

PART III: THE RESPONSIVENESS SUMMARY

On August 22, 2005, the IAGWSP published the RSP for the Demo 1 Groundwater Plume, which included the EPA proposed remedy for the Demo 1 site and announced the public comment period on the proposed remedy. The EPA proposed Enhanced Alternative 5 as the remedy for the Demo 1 plume.

At the August 23, 2005 public meeting of the IART, held in Falmouth, MA, the IAGWSP gave a presentation on the RSP and the EPA presented its proposed remedy and answered questions from the IART.

In addition, the IAGWSP held a public hearing on the RSP on September 12, 2005 in Bourne, MA. A public information session, along with a presentation on the RSP and EPA's proposed remedy were held prior to the opening of the public hearing. Local residents and officials, news media representatives, representatives from EPA, MassDEP and the IAGWSP interested in site activities and cleanup decisions were invited to attended both meetings. Representatives from EPA, MassDEP, and IAGWSP were present. Two members of the public and no news media representatives attended.

The IAGWSP notified the public of the August 23, 2005 public meeting and announced the public comment period in a display ad placed in the August 19, 2005, editions of *The Cape Cod Times* and *The Enterprise* newspapers, and display ads were placed in the September 9, 2005 editions of these same newspapers to announce the public hearing and as a reminder of the public comment period.

The IAGWSP placed copies of the RSP for the Demo 1 Groundwater Plume in the IAGWSP's information repositories at the Bourne, Falmouth, Mashpee and Sandwich, MA public libraries. The repository contains documents on the Demo 1 investigation and findings supporting selection of the RA including the FS for Demo 1 Groundwater and other relevant documents upon which EPA relied in selecting the proposed remedy. The RSP also was made available on the IAGWSP Web site, which also contains the supporting documents and which offered a means of submitting public comments on the RSP. In addition, the IAGWSP mailed copies of the RSP to IART members and distributed to individuals in attendance at the public meeting and public hearing.

The following table provides a summary of issues and concerns raised during the public comment period held on the RSP for the Demo 1 Groundwater Plume from August 22, 2005 through September 19, 2005.

	Name of Comment Originator:	Organization of Comment Originator:	Comment:	Response:
1	David Dow	Sierra Club	<p>In regards to remedy selection for the Demo Area 1 Groundwater Plume, we favor the Enhanced Alternative 5 proposed by the Environmental Protection Agency (EPA) which has 5 extraction wells/4 injection wells with treatment facilities (granulated activated carbon utilization for RDX and exchange resin treatment for perchlorate). We feel that the "adaptive management" approach for the toe of the plume (if it extends beyond the Pew Road Treatment facility) offers the flexibility to treat the leading edge if it migrates beyond the D1P-30-32 monitoring well transect. Since the regulatory agencies (EPA and MassDEP) disagree with the Army National Guard (ANG) on whether the leading edge will move past the Rod & Gun Club North Pond, we feel that an approach that uses monitoring data to revise model predictions should be used in choosing a remedy that adjusts to the facts on the ground. EPA's alternative 5 uses this adaptive management approach.</p>	<p>Preference noted. Both the IAGWSP and regulators understand that groundwater modeling is an iterative process with inherent uncertainties. That is extensive monitoring performance incorporated into the treatment system is used to ensure the meeting the remediation objectives.</p>
2	David Dow	Sierra Club	<p>In the face of scientific uncertainty regarding the safe drinking water level for perchlorate, we feel that a precautionary approach should be utilized in deriving the cleanup standard for Demo Area 1. The Massachusetts Department of Environmental Protection appears to be closer than EPA in establishing a maximum contaminant level (MCL) for perchlorate. Since the National Academy of Sciences used a no effect concentration from adults receiving perchlorate doses on thyroid hormones, we don't feel that their analysis should provide the basis for the reference dose, since babies and children are the most sensitive population for perchlorate impacts on thyroid function. EPA proposes to use risk-based criteria to establish the perchlorate cleanup standard of 1 ppb (parts per billion). Risk analysis presumes that one understands the cause/effect relationship in order to link dose to response. It is not clear that this is known for humans (since epidemiology studies don't link concentration of contaminants at the tissue level to their biological effects), even though animal studies may provide this information.</p>	<p>Comments noted related to uncertainty of safe drinking water level for perchlorate.</p>

Name of Comment Originator:	Organization of Comment Originator:	Comment:	Response:
		<p>Different regulatory bodies have arrived at widely different decisions on the safe level of perchlorate in the environment, depending upon what types of data they choose to utilize in the analysis.</p> <p>As an environmental advocacy organization the Sierra Club is not in the position to decide which of these technical arguments are correct, but we feel that the cleanup standard should be 1 ppb or less, based on a precautionary approach. Certainly the Environmental Working Group which has examined this issue from a technical perspective favors lower perchlorate levels than those proposed by the military or state of California. When Assistant Secretary Tad McCall came to Cape Cod during the Clinton Administration, he stated that the Department of Defense was going to make the citizens of Cape Cod whole from the groundwater contamination emanating from the Massachusetts Military Reservation (MMR). The Sierra Club's operational interpretation of this promise is that the cleanup standard would be non-detect, even though the Army National Guard has not even committed to achieving MCL levels when the current rule making process is completed. It is likely that similar uncertainties apply to the safe level of RDX, but it has been out of the public eye unlike perchlorate. Ross Vincent, a Sierra Club activist who is a former chemical engineer, has written eloquently on the fallacies underlying the application of risk assessment and cost/benefit analysis in establishing cleanup standards for hazardous/toxic waste cleanups.</p>	<p>Preference noted for 1 ppb standard or less for perchlorate.</p> <p>Comments noted regarding interpretation of Assistant Secretary Tad McCall statements.</p> <p>The response action goals include "preventing potential ingestion and inhalation of groundwater containing COCs in excess of federal maximum contaminant levels, Health Advisories, DWELs, applicable state standards or an unacceptable excess life-time cancer risk or non-cancer Hazard Index."</p>
3	David Dow Sierra Club	<p>At the August 23, 2005 Impact Area Review Team (IART) meeting, a citizen member, Peter Schlesinger, recommended that the Impact Area Groundwater Study program (IAGS) erect wind towers at the MMR to provide power for the pump and treatment plants involved in the groundwater cleanup. The Sierra Club supports this recommendation. We gather that the Air Force Center for Environmental Excellence (AFCEE) has done some preliminary analysis of utilizing renewable sources of energy to supplement that drawn from the New England Power Grid. Normally cost/benefit analysis is conducted in order to decide</p>	<p>Comments noted regarding support for a renewable energy source for the pump and treat plants involved in the groundwater cleanup.</p> <p>Comments noted regarding use of competent economists to perform cost/benefit analysis.</p>

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			<p>whether to utilize renewable energy to replace a portion of that generated from fossil fuels/nuclear power plants. There are a lot of technical issues, like the assumed discount rate and estimating costs and benefits in comparable units that influence the outcome of cost/benefit approaches. Many of the power and costs are part of our market economy and can be estimated using traditional natural resource economic approaches. Many of the benefits stem from reducing global warming and providing U.S. energy security. These have to be estimated using either ecological economics approaches or non-market valuation techniques as adjuncts to traditional economics. Thus competent economists should be employed in this analysis to avoid the problems found in the economic analysis utilized to support the Cape Wind Draft Environmental Impact Statement (DEIS).</p> <p>The Sierra Club feels that the federal government should provide the leadership for the wider society in moving towards greater use of renewable energy sources and promotion of greater energy use efficiency. This alone should justify the use of wind power to meet power requirements on AO3 of 10 million kw per yr at a cost of \$1.5 million per year (based on AFCEE use described at August 23 IART meeting). Given the rising price of fuel oil and natural gas used in the production of electricity, this switch is likely to be cost effective in the long run and will save the O&M money in the operation of the treatment systems. Placing wind towers on the moraine at the MMR could provide a supplemental electricity source for the entire facility, even if the wind speed is not up to those required for a commercial renewable energy operation like Cape Wind.</p>	<p>The IAGWSP supports the idea of using renewable energy sources to provide power for pump and treat systems where feasible and will explore the possibility of renewable energy sources that do not impact the training mission of Camp Edwards and other areas. Please be aware that Camp Edwards Aviation officials have historically requested that all facilities in the Demo 1 area remain below the tree tops.</p> <p>EPA and DOD support the use of renewable energy and has several programs currently investigating or using renewable energy sources.</p>
4	Peter Schlesinger	Impact Review Team (IART)	In general, I haven't any issue with the proposed Enhanced Alternative 5 scheme in the RSP, because it allows for an additional well to capture the toe of the plume as necessary (and there is sufficient room for consideration of an additional well(s) as needed).	Comment noted.

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5	Peter Schlesinger	IART	<p>I believe that the draft RSP should be amended to include a section on Energy Requirements for each of the potential Remedies, as well as a Renewable Energy-based solution (wind/solar/other) that would make use of the most efficient means of renewable energy for each suggested remedy.</p> <p>I propose that the regulatory agencies (MassDEP and EPA) require that all subsequent RSPs to be made for IAGWSP remedial solutions be required to include a section on potential Energy Requirements/Renewable Energy-based solutions (wind/solar/other)</p> <p>I propose that the IAGWSP commit to powering all of its remedial groundwater facilities with grid-tied non-fossil fuel based renewable energy solutions (wind/solar/other)</p>	<p>Comment noted. See response to Number 3.</p> <p>Since energy requirements would be the same for the alternatives presented regardless of power to operate the systems being from renewable or conventional sources, a comparison of Operations and Maintenance costs, which was completed in the FS, provides this information.</p> <p>Enhanced Alternative 5 was selected because it provided the best balance between meeting the cleanup goals and operational efficiency.</p> <p>Energy requirements are not required to be part of the Feasibility Study, although it may be added if the IAGWSP and regulatory agencies agree to incorporating this additional analysis in future feasibility studies.</p>
6	Michael E. Minior	Air Force/IRP Representative on the IART and Citizen of Pocasset	First, I would like to express my support for selection of alternative 3 for cleanup of the Demo 1 plume. This is the only alternative that balances the time for cleanup versus cost in consideration of risk and potential for future use of the aquifer. This is also the opinion of my neighbors to whom I have spoken as we are residents of the Pocasset community which is located to the west of the base.	Preference noted.

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7	Michael E. Minior	Air Force/IRP Representative on the IART and Citizen of Pocasset	I find it disingenuous that EPA, who selected the preferred remedy, put forth in the RSP, had the cost figures for alternatives 5 and 6 revised based on the latest plume shells and did not do the same for all the active alternatives. I would like an explanation of why only alternatives 5 and 6 were revised and an explanation of how EPA expected the public to be able to knowledgeably compare alternatives that have a different basis of analysis. It is difficult for the public to compare apples and oranges.	Both the original and revised costs were included in the Feasibility Study for comparison purposes. Only Alternatives 5 and 6, which required updated modeling of the toe of the plume were redone in the supplemental evaluation, so updated costs were only available for those alternatives.
8	Michael E. Minior	Air Force/IRP Representative on the IART and Citizen of Pocasset	The map provided in the RSP (August 2005) for public evaluation provides an outline of the RDX concentrations that and perchlorate plumes. However, there is no reference to the concentration contour depicted. This is an intentional misrepresentation of the actual size of the plume based on current federal or state standards. Why didn't EPA provide an accurate plume depiction for public review in the RSP? Where is the RDX 2ppb Health Advisory concentration contour? Where is the perchlorate 24.5 ppb concentration contour? Or even the 1 ppb contour? How can the public reasonably consider the various alternatives in addition to the recommended alternative without accurate information?	Since new 2 ppb RDX contour and the 1 ppb perchlorate contour were detected in recent sampling rounds it was determined that showing only the outer outline of the plume and not the inner contours would be most accurate. With respect to your comment about misrepresentation, EPA believes (and has been addressed by the IART) that showing the entire detectable plume is an honest representation. Based on your comments at the public meeting where the RSP was initially

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				presented, the figure was revised to show the 2 ppb RDX and 1 ppb perchlorate contours prior to the public hearing.
9	Michael Minor	E. Air Force/IRP Representative on the IART and Citizen of Pocasset	<p>On page 9 in the discussion of cleanup goals there is reference to perchlorate contamination in the Massachusetts has aquifer. Perchlorate is an unregulated contaminant promulgated an for which EPA has established a DWEL of 24.5 ppb MMCL for perchlorate (page 2). There is no state standard for perchlorate, only an advice level for sensitive populations. The EPA has stated that they selected "enhanced alternative 5" as the remedy to be found to be the best implemented. This I perceive is the only way that the EPA could get the Army to support the six well system (alt. 6) that EPA really wants built to remove every trace of contamination. How does the enhanced alternative 5 which is nothing more than a contingent remedy save money?</p> <p>I would like EPA to provide a clear explanation of which authority allows them to order the reduction of perchlorate concentrations to 1 ppb (as it requires a specialized technology for removal unlike the activated carbon that will easily remove the RDX) in the absence of a cleanup or drinking water standard at the 1 ppb level. Perchlorate removal to such low levels drives up the cost of cleanup considerably. How can the decision to build the sixth well, which will be based on perchlorate only, be justified?</p>	<p>The Commonwealth of Massachusetts has promulgated an MMCL for perchlorate since this comment was received. Alternative 5 was found to be the best balance between total costs and time required to reach the remedial goals. If the contingency is not required, Enhanced Alternative 5 would be significantly less costly than Alternative 6.</p> <p>The decision to build the sixth well will be based on contamination above any federal or state regulatory or risk-based levels for contaminants of concern migrating past the well transect that will include wells D1P-30, D1P-31 and D1P-32. SDWA does require protection of human health as a priority objective. Cost was considered as one of the factors in</p>

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9	Michael E. Minior	Air Force/IRP Representative on the IART and Citizen of Pocasset	The modeling predicts that the concentrations of perchlorate will dissipate (below 24.5 ppb) through natural processes downgradient of Pew Road. The RDX will also be reduced below its Health Advisory of 2ppb long before it reaches the base boundary now that the Demo 1 source area has been cleaned up (since there is no longer any mass of RDX leaching to groundwater to support higher concentrations downgradient).	achieving this objective but SDWA does not require a cost-benefit analysis under Section 1431. You are correct that perchlorate is not likely to migrate beyond the base boundary at concentrations exceeding 24.5 ppb under current conditions. However it is not certain that RDX would not migrate past the base boundary above the 2 ppb health advisory if no remedial systems were in place. In addition, because Camp Edwards is a potential future drinking water supply the plume should be remediated to prevent future exposures and the protect the sole source aquifer.
10	Michael E. Minior	Air Force/IRP Representative on the IART and Citizen of Pocasset	I would like EPA to provide a clear delineation of the productive portion of the aquifer that the recommended remedy is attempting to restore, to include an estimation (year) of when this portion of the aquifer might be needed to support future water supply needs for the Town of Bourne. The IRP's Long Range Water Supply Process Action Team	There is no current estimation as to when the restored portion of the aquifer will be required for water supply use. Your comments concerning

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		<p>downgradient of Pew Road; specifically for test well supply wells in the site number 10. The LRWSPAT recommended that vicinity of North Pond site 10 not be pursued, even though the water are noted and quality looked good and the formation looked consistent with promising for a sustainable yield, because of the findings during potential for adverse ecological impacts to North development of the Pond from development of site 10 as a potable Upper Cape Regional source. How is it reasonable then to push for a Water Supply system. quicker cleanup of that portion of the aquifer (than afforded by Alternative 3) if it will never (probability = zero) be used for water supply purposes?</p>	<p>Further, as a sole source aquifer, it should be remediated as quickly as possible.</p>
11	Michael E. Minior	<p>Air Force/IRP Representative on the IART and Citizen of Pocasset</p> <p>There is no mention of the receptors that are potentially at risk from the Demo 1 groundwater contamination. Is the sole reason for this cleanup to "restore the aquifer" as stated on page 2? Please explain the future use that warrants the expenditure of millions of additional dollars in order to restore this impacted portion of the aquifer in 11 years rather than the 23 years the modeling predicts will be the case for alternative 3. I am not sure of the cost difference (dollars to be saved) because of the EPA's decision not to include alternative 3 in the supplemental evaluation.</p>	<p>Currently there are no users of the aquifer affected by the Demo 1 plume. The objective is to restore the portion of the aquifer impacted by Demo 1 to protect the beneficial uses of the sole source aquifer and to minimize any future health risks and expedite cleanup as much as possible.</p>
12	Michael E. Minior	<p>Air Force/IRP Representative on the IART and Citizen of Pocasset</p> <p>In conclusion, the remedy preferred by EPA is not reasonable or supported by the facts. The information presented in this Remedy Selection Plan is a biased misrepresentation of (1) the extent of contamination, of (2) the risks associated with contaminants due to the potential for future use of this portion of the aquifer to include the lack of potential receptors and (3) for only revising the capital and life-cycle costs of the two alternatives that ultimately were combined into one enhanced alternative 5 without any cost information provided for public review in the RSP.</p> <p>I strongly recommend that EPA revise their recommendation (from enhanced alternative 5) and select alternative 2 as the cleanup remedy to be implemented. Or redo the RSP to present correct, factual information to allow for a through public present and future</p>	<p>Preference for Alternative 2 noted.</p> <p>EPA disagrees with the statements. The SDWA specifically allows for protection of present and future</p>

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		<p>review (apples to apples comparison) and schedule another public comment period.</p> <p>The above opinion is submitted for your consideration in final remedy selection. I request a written response to my comments and that I be provided a copy of the entire responsiveness summary that will be appended to the Decision Document for Demo 1 groundwater.</p>	<p>drinking water supplies.</p> <p>A copy of the Responsiveness Summary will be supplied as requested.</p>

Table 1
Remediation Goals for COCs for Demo 1 Groundwater Operable Unit

Contaminant Of Concern	Max. Concentration (2005-2006) ($\mu\text{g/L}$)	Analytical Reporting Limit ($\mu\text{g/L}$)	Background Concentration ($\mu\text{g/L}$)	Oral Risk-Based Concentration, RBC ¹ ($\mu\text{g/L}$)		Other Limits		
				Non-Cancer	Cancer	MCL ($\mu\text{g/L}$)	MMCL ($\mu\text{g/L}$)	DWEL ($\mu\text{g/L}$)
RDX	140	0.25	0.25	110	60	0.6	NA	NA
Perchlorate	102	1.00	0.35	24.5	NC	NC	2	NA
TNT	5.9	0.25	0.25	18	220	2.2	NA	2
2,4-DNT	0.37	0.25	0.25	73	10	0.1	NA	NA
							100	0.25*

¹ – Source of Toxicity Information (RfD and CSF) to derive RBC is IRIS (EPA 2006).

* – The risk based remediation level for 2,4,-DNT (0.1 $\mu\text{g/L}$) is below the reporting limit of the analytical method, therefore the reporting limit of 0.25 $\mu\text{g/L}$ will be used as the Remediation Goal. This equates to a cancer risk of 2×10^{-6} .

Background concentrations for RDX, TNT, and 2,4-DNT are equal to the analytical reporting limit, for perchlorate it is the analytical method detection limit.

COC – Contaminant of Concern.

DWEL – Drinking Water Equivalent Level, based on non-carcinogenic effects.

HA – USEPA Health Advisory.

NA – Not Available.

NC – Non-carcinogenic.

MCL – USEPA Maximum Contaminant Level.

MMCL – Massachusetts Maximum Contaminant Level.

RBC - Risk Based Concentration.

TABLE 2
SUMMARY OF ALTERNATIVES

Alt#	Design Details			RDX Remediation			Perchlorate Remediation			Capital Cost	O&M	Total Present Worth***
	Number of Extraction Wells	Total Extraction Rate (gpm)	Number of Injection Wells	Years to Achieve Risk-Based Concentration (0.6 ppb)	Years to Achieve Background (0.25 ppb)	% Mass Removed After 10 years	Years to Achieve Risk-Based Concentration (1.0 ppb)	Years to Achieve Background (0.35 ppb)	% Mass Removed after 10 years			
1	0	0	0	>50	0		>50	0		1,550,000	1,300,000	2,850,000
2	2	320	3	36	50	67.5	36	35/>50*	80.2	3,640,000	11,400,000	15,000,000
3	4	472	4	23	27	92.1	23	23/21*	92.7	6,350,000	14,700,000	21,100,000
4	5	1417	4	11	15	99.7	10	15/15*	98.3	10,200,000	15,500,000	25,700,000
5**	5	906	4	14	16	98.8	13	15/20*	98.3	8,340,000 (8,300,000)	12,700,000 (10,600,000)	21,000,000 (18,900,000)
6**	6	981	4	14	16	99.0	14	15/17*	97.9	9,870,000 (9,900,000)	16,700,000 (14,000,000)	26,600,000 (23,900,000)

TABLE 2 SUMMARY OF ALTERNATIVES

NOTES:

Although the Contaminants of Concern list includes other explosive compounds, this table presents only RDX and perchlorate because those two plume shells contain the other contaminants.

* upgradient/downgradient of Pew Road

All percentages reflect cumulative mass removed including interim actions taken prior to startup of selected cleanup alternative.

gpm = gallons per minute

** Alternatives 5 and 6 were reevaluated in early 2005 to account for revised RDX and perchlorate plume shells. The results of the supplemental evaluation are presented within the parentheses below the results from the Feasibility Study. These results show that Alternatives 5 and 6 perform relatively similar in time to restore the aquifer.

*** In the supplemental evaluation, the estimated time to reach a 1 ppb cleanup for perchlorate is 11 years for both Alternatives 5 and 6 with total present worth cost to achieve 1 ppb for perchlorate of \$18.9 million and \$22.1 million for Alternative 5 and Alternative 6 respectively. To achieve background for perchlorate, the total present worth costs are \$20.3 million and \$23.9 million for Alternatives 5 and 6, respectively.

Table 3
Regulatory Considerations
Decision Document
Demo 1 Groundwater Response Action

AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
Groundwater			
Federal/Chemical Specific	SDWA Maximum Contaminant Levels (MCLs), 40 CFR 141.61–141.63	EPA has promulgated SDWA MCLs (40 CFR Parts 141-143). MCLs are enforceable standards that regulate the concentration of contaminants in public drinking water supplies. In addition to health considerations, MCLs also take into account cost and feasibility using current technology.	EPA has considered these values in the determination of numerical remediation goals for this response action. Under Alternative 5, the Demo 1 ETR system is designed to treat groundwater to levels at or below relevant MCLs. If EPA promulgates more stringent MCLs, the more stringent standards will apply.

Table 3
Regulatory Considerations
Decision Document
Demo 1 Groundwater Response Action

AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
State/Chemical Specific	Massachusetts Method 1 Groundwater Standards, 310 CMR 40.0974(2), Table 1	<p>These standards have been developed by MassDEP considering a defined set of exposures considered to be a conservative estimate of the potential exposures at most sites.</p> <p>The State has classified the groundwater beneath MMR as GW-1. The State has promulgated Method 1 standards for GW-1 groundwater for perchlorate (2 ppb) and 2, 4-DNT (30 ppb).</p>	<p>EPA has considered these values in the determination of numerical remediation goals for this response action. Under Alternative 5, the Demo 1 ETR system is designed to treat groundwater to levels at or below these values.</p>
State/Chemical Specific	Massachusetts Ground Water Quality Standards, 314 CMR 6.06	<p>These MassDEP standards limit the concentration of certain materials allowed in classified Massachusetts waters. Massachusetts has classified the groundwater beneath MMR as a Class I water (fresh groundwater found in the saturated zone of unconsolidated deposits) and is designated as a source of potable water. The standards for Class 1 groundwater are stated in 314 CMR 6.06(1).</p>	<p>EPA has considered the MassDEP groundwater quality standards in the determination of numerical remediation goals for this response action. Under Alternative 5, the Demo 1 ETR system is designed to treat groundwater to levels at or below relevant Massachusetts Class 1 groundwater standards. If EPA promulgates more stringent drinking water or groundwater quality standards, the more stringent standards will apply. If the State issues new or revised drinking water or groundwater quality standards relevant to this response action, EPA will evaluate whether such standards warrant modification of the response action.</p>

Table 3
Regulatory Considerations
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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
Federal/Chemical Specific	Drinking Water Health Advisories, published at http://www.epa.gov/waterscience/criteria/drinking/	These are exposure concentrations protective of adverse <i>non-cancer</i> effects for a given exposure period. The 1-day and 10-day HA are designed to protect a child; the lifetime HA is designed to protect an adult.	EPA has considered Drinking Water Health Advisories in the determination of numerical remediation goals for this response action. Under Alternative 5, the Demo 1 ETR system is designed to treat groundwater to levels at or below the relevant Health Advisory values. If EPA issues new or revised Drinking Water Health Advisories relevant to this response action, EPA will determine whether such Health Advisories warrant modification of the response action.
Federal/Chemical Specific	Drinking Water Equivalent Levels (DWELs), published at http://www.epa.gov/waterscience/criteria/drinking/	DWELs set forth lifetime exposure concentration values protective of adverse, <i>non-cancer</i> health effects, assuming that all of the exposure to a contaminant is from drinking water.	EPA has considered DWEL values in the determination of numerical remediation goals for this response action. Under Alternative 5, the Demo 1 ETR system is designed to treat groundwater to levels at or below the relevant DWEL values. If EPA issues new or revised Drinking Water Equivalent Levels relevant to this response action, EPA will determine whether such Levels warrant modification of the response action.

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
Federal/Chemical Specific	Human Health Reference Doses (RfDs), Reference Concentrations (RfCs), Cancer Slope Factors (CSFs), and 10^{-6} excess lifetime cancer risk level	These risk-based concentrations are considered together with site-specific exposure information to develop concentrations of residual contamination that will not endanger human health.	These values were considered in the risk assessment and calculation of numerical remediation goals. When the response action's residual risk assessment is performed, the most up-to-date values available will be used.
State/Chemical Specific	Massachusetts Office of Research and Standards ("ORS") Guidelines, as found in <i>Standards and Guidelines for Chemicals in Massachusetts Drinking Waters</i> (Spring 2006)	The Massachusetts ORS has identified guidelines, based on health and technical practicality, applicable to drinking water.	EPA has considered these guidelines in the determination of numerical remediation goals for this response action.
Federal/Action Specific	Underground Injection Control Program, 40 CFR Parts 144-148	These regulations outline minimum program and performance standards for underground injection wells, prohibit any injection that may cause a violation of any primary drinking water regulation under 40 CFR 142 in the aquifer or may otherwise adversely affect the health of persons, and restrict injection of hazardous waste. Infiltration galleries fall within the broad definition of Class V wells. The relevant regulations are administered by the State through 310 CMR 27.00.	Under Alternative 5, the Demo 1 ETR system is designed to treat groundwater to levels at or below relevant federal and state drinking water standards (where they exist) to ensure that reinjection of the treated groundwater will not cause a violation of these standards in the aquifer or otherwise adversely affect the health of persons.

Table 3
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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
State/Action Specific	Underground Injection Control, 310 CMR 27.00	These MassDEP regulations prohibit injection of fluid containing any pollutant into underground sources of drinking water where such pollutant will, or is likely to, cause a violation of any state drinking water standard or may adversely affect the health of persons.	Under Alternative 5, the Demo 1 ETR system is designed to treat groundwater to levels at or below relevant federal and state drinking water standards (where they exist) to ensure that injection of the treated groundwater will not cause a violation of these standards in the aquifer or adversely affect the health of persons.

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
State/Action Specific	Groundwater Discharge Regulations, 314 CMR 5.00	<p>These MassDEP regulations provide that recharge of effluent from some treatment works requires a permit under Groundwater Discharge Regulations at 314 CMR 5.00 unless the exemption allowing for actions taken in compliance with MGL ch. 21E and 310 CMR 40.0000 applies. 314 CMR 5.10 sets forth specific water quality-based effluent limits for groundwater discharge.</p> <p>MassDEP has determined that effluent from the Demo 1 treatment system is “conditionally exempt” from obtaining a groundwater discharge permit provided that the treatment system is built and operated consistent with “the applicable or relevant provisions of the Massachusetts Contingency Plan, and more specifically, the Management Procedures for Remedial Wastewater and Remedial Additives at 310 CMR 40.0040.” (see letter from MassDEP to IAGWSP dated 13 February 2004).</p>	<p>Under Alternative 5, the planned approach for operation and maintenance of the Demo 1 ETR system meets the substantive objectives of this regulation or provides adequate alternative protective measures. Treated effluent which is recharged to the aquifer will be at or below applicable Massachusetts groundwater quality standards. The detailed plan for monitoring, inspecting and reporting on the performance of the extraction, treatment and recharge systems will be presented in the system performance monitoring plan, which will be provided to the MassDEP for review.</p>

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
State/Action Specific	Construction and operation of a groundwater treatment plant, 310 CMR 40.0040	<p>These MassDEP regulations establish management procedures for remedial wastewater as well as the construction, installation, change, operation and maintenance of treatment works for Remedial Wastewater. Treatment works shall be inspected and the inspections documented. Treatment works shall be protected from vandalism and measures shall be taken to prevent system failure, contaminant pass through, interference, bypass, upset, and other events likely to result in a discharge of oil and/or hazardous material to the environment.</p>	<p>Consistent with the letter from MassDEP to IAGWSP dated 13 February 2004 and the Demo 1 treatment system's conditional exemption from the requirements of 314 CMR 5.00, the Demo 1 ETR system will be operated and maintained in a manner consistent with these provisions.</p>

Table 3
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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
State/Action Specific, Chemical Specific	Discharge of Groundwater, 310 CMR 40.0045	<p>These MassDEP regulations restrict remedial wastewater discharge to the ground surface or subsurface and/or groundwater. Such a discharge should not erode or impair the functioning of the surficial and subsurface soils, infiltrate underground utilities, building interiors or subsurface structures, result in groundwater mounding within two feet of the ground surface, or result in flooding or breakout to the ground surface. The concentrations of all pollutants discharged must be below the Massachusetts Groundwater Quality Standards established by 314 CMR 6.00. The concentrations must also be below the applicable Reportable Concentrations established by 310 CMR 40.0300 and 40.1600.</p>	<p>EPA has considered these provisions in its review of Alternative 5. Under Alternative 5, the planned approach for operation and maintenance of the Demo 1 ETR system meets the objectives of this regulation. Under Alternative 5, the system Performance Monitoring Plan presents a detailed plan for monitoring, inspecting and reporting on the performance of the Demo 1 ETR system. The Performance Monitoring Plan, will be provided to MassDEP for review.</p> <p>The regulations provide performance standards for discharges depending on whether they are downgradient or upgradient, contain non-reportable concentrations of oil or hazardous material, or occur during well development or sampling.</p>

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
State/Action Specific, Chemical Specific	Discharge of Groundwater, 310 CMR 40.0300 and 310 CMR 40.1600	The MCP contains special provisions for the discharge of groundwater containing very low levels of oil or hazardous material. Groundwater containing oil and/or hazardous material in concentrations less than the applicable release notification threshold established by 310 CMR 40.0300 and 40.1600, can be discharged to the ground subsurface and/or groundwater only when following appropriate guidelines.	EPA has considered these provisions in its review of Alternative 5. Under Alternative 5, the planned approach for operation and maintenance of the Demo 1 ETR system meets the objectives of this regulation. Under Alternative 5, the system Performance Monitoring Plan presents a detailed plan for monitoring, inspecting and reporting on the performance of the Demo 1 ETR system. The Performance Monitoring Plan will be provided to MassDEP for review.
Federal/Location Specific	Sole Source Aquifer Determination for Cape Cod Aquifer, 47 Fed. Reg. 30,282 (July 13, 1982)	SDWA Section 1424(e) authorizes EPA to determine that an area has an aquifer which is the sole or principal drinking water source for the area and, if contaminated, would create a significant hazard to public health. Once an area is so designated, no Federal financial assistance may be provided for any project that may contaminate the aquifer through a recharge zone so as to create a significant hazard to public health.	EPA has considered the Sole Source Aquifer Determination in its review of Alternative 5. Alternative 5 is designed to remediate groundwater to levels that prevent creation or aggravation of a significant hazard to public health. Specifically, Alternative 5 is designed to remediate groundwater to levels that meet or exceed applicable Federal/State MCLs, MCLGs, DWELs, HAS, and the 10^{-6} excess cancer risk level.

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
Surface water			
State/Chemical Specific	Massachusetts Surface Water Quality Standards, 314 CMR 4.00	<p>These MassDEP standards prescribe the minimum water quality criteria required to sustain the designated uses of Massachusetts waters. The levels are designed to prevent all adverse health effects from ingestion, inhalation or dermal contact.</p>	<p>EPA has considered these provisions in its review of Alternative 5. Alternative 5 as designed, does not involve routine discharge of effluent into surface waters. However, if dewatering or other activities were to require discharge into a surface water body, the treated effluent from the Demo 1 ETR system would meet or exceed these standards.</p>
State/Action Specific	Prohibitions and Standards for Discharges to POTWs, 314 CMR 12.08	<p>Contains prohibitions and pretreatment standards for discharges to publicly owned treatment works.</p>	<p>EPA has considered these provisions in its review of Alternative 5. Alternative 5 as designed, does not involve routine discharge of effluent into a POTW. However, if dewatering, sludge disposal, or other activities generate wastewater that requires discharge into a POTW, the treated effluent from the Demo 1 ETR system would meet or exceed the relevant standards.</p>

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
Federal/Chemical Specific	National Recommended Water Quality Criteria, published at http://www.epa.gov/waterrscience/criteria/wqcriteria.html	Under Section 304(a)(1) of the Clean Water Act, EPA develops these criteria for surface water quality that accurately reflect the latest scientific knowledge. These criteria are based solely on data and scientific judgments on pollutant concentrations and environmental or human health effects.	EPA has considered these provisions in its review of Alternative 5. Alternative 5 as designed, does not involve routine discharge of effluent into surface waters. However, if dewatering or other activities were to generate wastewater that required discharge into surface waters, the treated effluent from the Demo 1 ETR system would meet or exceed these standards.
Federal/Action Specific	CWA NPDES Stormwater Discharge Requirements, 40 CFR 122.26	Establishes requirements for stormwater discharges associated with construction activities that result in a land disturbance of equal to or greater than one acre of land. The requirements include good construction management techniques; phasing of construction projects; minimal clearing; and sediment, erosion, structural, and vegetative controls to mitigate stormwater run-on and runoff.	If stormwater runoff associated with well placement, or from remedy construction, operation, and maintenance activities, or other activities deriving from the remedial action discharges directly or indirectly to a surface water body, including wetlands, the runoff will be controlled in accordance with these provisions.

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
State/Action Specific	Stormwater Discharge Requirements, 314 CMR 3.04 and 314 CMR 3.19	Requires that stormwater discharges associated with construction activities be managed in accordance with the general permit conditions of 314 CMR 3.19 so as not to cause a violation of Massachusetts surface water quality standards in the receiving surface water body (including wetlands).	If stormwater runoff associated with well placement, or from remedy construction, operation, and maintenance activities, or other activities deriving from the remedial action discharges directly or indirectly to a surface water body, including wetlands, the runoff will be controlled in accordance with these provisions.
State/Action Specific	Stormwater Management Program Policy (Nov. 18, 1996)	Provides policies and guidance on complying with the state's stormwater discharge requirements.	If stormwater runoff associated with well placement, or from remedy construction, operation, and maintenance activities, or other activities deriving from the remedial action discharges directly or indirectly to a surface water body, including wetlands, the runoff will be controlled in accordance with these provisions.

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
Solid Waste			
Federal/Action Specific	Resource Conservation and Recovery Act (RCRA) - Identification and Listing of Hazardous Waste, 40 CFR Part 261	Part 261 establishes requirements for determining whether wastes are hazardous. 40 CFR 261.24 identifies the concentrations of contaminants that make a waste material a RCRA-characteristic hazardous waste for toxicity using the Toxicity Characteristic Leaching Procedure (TCLP) test.	Spent activated carbon and any other solid waste will be analyzed. If the results exceed the standards in 40 CFR 261.24, or otherwise constitute hazardous wastes, the material will be treated and/or disposed of offsite in a RCRA-permitted treatment, storage, and disposal facility.
Federal/Action Specific	RCRA Generator Requirements; 40 CFR Part 262	At present, the only COC with a listed toxicity threshold is 2,4-DNT (130 ppb). See 40 CFR 261.24(b), Table 1.	Hazardous wastes will be identified at the point of generation, and will be accumulated in accordance with requirements of 40 CFR 262.34(a) on-site for no greater than 90 days without a RCRA permit. If hazardous wastes are accumulated for greater than 90 days, then a RCRA permit will be obtained.
Federal/Action Specific	RCRA Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, 40 CFR Part 264	These regulations define the acceptable management of hazardous waste, and apply to owners and operators of all facilities which treat, store, or dispose of hazardous waste.	If remedial actions result in the generation or accumulation of hazardous waste, then such wastes will be treated, stored, and disposed of in a manner that meets or exceeds these requirements.

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
Federal/Action Specific	RCRA Land Disposal Restrictions, 40 CFR Part 268	These regulations restrict the disposal of any treatment wastes classified as hazardous waste.	If any offsite land disposal of hazardous waste occurs, the hazardous waste will be treated before disposal so as to meet or exceed these requirements.
Federal/Action Specific	RCRA Control of Hazardous Waste Injection, RCRA Section 3020; "Applicability of RCRA Section 3020 to In Situ Treatment of Ground Water" (EPA, Dec. 2000); "Applicability of Land Disposal Restrictions to RCRA and CERCLA Ground Water Treatment Reinjection" (EPA, Dec. 1989)	This provision prohibits disposing of hazardous waste by underground injection into or above a formation which contains an underground source of drinking water within one-quarter mile of the injection well. The statute exempts certain cleanup actions conducted under CERCLA and RCRA, but not the SDWA.	All remedial actions will be conducted in accordance with RCRA Section 3020 and EPA's guidance. No hazardous wastes will be injected into the ground. The groundwater that is treated by the remedial system is not expected to be a listed or characteristic hazardous waste. Any hazardous wastes that are disposed of on or below ground must satisfy the Land Disposal Restrictions at 40 CFR Part 268.
Federal/Action Specific	Hazardous Waste Operations and Emergency Response, 29 CFR 1910.120	These regulations describe training, monitoring, planning, and other activities to protect the health of workers performing hazardous waste operations.	These worker protection standards will be followed, where applicable, to protect the health of workers from risks posed by hazardous substances.
State/Action Specific	Massachusetts Solid Waste Management Regulations, 310 CMR 19.00	If a waste is determined to be a solid waste, it must be managed in accordance with the state regulations at 310 CMR 19.00.	Any solid wastes determined to be non-hazardous will be managed and disposed of in accordance with these regulations.

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
State/Action Specific	Massachusetts Hazardous Waste Regulations, 310 CMR 30.00	<p>These regulations establish requirements for identification, treatment, storage, and disposal of hazardous waste. 310 CMR 30.100-30.162 specifies how to determine whether a solid waste is considered hazardous under these regulations. 310 CMR 30.125 identifies the concentrations of contaminants that make a waste material a characteristic hazardous waste for toxicity using the TCLP test.</p> <p>At present, the only COC with a listed toxicity threshold is 2,4-DNT (130 ppb). See 40 CFR 261.24(b), Table 1. Certain dinitrotoluene byproducts are listed in 30 CMR 30.132.</p>	<p>Any solid wastes determined to be hazardous will be managed and disposed of in accordance with these regulations. The guidelines in 310 CMR 30.561, concerning the substances with which perchlorates should not be mixed so as to prevent fire, explosion, or violent reaction, will be followed unless impractical or unsafe.</p>
Air	Massachusetts Air Pollution Control Regulations, 310 CMR 7.00	<p>These regulations set emission limits necessary to attain ambient air quality standards for fugitive emissions, dust, odor, particulates, and noise.</p>	<p>Construction or demolition activities may trigger the Massachusetts Air Pollution Control Regulations. Engineering controls, such as dust suppression, will be used as necessary to comply with these regulations for fugitive emissions, dust, odor, particulate, and noise emissions during site construction activities.</p>

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
State/Action Specific	Massachusetts Remedial Air Emissions Regulations, 310 CMR 40.0049	The Massachusetts rules set forth standards for emissions from remedial activities, including a requirement for 95% control over emissions of oil and hazardous materials from the remedial system.	The remedial system is not expected to emit any oil or hazardous materials to the atmosphere. However, if oil or hazardous materials are emitted, then the remedial system will meet or exceed the substantive requirements of this provision.
Wetlands			
Federal/Location Specific	Clean Water Act § 404, Permits for Dredged or Fill Material; Army Corps of Engineers Regulations, 33 CFR Part 320-330; 40 CFR Part 230	Regulates discharges of dredged or fill material, and associated activities, that may adversely affect wetlands. No such activity that adversely affects a wetland shall be permitted if a practicable alternative with fewer effects is available. If no practicable alternative exists, impacts must be mitigated.	Some of the area near North Pond is a wetland. If construction of additional monitoring wells, or other activity that might disturb any wetlands becomes necessary, then the activity will be designed to minimize impacts on wetlands.
State/Location Specific	Massachusetts 401 Water Quality Certification for Discharge of Dredged or Fill Material, 314 CMR 9.00	Applies to the discharge of dredged or fill material in waters of the United States within the Commonwealth which require federal permits and which are subject to state water quality certification. With certain exceptions, applicants for such permits must also apply for state certification.	If any remedial activity requires a discharge of dredged or fill material to waters of the United States, a state water quality certification will also be obtained.

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
Federal/Location Specific	Executive Order 11990, Protection of Wetlands; 40 CFR Part 6, Appendix A	Requires federal agencies to take action to avoid adversely impacting wetlands wherever possible, and to preserve the beneficial values of wetlands.	Some of the area near North Pond is a wetland. If construction of additional wells, or other activity that might disturb any wetlands, becomes necessary, then the activity will be designed to minimize impacts on, and preserve the values of, these wetlands.
Federal/Location Specific	Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661 <i>et seq.</i>	Requires federal agencies to consult with U.S. Fish and Wildlife Service and state wildlife agencies to mitigate losses of fish and/or wildlife habitat that may result from modification of a water body for any purpose.	Some of the area near North Pond is a wetland. If construction of additional wells, or other activity that might disturb any water body becomes necessary, then the wildlife agencies will be consulted and the activity will be designed to minimize and/or compensate for impacts on wildlife resources.
State/Location Specific	Massachusetts Wetlands Protection Act, MGL ch. 131, § 40; 310 CMR 10.00	Imposes requirements and limitations for alteration of land under water bodies and establishes performance standards for projects that affect wetlands.	Some of the area near North Pond is a wetland. If construction of additional wells, or other activity that might disturb any wetlands, becomes necessary, then the activity will be designed to minimize impacts on, and preserve the values of, these wetlands.

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
Wildlife	State/Action Specific Massachusetts Endangered Species Act, MGL ch. 131A; 321 CMR 10.00	Actions that jeopardize state-listed endangered or threatened species, or species of special concern or their habitats must be avoided, or, if that is not possible, minimized and mitigated.	<p>Several state-listed species have been identified on MMR, and some of the area near North Pond is listed as a state Natural Heritage and Endangered Species Program (NHESP) Estimated Habitat of Rare Wildlife in Wetland Areas. Moreover, the Natural Resource Offices at the Massachusetts National Guard Environmental & Readiness Center continues to search for, identify, and map locations of rare species on MMR.</p> <p>Operation and maintenance of the current well system, construction of new wells, and all other activities will be designed to minimize effects to endangered or threatened species and their habitats.</p>

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
Other			
Federal/Action Specific	Historic Sites, Buildings, Objects, and Antiquities: National Historic Preservation Act, 16 U.S.C. §§ 470 et seq., 36 CFR Part 800; AHPA, 16 U.S.C. §§ 469a-c; Archaeological Resources Protection Act, 16 U.S.C. §§ 470aa-ll, 43 CFR Part 7; Native American Graves Protection and Repatriation Act, 25 U.S.C. §§ 3001-3013, 43 CFR Part 10	<p>These statutes and regulations provide for the protection of historical, archaeological, and Native American burial sites, artifacts, and objects that might be lost as a result of a federal construction project. If a discovery is made, all activity in the area must stop and reasonable effort must be made to secure and protect the objects discovered.</p>	<p>The Wampanoag Indian Tribes and the Massachusetts Historical Commission will be consulted regarding whether a cultural resources survey is needed to discover and identify objects and artifacts, particularly Native American artifacts of the Wampanoag Indian Tribes.</p> <p>If wells will be sited, or any other potentially land-disturbing activities will occur, in areas that may have such resources, all such resources discovered during a survey or inadvertently discovered during on-site remedial activities (for example, siting new wells) will be secured and protected as required by law.</p>

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AUTHORITY/TYPE	PROVISION	SYNOPSIS	RESPONSE
State/Action Specific	Massachusetts Historic Preservation Act, MGL ch. 9 §§ 26-27C; MGL ch. 7, § 38A; MGL ch. 38, §§ 6B, 6C; 950 CMR 70-71	The MHC is the state historic preservation office and is authorized by Massachusetts law to identify, evaluate and protect the Commonwealth's important historic and archaeological resources. The MHC administers state and federal preservation programs, including planning, review and compliance.	The Wampanoag Indian Tribes and the Massachusetts Historical Commission will be consulted regarding whether a cultural resources survey is needed to discover and identify objects and artifacts, particularly Native American artifacts of the Wampanoag Indian Tribes. If wells will be sited, or any other potentially land-disturbing activities will occur, in areas that may have such resources, all such resources discovered during a survey or inadvertently discovered during on-site remedial activities (for example, siting new wells) will be secured and protected as required by law.