recently EPA has shown they are unwilling to defend their standards and will actually support the use of the drinking water MCL of 50 ug/l. The controversy surrounding the arsenic human health surface water quality standards led the author to identify what the various state water quality standards for arsenic were. Standards span six orders of magnitude. Substantial inequities in EPA's 1992 adoption of arsenic standards are also evident.

Background

The Clean Water Act requires states to adopt water quality standards for certain toxic pollutants if EPA has published criteria for them.[1] State standards do not need to be the same as EPA's criteria values, but they are subject to EPA review and approval.

EPA published most of their Water Quality Criteria documents in 1980 and summarized them in the Goldbook.[2] The Goldbook, and the individual criteria documents present published criteria for acute and chronic aquatic life protection and for human health protection.

There are two different types of human health values presented in EPA's criteria documents. One is intended to be protective for those who consume both the water and the organisms that live in the water. The other is intended to be protective only for those who consume organisms that live in the water. These are sometimes referred to as "water and fish ingestion" and "fish ingestion only". EPA's human health criteria for carcinogens are presented for three different risk levels (10^{-5}, 10^{-6}, and 10^{-7}), and assume average fish consumption rates of 6.5 grams per day. The Goldbook 10^{-6} based human health values for arsenic were 0.0175 ug/l for fish ingestion only and 0.002 ug/l for water and fish ingestion.

In 1991, EPA proposed a rule to adopt EPA criteria as state standards for those states that had not yet adopted their own standards. This rule was commonly referred to as the National Toxics Rule ("NTR"). States that did not have human health

criteria were given the choice by EPA of selecting a 10^{-5} or 10^{-6} risk level for carcinogens. The 10^{-6} based human health standards for arsenic proposed in the NTR were 0.14 ug/l for fish ingestion only and 0.018 ug/l for water and fish ingestion. The NTR was finalized in 1992 and imposed arsenic human health standards as shown in Table 1.

There is a lot of controversy surrounding the NTR human health arsenic standards and the controversy is equally applicable to the earlier Goldbook criteria. Examples of this controversy include:

- Background levels in freshwaters and marine waters typically exceed the NTR's 10^{-6} based criteria and sometimes exceed the 10^{-5} based criteria. For example, the background levels for arsenic in rivers in Washington is in the 0.1 to 1 ug/l range and the background levels for arsenic in the North Pacific is in the 1 to 2 ug/l range.[3]

- EPA's drinking water MCL is 50 ug/l (and many states with only the drinking water MCL, did not have additional arsenic human health standards imposed on them by EPA via the NTR.)

- When EPA developed their criteria, they did not recognize that fish convert inorganic arsenic (the carcinogen) to organic arsenic (which is comparatively harmless).[4] Following public comment, a footnote was hastily added to the final NTR criteria that said that the arsenic standard pertained only to inorganic arsenic.[5] However, no adjustment was made to the actual standard; although, it should have been because the actual standard was based on total arsenic in fish tissue. The inorganic arsenic to total arsenic ratio in marine tissues is about 0.005.[6] Therefore, the fish consumption only based standard is overly conservative by a factor of 200.

- EPA's Science Advisory Board has raised the issue that there may be a threshold effect for arsenic, as blood arsenic measurements in populations with elevated arsenic in their drinking water do not show a dose response until drinking water levels greater than 100 ug/l are consumed.[7]

- There are a number of technical concerns with the Taiwanese study that has formed the basis for the arsenic standard.[8]

- Some states have recently moved to adopt less stringent arsenic human health standards. In the case of Montana and Idaho, these revisions occurred by legislation. In

1995, Montana adopted 18 ug/l as a 10^{-3} based standard[9] because this was in the range found in the waters coming out of Yellowstone National Park.

- Pennsylvania was challenged when it sought to enforce its arsenic human health standards that were based on EPA's Goldbook 10^{-5} based criteria of 0.02 ug/l for fish and water ingestion while the adjoining state of New York used the drinking water MCL of 50 ug/l. Pennsylvania requested EPA assistance in defending their arsenic standard. When EPA provided no assistance, Pennsylvania changed their arsenic human health standard to 50 ug/l.[10]

Review of state standards

The author attempted to contact every state water quality standard coordinator in the summer of 1996 to get a snapshot in time as to what the arsenic human health standards were throughout the country, how they were being implemented, and whether the states were planning any changes in the near future. Conversations resulted with about forty state representatives, while responses from about seven others were by voice mail only. It was necessary to refer to written copies of three states standards without talking to a state representative, and for those, it wasn't certain that the written versions reviewed were the most current. The accuracy of the information presented is dependent on the information verbally communicated to the author by the state contacts. One instance of significantly incorrect information was noted and corrected.[11] It is reasonable to assume that there could be other instances. However, the overall picture presented here is not expected to significantly change.

The results of this review are presented in Figure 1 and Table 2. The various state standards span six orders of magnitude. This review identified a number of items of interest including:

- Three states[12] have no identified arsenic human health standard in their surface water quality standards, yet EPA did not adopt any for them in the National Toxics Rule. Some of these states however have 50 ug/l as a standard in their drinking water regulations or as an aquatic life standard.

- Thirteen states[13] have just the drinking water MCL of 50 ug/l and no standard that considers fish ingestion. EPA did not adopt fish ingestion based numbers for these states.

- Three states[14] have 50 ug/l as their only human health arsenic standard for fish and water ingestion.

- Four states[15] have 50 ug/l as both a fish and water ingestion standard and as a standard for only fish ingestion.

- Connecticut adopted the NTR 10^{-6} values of 0.14 ug/l and 0.018 ug/l, and is considering changing the standards to reflect the state's higher fish consumption rates.

- Utah has the 10^{-6} based Goldbook standards of 0.0175 ug/l and 0.002 ug/l. Michigan has 10^{-5} based standards of 1.4 ug/l and 0.18 ug/l imposed by the NTR. Neither state enforces these standards. Rather, they only use the drinking water MCL of 50 ug/l.

- Maryland adopted 50 ug/l for drinking water only in 1990. EPA had urged them to also adopt fish consumption based values, but Maryland refused, stressing that "the arsenic in fish tissue was not in the carcinogenic form". Maryland had many meetings with EPA and eventually EPA dropped their demand for the state to adopt a fish consumption number.[16]

- EPA Region V is encouraging states to use non-cancer based human health arsenic numbers but they also say that 50 ug/l is acceptable.[17]

- Arizona (June 1996) adopted a non-cancer based human health standard of 1,450 ug/l for arsenic for a fish consumption based standard. This functionally leaves them with the drinking water MCL of 50 ug/l as the more stringent of their two standards. Prior to the recent adoption, the fish consumption based number was the more stringent.

- California does not have an arsenic human health standard, but specifically views their 8 ug/l long term chronic aquatic life standard as being more stringent than a human health standard. (For that reason, I have counted 8 ug/l as the equivalent of a human health standard for California.)

- Following Pennsylvania's switch to 50 ug/l in 1995, EPA Region III sent a letter to the state that endorsed the switch.[18] This letter also provided a copy of a memo from Robert Perciasepe, EPA Assistant Administrator which supported the use of 50 ug/l.[19]

- The Delaware River Basin Commission had proposed the NTR 10^{-6} values of 0.14 and 0.018 ug/l in 1995, but in June 1996 they switched to 50 ug/l.[20]

- Wisconsin and West Virginia considered whether to change their state arsenic standards to reflect the NTR

arsenic values, but each state specifically rejected those values and retained their earlier standards.

- Georgia (July 1996) and Kansas (1994) revised their arsenic standards to 50 ug/l and are awaiting EPA's review and approval. (Kansas had the 10^{-5} numbers adopted by EPA in 1992, while Georgia had a value of 0.14 ug/l for the consumption of everything.)

- New England states mostly used either Goldbook or NTR based 10^{-6} risk level arsenic standards, but in implementation they have not really looked closely at arsenic and have little or no effluent data with low enough detection limits to identify whether there is a problem.

- New Mexico has only a water consumption based standard of 50 ug/l, but several tribes[21] have adopted Goldbook values of 0.0175 ug/l and this has affected the city of Albuquerque's NPDES permit. The Rio Grande River natural background is 4 to 5 ug/l.[22]

- Alaska's Department of Environmental Conservation sent a letter to the EPA Region X administrator asking that the region adopt an interim solution for the State while waiting for EPA headquarters to make a decision. Alaska noted that the human health criteria for arsenic currently in the NTR is scientifically indefensible and it does not make sense to continue to impose it on Alaska.[23]

Conclusions

There is a very large range (spanning six orders of magnitude) in the states' human health surface water quality standards for arsenic. EPA's National Toxic Rule selectively imposed standards on some states that were more stringent than what many states had. EPA's National Toxic Rule did not impose arsenic standards for three states even though they had no human health standards for arsenic in their surface water quality standards. EPA's National Toxic Rule did not impose standards for fish ingestion, or for fish and water ingestion for twelve states that at the time had only a drinking water standard. EPA's National Toxic Rule did impose standards for fish ingestion and for fish and water ingestion for Alaska, even though it had adopted the same drinking water standard as twelve other states. A number of states have recently relaxed their arsenic human health standards.

Recommendations

In view of 1) the wide range of standards, 2) the issue that background is often higher than some of the lower standards, 3)

the scientific questions around the arsenic standards, 4) the lack of technical expertise regarding arsenic and human health in most states, 5) the inexplicable different treatment of states under the National Toxics Rule, and 6) the unwillingness of EPA to support their own criteria, it seems prudent for all states to switch to the drinking water MCL of 50 ug/l until such time as EPA can clarify just what the criteria should be and what they would be willing and able to support. EPA should immediately revise the National Toxics Rule for those states affected by it, and should clearly advise states, territories and tribes with standards of their own, that 50 ug/l is the only arsenic human health surface water quality standard that EPA can support at this time. EPA should cease implementing the National Toxics Rule standards in NPDES permits and Superfund Cleanup decisions.

Table 1. State Arsenic Human Health Standards Imposed by the 1992 National Toxics Rule

10^{-5} based

Water and Fish Ingestion	Fish Ingestion Only	States
0.18 ug/l	1.4 ug/l	Alaska Michigan Rhode Island

10^{-6} based

Water and Fish Ingestion	Fish Ingestion Only	States
0.018 ug/l	0.14 ug/l	Idaho Kansas New Jersey Vermont Washington Puerto Rico District of Columbia

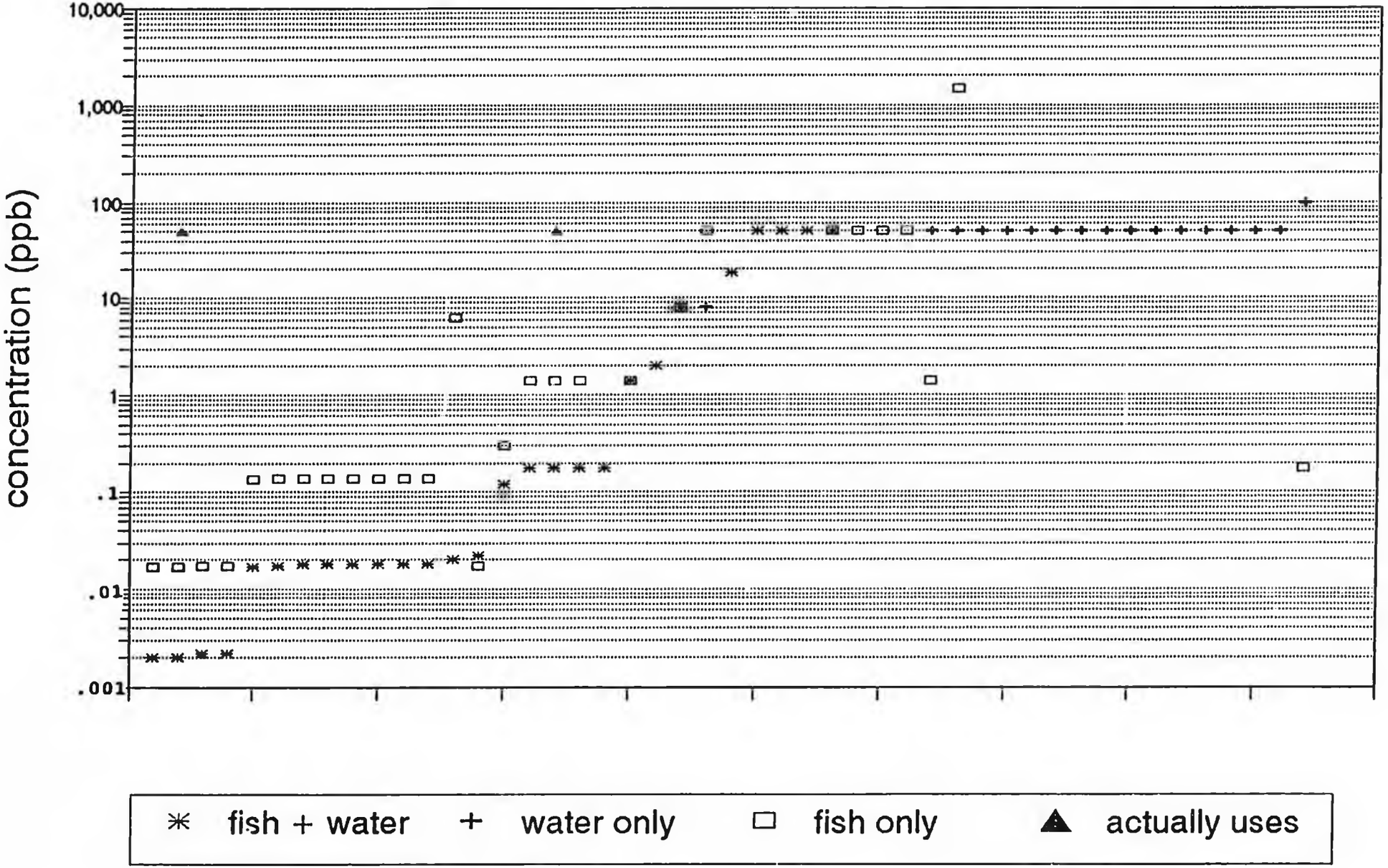
Table 2. State Human Health Arsenic
Surface Water Quality Standards as of July 1996

State	Ingestion of Fish + Water (ug/l)	Ingestion of Fish only (ug/l)	Ingestion of Water only (ug/l)
SD	0.002	0.017	
UT	0.002	0.017	
NH	0.0022	0.0175	
OR	0.0022	0.0175	
NJ	0.017	0.136	
MS	0.0175	0.14	
CT	0.018	0.14	
VT	0.018	0.14	
MA	0.018	0.14	
ND	0.018	0.14	
WA	0.018	0.14	
ME	0.018	0.14	
ID	0.02	6.2	
IN	0.022	0.0175	
AL	0.12	0.3	
RI	0.18	1.4	
MI	0.18	1.4	
AK	0.18	1.4	
WY	0.18		
SC	1.4	1.4	
MN	2		
CA	8	8	
WI		50	8.3
MT	18		
FL	50	50	
GA	50	50	
PA	50	50	
WV	50	50	
IA	50		
LA	50		
TX	50		
NE		1.4	50
AZ		1,450	50
KS			50
OH			50
IL			50
NM			50
TN			50
MD			50
VA			50
DE			50
MO			50
CO			50
HI			50
NV			50
NY			50
OK		0.175	100

Note: Arkansas, Kentucky and North Carolina have no arsenic human health standards in their surface water quality standards.

State arsenic human health standards

for surface waters as of July 1996



1. Clean Water Act, Section 303(c)(2)(B), (33 U.S.C.A. § 1313), requires states to adopt water quality standards for all toxic pollutants listed pursuant to section 307(a)(1) for which criteria have been published under section 304(a).

2. EPA, 1986. Quality Criteria for Water. EPA 440/5-86-001.

3. Eric Crecelius, 1996. (personal communication)

4. See, 57 FR 60887 to 60888.

5. See, footnote "b" at 57 FR 60916.

6. Edmonds, J.S. and K.A. Francesconi. Arsenic in Seafoods: Human Health Aspects and regulations. *Marine Pollution Bulletin* 26(12):665-674, December 1993.

7. EPA SAB, November 1993. Review of the Draft Drinking Water Criteria Document on Inorganic Arsenic. EPA-SAB-DWC-94-004.

8. EPA SAB, November 1993. Review of the Draft Drinking Water Criteria Document on Inorganic Arsenic. EPA-SAB-DWC-94-004.

9. See, Section 75-5-301(2)b)(i), Montana Code Annotated.

10. Dr. Hugh Archer, Deputy Secretary for Water Management, Department of Environmental Resources (personal communication, July 13, 1995).

11. The state coordinator viewed their table of standards and concluded there wasn't a human health standard for arsenic, when in fact the state had adopted and published the 10^{-6} values from the Goldbook.

12. Arkansas, Kentucky and North Carolina

13. Colorado, Delaware, Hawaii, Illinois, Kansas, Maryland, Montana, New Mexico, Nevada,New York, Ohio, Tennessee and Virginia.

14. Iowa, Louisiana and Texas

15. Florida, Georgia, Pennsylvania and West Virginia

16. Mary Jo Garries, Maryland Department of the Environment. (personal communication)

17. David Peiffer, EPA Region V water quality standards coordinator, personal communication.

18. Letter from Alvin Morris, Director Water Management Division, EPA Region III to Dr. Hugh Archer, Department of Environmental Resources, June 2, 1995. This letter states that EPA has decided to reevaluate the existing recommended human health criteria for arsenic "for all programs" and that during this period of reevaluation, "the use of the MCL value of 50 ug/l is recommended as an interim value for protection of human health."

19. February 6, 1995 memo sent to the heads of 7 different EPA programs as well as the individual regional administrators and key people in the water quality criteria program.

20. Delaware River Basin Commission, June 1996. Public Hearing Response Document - Regulations for Controlling Toxic Pollutants in the Delaware River Estuary.

21. Pueblo of Isleta, Pueblo of Sandia, Pueblo of San Juan

22. Steve Pierce, New Mexico Water Quality Control Commission (personal communication).

23. Letter from Michelle Brown, ADEC Commissioner to Chuck Clarke, Regional Administrator, EPA Region 10, May 31, 1996.

SOLIDS (DISSOLVED) AND SALINITY

CRITERION:

250 mg/L for chlorides and sulfates in domestic water supplies (welfare).

INTRODUCTION:

Dissolved solids and total dissolved solids are terms generally associated with freshwater systems and consist of inorganic salts, small amounts of organic matter, and dissolved materials (Sawyer, 1960). The equivalent terminology in Standard Methods is filtrable residue (Standard Methods, 1971). Salinity is an oceanographic term, and although not precisely equivalent to the total dissolved salt content it is related to it (Capurro, 1970). For most purposes, the terms total dissolved salt content and salinity are equivalent. The principal inorganic anions dissolved in water include the carbonates, chlorides, sulfates, and nitrates (principally in ground waters); the principal cations are sodium, potassium, calcium, and magnesium.

RATIONALE:

Excess dissolved solids are objectionable in drinking water because of possible physiological effects, unpalatable mineral tastes, and higher costs because of corrosion or the necessity for additional treatment.

The physiological effects directly related to dissolved solids include laxative effects principally from sodium sulfate and magnesium sulfate and the adverse effect of sodium on certain patients afflicted with cardiac disease and women with toxemia associated with pregnancy. One study was made using data

collected from wells in North Dakota. Results from a questionnaire showed that with wells in which sulfates ranged from 1,000 to 1,500 mg/L, 62 percent of the respondents indicated laxative effects associated with consumption of the water. However, nearly one-quarter of the respondents to the questionnaire reported difficulties when concentrations ranged from 200 to 500 mg/L (Moore, 1952). To protect transients to an area, a sulfate level of 250 mg/L should afford reasonable protection from laxative effects.

As indicated, sodium frequently is the principal component of dissolved solids. Persons on restricted sodium diets may have an intake restricted from 500 to 1,000 mg/day (Nat. Res. Coun., 1954). That portion ingested in water must be compensated by reduced levels in food ingested so that the total does not exceed the allowable intake. Using certain assumptions of water intake (e.g., 2 liters of water consumed per day) and sodium content of food, it has been calculated that for very restricted sodium diets, 20 mg/L in water would be the maximum, while for moderately restricted diets, 270 mg/L would be maximum. Specific sodium levels for entire water supplies have not been recommended but various restricted sodium intakes are recommended because: (1) the general population is not adversely affected by sodium, but various restricted sodium intakes are recommended by physicians for a significant portion of the population, and (2) 270 mg/L of sodium is representative of mineralized waters that may be aesthetically unacceptable, but many domestic water supplies exceed this level. Treatment for removal of sodium in

water supplies is costly (NAS, 1974).

A study based on consumer surveys in 29 California water systems was made to measure the taste threshold of dissolved salts in water (Bruvold et al., 1969). Systems were selected to eliminate possible interferances from other taste-causing substances than dissolved salts. The study revealed that consumers rated waters with 319 to 397 mg/L dissolved solids as "excellent" while those with 1,283 to 1,333 mg/L dissolved solids were "unacceptable" depending on the rating system used. A "good" rating was registered for dissolved solids less than 658 to 755 mg/L. The 1962 PHS Drinking Water Standards recommended a maximum dissolved solids concentration of 500 mg/L unless more suitable supplies were unavailable.

Specific constituents included in the dissolved solids in water may cause mineral tastes at lower concentrations than other constituents. Chloride ions have frequently been cited as having a low taste threshold in water. Data from Ricter and MacLean (1939) on a taste panel of 53 adults indicated that 61 mg/L NaCl was tha median level for detecting a difference from distilled water. At a median concentration of 395 mg/L chloride a salty taste was distinguishable, although the range was from 120 to 1,215 mg/L. Lockhart, at al. 1935) evaluated tha affect of chlorides on water used for brewing coffee indicated threshold concentrations for chloride ranging from 210 mg/L to 310 mg/L depending on the associated cation. These data indicate that a level of 250 mg/L chlorides is a reasonable maximum level to protect consumers of drinking water.

The causation of corrosion and encrustation of metallic surfaces by water containing dissolved solids is well known. In water distribution systems corrosion is controlled by insulating dissimilar metal connections by nonmetallic materials, using pH control and corrosion inhibitors, or some form of galvanic or impressed electrical current systems (Lehmann, 1964). In household systems water piping, wastewater piping, water heaters, faucets, toilet flushing mechanisms, garbage grinders and both clothes and dishwashing machines incure damage.

By using water with 1,750 mg/L dissolved solids as compared with 250 mg/L, service life was reduced from 70 percent for toilet flushing mechanisms to 30 percent for washing equipment. Such increased corrosion was calculated in 1968 to cost the consumer an additional $0.50 per 1,000 gallons used.

All species of fish and other aquatic life must tolerate a range of dissolved solids concentrations in order to survive under natural conditions. Based on studies in Saskatchewan it has been indicated that several common freshwater species survived 10,000 mg/L dissolved solids, that whitefish and pike-perch survived 15,000 mg/L, but only the stickleback survived 20,000 mg/L dissolved solids. It was concluded that lakes with dissolved solids in excess of 15,000 mg/L were unsuitable for most freshwater fishes (Rawson and Moore, 1944). The 1968 NTAC Report also recommended maintaining osmotic pressure levels of less than that caused by a 15,000 mg/L solution of sodium chloride.

Marine fishes also exhibit variance in ability to tolerate salinity changes. However, fishkills in Laguna Madre off the Texas coast have occurred with salinities in the range of 75 to 100 o/oo. Such concentrated seawater is caused by evaporation and lack of exchange with the Gulf of Mexico (Rounsefell and Everhart, 1953).

Estuarine species of fish are tolerant of salinity changes ranging from fresh to brackish to seawater. Anadromous species likewise are tolerant although evidence indicates that the young cannot tolerate the change until the normal time of migration (Rounsefell and Everhart, 1953). Other aquatic species are more dependent on salinity for protection from predators or require certain minimal salinities for successful hatching of eggs. The oyster drill cannot tolerate salinities less than 12.5 o/oo. Therefore, estuarine segments containing salinities below about 12.5 o/oo produce most of the seed oysters for planting (Rounsefell and Everhart, 1953). Based on similar examples, the 1968 NTAC Report recommended that to protect fish and other marine animals no changes in hydrography or stream flow should be allowed that permanently change isohaline patterns in the estuary by more than 10 percent from natural variation.

Many of the recommended game bird levels for dissolved solids concentrations in drinking water have been extrapolated from data collected on domestic species such as chickens. However, young ducklings were reported poisoned in Suisan Marsh by salt when maximum summer salinities varied from 0.55 to 1.74 o/oo with means as high as 1.26 o/oo (Griffith, 1963).

Indirect effects of excess dissolved solids are primarily the elimination of desirable food plants and other habitat-forming plants. Rapid salinity changes cause plasmolysis of tender leaves and stems because of changes in osmotic pressure. The 1968 NTAC Report recommended the following limits in salinity variation from natural to protect wildlife habitats:

Natural Salinity (o/oo)	Variation Permitted (o/oo)
0 to 3.5	1
3.5 to 13.5	2
13.5 to 35	4

Agricultural uses of water are also limited by excessive dissolved solids concentrations. Studies have indicated that chickens, swine, cattle, and sheep can survive on saline waters up to 15,000 mg/L of salts of sodium and calcium combined with bicarbonates, chlorides, and sulfates but only 10,000 mg/L of corresponding salts of potassium and magnesium. The approximate limit for highly alkaline waters containing sodium and calcium carbonates is 5,000 mg/L (NTAC, 1968).

Irrigation use of water depends not only upon the osmotic effect of dissolved solids, but also on the ratio of the various cations present. In arid and semiarid areas general classification of salinity hazards has been prepared (NTAC, 1968) (see Table 9).

Table 9.-Dissolved Solids Hazard for Irrigation Water (mg/L).

water from which no detrimental effects will usually be noticed----------	500

water which can have detrimental effects on sensitive crops----------	500-1,000
water that may have adverse effects on many crops and requires careful management Practices----------	1,000-2,000
water that can be used for tolerant plants on permeable soils with careful management practices----------	2,000-5,000

The amount of sodium and the percentage of sodium in relation to other cations are often important. In addition to contributing to osmotic pressure, sodium is toxic to certain plants, especially fruits, and frequently causes problems in soil structure, infiltration, and permeability rates (Agriculture Handbook #60, 1954). A high percentage of exchangeable sodium in soils containing clays that swell when wet can cause a soil condition adverse to water movement and plant growth. The exchangeable-sodium percentage (ESP)* is an index of the sodium status of soils. An ESP of 10 to 15 percent is considered excessive if a high percentage of swelling clay minerals is present (Agricultural Handbook #60, 1954).

For sensitive fruits, the tolerance for sodium for irrigation water is for a sodium adsorption ratio (SAR)** of about 4, whereas for general crops and forages a range of 8 to 18 is generally considered usable (NTAC, 1968). It is emphasized that application of these factors must be interpreted in relation to specific soil conditions existing in a given locale and therefore frequently requires field investigation.

Industrial requirements regarding the dissolved solids content of raw waters is quite variable. Table 10 indicates

Table 10.-Total Dissolved Solids Concentrations of Surface Waters That Have Been Used as Sources for Industrial Water Supplies

Industry/Use	Maximum Concentration (mg/L)
Textile	150
Pulp and Paper	1,080
Chemical	2,500
Petroleum	3,500
Primary Metals	1,500
Boiler Make-up	35,000

maximum values accepted by various industries for process requirements (NAS, 1974). Since water of almost any dissolved solids concentration can be de-ionized to meet the most stringent requirements, the economics of such treatment are the limiting factor for industry.

$$*ESP = \frac{100\ [a + b(SAR)]}{1\ \ [a + b(SAR)]}$$

where: a = intercept respresenting experimental error (ranges from -0.06 to 0.01)
b = slope of regression line (ranges from 0.014 to 0.016)

$$**SAR = \text{sodium adsorption ratio} = \frac{Na}{[0.5(Ca + Mg)]^{0.5}}$$

SAR is expressed as milliequivalents

(QUALITY CRITERIA FOR WATER, JULY 1976) PB-263943
SEE APPENDIX C FOR METHODOLOGY

Ceriodaphnia dubia whole effluent toxicity (WET) testing standard protocol

- Dilution water source - synthetic water at prescribed hardness, alkalinity and conductivity.
- Organisms - cultured in the test laboratory, 24 hours old. The number of generations add quickly and allow the animals to acclimatize to lab conditions. Exotic to Alaska waters.
- Water conditions:

Parameter	Culture conditions (water)	Example test conditions (water)	Example field conditions (water)
Temperature	**25 degrees C**	**25.3 degrees C**	**4 degrees C**
Dissolved oxygen	**8.4 mg/l**	**7.7 mg/l**	**11 mg/l**
Conductivity	**384 µmhos/cm**	**1000 µmhos/cm**	**50 to 3000 µmhos/cm**
pH	**7.7**	**8.0**	**7.5 to 9.0**
Hardness	**100 mg/l as $CaCO_3$**	**300 mg/l as $CaCO_3$**	**100 to 1500 mg/l**
Alkalinity	**70 mg/l as $CaCO_3$**	**140 mg/l as $CaCO_3$ effluent, 73 mg/l as $CaCO_3$ control**	**150 mg/l as $CaCO_3$**
L:D photo period	**16:8**	**16:8**	**24:0 to 0:24**

- Test measurements:
  - number surviving (still moving at end of test)
  - number of young produced/surviving female
- A reference toxicant test ($CdCl_2$) is used to see if organisms die properly; i.e., 7 day LC50, IC25, and NOEC should be at prescribed concentrations of Cd.
- Control must survive at 80% or greater to validate the test.

General issues on WET testing

- Numeric criteria established to protect fish species are based on a conservative interpretation of toxicity testing literature for all organisms.
- WET testing ostensibly looks at combined effects of substances in the water (dissolved, suspended, or otherwise - no way to separate effects). Permit limits must be set to protect water quality criteria. To assure permit limits are met permit writers multiply by safety factors, setting permits effluent limits below water quality criteria. WET standards appear redundant unless the information obtained could be more applicable to local waters than the research upon which the numeric values are based.
- Working with live animals introduces many more variables than can be effectively controlled in the laboratory. While temperature, conductivity, D.O., etc., can be controlled; Darwinian effects are not controllable. This is exemplified by differences which are obtained between laboratories under the "same" control conditions.
- WET testing research proposal:

- Goals; (1) research should result in a quantitative measure of toxicity in state waters and effluents, (2) results should demonstrate compliance with "no toxics in toxic amounts" federal language without establishing a separate numeric water quality standard for toxicity; i.e., 1.0 toxicity units (TU), and (3) the result should be reasonably agreeable to EPA.
- Approaches:
    - A target of one or two state wide test protocols for freshwater and two to three test protocols for sea water should be set to focus the efforts and resources on the most promising organisms.
    - Document healthy aquatic ecosystems and select sensitive suitable organism(s) for laboratory testing. Suitable would mean: (1) readily available, (2) survives in laboratory conditions, (3) is ubiquitous to Alaska, and (4) show a suitable sensitivity (willingness to die) to substances at or near the state water quality standards.
    - Tests developed should have ecological relevance; that is, they should model actual field conditions and animals of importance to maintaining and protecting water uses. Static test protocols should not be used where dynamic (flow through) testing is required to adequately simulate the natural conditions. Temporal aspects of a water use should be considered (ex. when are salmon smolt present in the water body, or are sediment loads seasonally high which could bind constituents during sensitive periods).
    - Tests should use actual conditions found in nature. That is, an organism which lives in sediment, but broadcast spans to the overlying water column should not be used for larval sensitivity to sediments.
    - For fresh water, the animal(s) selected should be a larval stage insect that is a major food source for many vertebrates important to the water use.
    - For sea water, the green sea urchin fertilization test and the bivalve larval test have been well received.
    - Alaska laboratories should be brought into the research early to assure there will be an adequate availability of services to dischargers in Alaska.
    - Organisms must be culturable in the laboratory, abundant, available when needed, and easily collected.
    - Seasonally available test organisms should be looked at solely as indicators when they are available. Substitute organisms for seasonally available animals should be discouraged. The winning organisms must, again, have ecological relevance unto themselves, not as substitutes for something else.