



DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final

2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control

Facility Name: Maine Yankee Atomic Power Company
Facility Address: 321 Old Ferry Road, Wiscasset Maine
Facility EPA ID #: MED 071 749 329

- 1. Has all available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action...
[X] If yes - check here and continue with #2 below.
If no - re-evaluate existing data, or
if data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions.

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

RCRA RECORDS CENTER
FACILITY NAME: Maine Yankee Atomic Power
ID: MED 071 749 329
FILE NO: A-13
DATE: 10/20/99

**Current Human Exposures Under Control  
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2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **“contaminated”**<sup>1</sup> above appropriately protective risk-based “levels” (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
Groundwater	<u>X</u>	<u>   </u>	<u>   </u>	Petroleum compounds, VOCs, metals
Air (indoors) <sup>2</sup>	<u>   </u>	<u>X</u>	<u>   </u>	
Surface Soil (e.g. <2 ft)	<u>X</u>	<u>   </u>	<u>   </u>	Arsenic, manganese, boron, iron, sodium
Surface Water	<u>   </u>	<u>X</u>	<u>   </u>	
Sediment	<u>   </u>	<u>X</u>	<u>   </u>	
Subsurf. Soil (e.g., >2 ft)	<u>X</u>	<u>   </u>	<u>   </u>	same as above
Air (outdoors)	<u>   </u>	<u>X</u>	<u>   </u>	

       If no (for all media) - skip to #6, and enter “YE,” status code after providing or citing appropriate “levels,” and referencing sufficient supporting documentation demonstrating that these “levels” are not exceeded.

  X   If yes (for any media) - continue after identifying key contaminants in each “contaminated” medium, citing appropriate “levels” (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

       If unknown (for any media) - skip to #6 and enter “IN” status code.

**Rationale:** All but one structure has been demolished and removed from Bailey Point. Future use of the site will be limited to industrial or commercial use. Current use of the site is primarily limited to access into and storage of spent nuclear fuel with a 300 meter buffer around the Independent Spent Fuel Storage Facility (ISFSI).

Groundwater is not used as a drinking water supply at this site. Site investigations from late 1980s determined that the issues of concern were petroleum discharges, VOCs and most recently two metals, arsenic and manganese. The Bailey Point RFI investigation has revealed contaminants that were, in general, related to some aspect of plant construction and/or 25 years of operation. The contaminants detected at concentrations greater than Project Action Levels (PALs), defined as the lesser of the Maximum Exposure Guidelines (MEGs) or the Maximum Contaminant Levels (MCLs): aluminum, arsenic, boron, lead, manganese, molybdenum, silver, sodium, thallium, dieldrin, heptachlor, 4-methylphenal, 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, ethylbenzene, vinyl chloride, and DRO. See table 5-13 attached for maximum detected concentrations in groundwater, the State’s MEG standards and federal MCLs limits.

Groundwater in the Industrial and Radiological Restricted Areas (southern portion of the site) contains sodium concentrations that exceed PALs, most likely as a result of saltwater intrusion, operational dosing of seawater, late 1980s sodium chromate leaks, and winter salt application on site roadways. Groundwater in the Industrial and Radiological Restricted Areas contains DRO concentrations ranging from 100 to 500 ppm with a maximum of 581 ppm, most likely as a result of historical petroleum releases, former USTs and other non-point sources such as vehicles and equipment leaks.

Dieldrin was found in several bedrock wells in and near the Restricted Area (RA) in concentrations exceeding the PALs, most likely from placement of fill during construction. Groundwater east and south of Warehouse 2/3 contains Trichloroethane and related chlorinated daughter products that exceed MEGs and MCLs, most likely as a result of solvent leakage from drum storage and management activities. Groundwater west of Warehouse 2/3 contains Benzene, Toluene, Ethene, Xylenes (BTEX) compounds and metals that exceed MEGs, most likely from spilling paints and solvents to surface soils during operation.

For the northern portion of the site, groundwater beneath the dredge spoil disposal area north of the ISFSI and 345 kV Switchyard contains elevated metals, including boron, sodium, iron and manganese concentrations that exceed PALs. These levels were most likely a result of the historic filling of the marsh area with marine sediments. Groundwater in most of the wells north of the staff building which as the site high point is commonly referred to as the knoll and contains DRO and EPH concentrations in excess of PALs, most likely as a result of the kerosene and historical petroleum spills discovered within Study Area 4 (ISFSI), pre-operational features such as the Former Truck Maintenance Garage, and miscellaneous sources within the marine sediment/construction debris disposal area north of the 345 kV Switchyard. Across much of the northern and southern Bailey Point areas, the molybdenum concentration in groundwater exceeds the MEG. The source of molybdenum is unclear; possible sources are petroleum lubricant spills and natural rock minerals.

A groundwater use prohibition has been proposed in a draft restrictive covenant to prevent any future residential use of groundwater.

For soil contaminants, some contaminants were introduced to surface and/or subsurface soil through accidental spills or leaks, while other contaminants may not have been directly associated with plant activities, but were released from placement of dredge materials and pH interactions with natural, geologic materials which released elevated levels of manganese. Elevated arsenic appears to be naturally occurring when compared to background levels, typically ranging between 5 ppm to 13 ppm with a PAL of 22 ppm. Iron was a significant site contaminant that ranged from 23,000 ppm to 40,500 ppm with a PAL of 23,000 ppm throughout the site. SVOCs or PAHs had significant variability with a frequent detection of benzo-a-pyrene from 90 to 6300 ppm and its PAL of 62 ppm. A variety of other SVOCs were detected throughout the industrial area of the site but not at significant levels and were taken into consideration during the human health risk assessment. Minor detections of PCB aroclors were occasionally detected but were well below the PAL of 220 ppb.

#### References:

Maine Yankee Compliance order, 2005  
Maine Yankee Bailey Point RFI Report dated December 2004 and CMS report March/June 2005; and  
Procedural Guidelines for Establishing Standards for the Remediation of Oil Contaminated Soil and Groundwater in Maine.  
Vapor Intrusion Pathway Summary Page (attached)

#### Footnotes:

<sup>1</sup> "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

<sup>2</sup> Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

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3. Are there **complete pathways** between “contamination” and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

<b>“Contaminated” Media</b>	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food <sup>3</sup>
Groundwater	NO	NO	NO	NO			NO
Air (indoors)							
Soil (surface, e.g., <2 ft)	NO	NO	NO	YES	NO	NO	NO
Surface Water							
Sediment	NO	NO			NO	NO	NO
Soil (subsurface e.g., >2 ft)				YES			NO
Air (outdoors)							

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors’ spaces for Media which are not “contaminated”) as identified in #2 above.
2. enter “yes” or “no” for potential “completeness” under each “Contaminated” Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential “Contaminated” Media - Human Receptor combinations (Pathways) do not have check spaces (“\_\_\_”). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- \_\_\_\_\_ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter “YE” status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- X   If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation.
- \_\_\_\_\_ If unknown (for any “Contaminated” Media - Human Receptor combination) - skip to #6 and enter “IN” status code

Rationale and Reference(s) All but one structure has been demolished from the Bailey Point property. There is no current or proposed future use of groundwater. Future construction of any structures could expose humans to contaminated surface or subsurface soils. In the draft restrictive covenant, any potential construction activity within an area of known contamination will be required to submit a waste management plan for the Department’s review and approval.

Bailey Point RFI, Bailey Point CMS,  
Draft restrictive Covenant, June 2005

Footnotes:

<sup>3</sup> Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

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4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be “**significant**”<sup>4</sup> (i.e., potentially “unacceptable” because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable “levels” (used to identify the “contamination”); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable “levels”) could result in greater than acceptable risks)?

  X   If no (exposures can not be reasonably expected to be significant (i.e., potentially “unacceptable”) for any complete exposure pathway) - skip to #6 and enter “YE” status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

       If yes (exposures could be reasonably expected to be “significant” (i.e., potentially “unacceptable”) for any complete exposure pathway) - continue after providing a description (of each potentially “unacceptable” exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

       If unknown (for any complete pathway) - skip to #6 and enter “TN” status code

Rationale and Reference(s): A restrictive covenant is under review and approval that requires if any future construction is likely to be located in an area of known contamination than a soils management plan must be submitted to the Department for review and approval.

Future development is limited to commercial or industrial use only. No use of groundwater for drinking water will be permitted.

Reference: Draft Restrictive Covenant, June 2005

Footnotes:

<sup>4</sup> If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”) consult a human health Risk Assessment specialist with appropriate education, training and experience.

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5 Can the “significant” exposures (identified in #4) be shown to be within **acceptable** limits?

  NA   If yes (all “significant” exposures have been shown to be within acceptable limits) - continue and enter “YE” after summarizing and referencing documentation justifying why all “significant” exposures to “contamination” are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

       If no (there are current exposures that can be reasonably expected to be “unacceptable”)- continue and enter “NO” status code after providing a description of each potentially “unacceptable” exposure.

       If unknown (for any potentially “unacceptable” exposure) - continue and enter “IN” status code

Rationale and Reference(s):

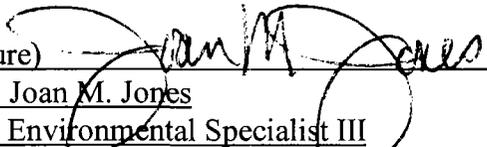
**Current Human Exposures Under Control  
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6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

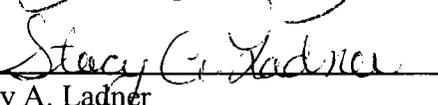
X  YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Maine Yankee \_\_\_ facility, EPA ID #  MED 071 749 329 , located at Wiscasset, Maine under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

\_\_\_ NO - "Current Human Exposures" are NOT "Under Control."

\_\_\_ IN - More information is needed to make a determination.

Completed by (signature)     
(print)  Joan M. Jones   
(title)  Environmental Specialist III

Date  9-30-05

Supervisor (signature)     
(print)  Stacy A. Ladner   
(title)  Unit Manager   
 State of Maine

Date  9-30-05

Locations where References may be found:  
Maine DEP File Room, Augusta, Maine

Contact telephone and e-mail numbers

(name) \_\_\_  Joan M. Jones   
(phone #) \_\_\_  207-287-7879   
(e-mail) \_\_\_  Joan. M. Jones@maine.gov

**FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK**

C/EI MAINE YANKEE 725

**Table 5-13**  
**Comparison of Groundwater Constituents to MEGs and MCLs**

Groundwater Constituents	Maximum Detected Concentration (ug/L)		State MEG (ug/L)	Federal MCL (ug/L)
<b>DRO</b>	<b>5810*</b>	J	50	
<b>ALUMINUM</b>	<b>3850</b>		1430	
ANTIMONY	0.03	J	3	6
<b>ARSENIC</b>	<b>23.3</b>		10	50
BARIUM	266		2000	2000
BERYLLIUM	1.2	J		
<b>BORON</b>	<b>2450</b>		630	
CADMIUM	1.7		3.5	5
CALCIUM	681000			
CHROMIUM	22.2		40	
COBALT	61	J		
COPPER	296		1300	1300
IRON	543000			
<b>LEAD</b>	<b>19</b>		10	15
MAGNESIUM	718000			
<b>MANGANESE</b>	<b>41800</b>		500	
MERCURY	0.59		2	2
<b>MOLYBDENUM</b>	<b>3170</b>		35	
NICKEL	139		140	
POTASSIUM	143000	J		
SELENIUM	21	J	35	50
<b>SILVER</b>	<b>50</b>		35	
<b>SODIUM</b>	<b>4280000</b>		20000	
THALLIUM	3.3		0.5	2
VANADIUM	21			
ZINC	491		2000	
<b>DIELDRIN</b>	<b>0.11</b>	J	0.02	
<b>HEPTACHLOR</b>	<b>0.52</b>		0.08	0
2-METHYLPHENOL	3.7			
<b>4-METHYLPHENOL</b>	<b>16.5</b>		3.5	
BIS(2-ETHYLHEXYL)PHTHALATE	7	J		
DI-N-BUTYLPHTHALATE	1	J	700	
NAPHTHALENE	3	J	14	
PHENOL	265		4000	200
<b>1,1,1-TRICHLOROETHANE</b>	<b>535</b>	J	200	5
1,1,2-TRICHLOROETHANE	0.4	J	6	
<b>1,1-DICHLOROETHANE</b>	<b>240</b>		70	7
<b>1,1-DICHLOROETHENE</b>	<b>190</b>		0.6	5
1,2-DICHLOROETHANE	2		4	
2-BUTANONE	15		1440	
ACETONE	23	J	700	
BENZENE	3.7		12	
BROMODICHLOROMETHANE	2		6	
BROMOMETHANE	1	J	10	
CHLOROFORM	36		57	
CHLOROMETHANE	3		3	
<b>ETHYLBENZENE</b>	<b>160</b>		70	700
M/P-XYLENE	340		14000	10000
METHYLENE CHLORIDE	1	J		
O-XYLENE	170		14000	10000
TOLUENE	2		1400	1000
TRICHLOROETHENE	4		32	5
<b>VINYL CHLORIDE</b>	<b>2</b>	J	0.2	2
NITRATE	3135		10000	10000

Note: Bold indicates compound exceeds either its MEG or MCL

\* - sample collected from the PAB sump. Not considered representative of groundwater quality

J - estimated concentration

MEG - Maximum Exposure Guideline

MCL - Maximum Contaminant Level

**VII. VAPOR INTRUSION PATHWAY SUMMARY PAGE**

Facility Name: Maine Yankee  
Facility Address: 321 Old Ferry Road, Wiscasset, Maine

**Primary Screening Summary**

Q1: Constituents of concern Identified?  
 Yes  
 No (If NO, skip to the conclusion section below and check NO to indicate the pathway is incomplete.)

Q2: Currently inhabited buildings near subsurface contamination?  
 Yes  
 No

Areas of future concern near subsurface contamination?  
 Yes  
 No (If NO, skip to the conclusion section below and check NO to indicate the pathway is incomplete.)

Q3: Immediate Actions Warranted?  
 Yes  
 No

**Secondary Screening Summary**

Vapor source identified:  
 Groundwater  
 Soil  
 Insufficient data

Indoor air data available?  
 Yes  
 No

Indoor air concentrations exceed target levels?  
 Yes  
 No

X *Subsurface data evaluation: (Circle appropriate answers below)*

Medium	Q4 Levels Exceeded?	Q5 Levels Exceeded?	Data Indicates Pathway is Complete?
Groundwater	YES / NO / NA / INS	YES / NO / NA / INS	YES / <u>NO</u> / INS
Soil Gas	YES / NO / NA / INS	YES / NO / NA / INS	YES / NO / INS

NA = not applicable

INS = insufficient data available to make a determination

**Site-Specific Summary**

- Have the nature and extent of subsurface contamination, potential preferential pathways and overlying building characteristics been adequately characterized to identify the most-likely-to-be-impacted buildings?*

\_\_\_\_\_ *Yes*

\_\_\_\_\_ *No*

\_\_\_\_\_ *N/A*

EPA recommends that if a model was used, it be an appropriate and applicable model that represents the conceptual site model. If other means were used, document how you determined the potentially most impacted areas to sample. EPA recommends that predictive modeling can be used to support Current Human Exposures Under Control EI determinations without confirmatory sampling to support this determination. Current Human Exposures Under Control EI determinations are intended to reflect a reasonable conclusion by EPA or the State that current human exposures are under control with regard to the vapor intrusion pathway and current land use conditions. Therefore, if conducting evaluation for an EI determination, document that the **Pathway is Incomplete** and/or does not pose an unacceptable risk to human health for EI determinations.

- Are you making an EI determination based on modeling and does the model prediction indicate that determination is expected to be adequately protective to support Current Human Exposures Under Control EI determinations?*

\_\_\_\_\_ *Yes*

\_\_\_\_\_ *No*

\_\_\_\_\_ *N/A*

- Do subslab vapor concentrations exceed target levels?*

\_\_\_\_\_ *Yes*

\_\_\_\_\_ *No*

\_\_\_\_\_ *N/A*

Do indoor air concentrations exceed target levels?

\_\_\_\_\_ Yes

\_\_\_\_\_ No

**Conclusion**

**Is there a Complete Pathway for subsurface vapor intrusion to indoor air?**

Below, check the appropriate conclusion for the Subsurface Vapor to Indoor Air Pathway evaluation and attach supporting documentation as well as a map of the facility.

NO - the "Subsurface Vapor Intrusion to Indoor Air Pathway" has been verified to be incomplete for the Maine Yankee facility, EPA ID # MED 0717493A, located at 321 Old Ferry Rd. Wiscasset Maine. This determination is based on a review of site information, as suggested in this guidance, check as appropriate:

for current and reasonably expected conditions, or  
\_\_\_\_\_ based on performance monitoring evaluations for engineered exposure controls. This determination may be re-evaluated, where appropriate, when the Agency/State becomes aware of any significant changes at the facility.

\_\_\_\_\_ YES -The "Subsurface Vapor to Indoor Air Pathway" is Complete. Engineered controls, avoidance actions, or removal actions taken include: \_\_\_\_\_

\_\_\_\_\_ UNKNOWN - More information is needed to make a determination.

**Locations where References may be found:**

Bailey Pt. RFI Section 5 Risk Assessment

DEP File Room  
Augusta, Maine

**Contact telephone and e-mail numbers:**

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(phone #) 207 - 287 - 7879

(e-mail) joan.m.jones@maine.gov

**Reminder: As discussed above, this is a guidance document, not a regulation. Therefore, conclusions reached based on the approaches suggested in this guidance are not binding on EPA or the regulated community. If information suggests that the conclusions reached using the approaches recommend are inappropriate, EPA may (on it's own initiative or at the suggestion of interested parties) choose to act at variance with these conclusions.**