DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: New Page Corporation
Facility Address: 35 Hartford St., Rumford, ME 04276
Facility EPA ID #: MED 001095041

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?

X If yes - check here and continue with #2 below.

____ If no - re-evaluate existing data, or

____ if data are not available, skip to #8 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. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

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). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

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).

RDMS Doc ID 109874

2. **Is groundwater known or reasonably suspected to be "contaminated"[1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?**

   X **If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.**

   ____ **If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."**

   ____ **If unknown - skip to #8 and enter "IN" status code.**

Rationale and Reference(s): In 1992 the Maine Department of Environmental Protection (DEP) completed a RCRA Facility Assessment (RFA) for this site. The RFA identified eight (8) Solid Waste Management Units (SWMU 1 through SWMU 8) with known or potential releases of hazardous wastes. After Phase I and Phase II environmental assessments of the SWMUs, it was determined that groundwater contamination was present only at SWMU 1, the Commodity Storage Area. The Commodity Storage Area, is an area previously occupied by a chloralkali plant that discharged mercury to surrounding soils. Approximately one half of the chloralkali plant was demolished and mercury-contaminated soil removed from beneath the demolished portion, tested, and found to be non-hazardous using the TCLP test. Soil classified as special waste was disposed at a landfill licensed for the disposal of special waste. Soils with low or non-detect levels of mercury were used as backfill. The remaining part of the chloralkali plant was converted to a commodity storage building. A newer structure, the evaporator building, was constructed on part of the chloralkali plant footprint. Excavations attempted to remove the most-contaminated soil, but some contaminated soil may remain.

Table 1 summarizes mercury levels in groundwater from 2001 through 2008 at 12 monitoring wells associated with SWMU 1. Mercury was equal to or below the state Maximum Exposure Guideline (MEG) of 2 ppb for all monitoring wells except for MD-14 and MD-15 which are installed at the former chloralkali plant location. Mercury levels exceeding the MEG at these locations ranged up to 19.4 ppb.

Footnotes:

[1]"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 appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

Table 1
Mercury Concentrations in SWMU 1 Groundwater
2001-2008
New Page Mill, Rumford, Maine

Well Name	Date	Sample Collection Method	Analytical Method	Concentration (ug/L)	Lab Qualifier	Quantitation Limit (ug/L)	Comments
B-301	9/11/2001	Low Flow	Unknown	0.5000			
B-301	11/13/2001	Low Flow	Unknown		U	0.2000	
B-301	6/3/2003	Unknown	SW7470		U	0.2000	
B-301	10/7/2003	Unknown	SW7470A		U	0.2000	
B-301	12/11/2007	Low Flow	E1631	0.0485		0.0012	
B-301	4/22/2008	Low Flow	E1631	0.0480		0.0030	
B-302D	9/10/2001	Low Flow	Unknown	0.9000			
B-302D	11/13/2001	Low Flow	Unknown	0.6000			
B-302D	6/2/2003	Unknown	SW7470	0.3000	J	0.5000	
B-302D	10/7/2003	Unknown	SW7470A	0.4000	J	0.5000	
B-302D	12/11/2007	Low Flow	E1631	0.2020		0.0051	
B-302D	4/21/2008	Low Flow	E1631	0.1960		0.0020	
B-302S	9/10/2001	Low Flow	Unknown		U	0.2000	
B-302S	11/13/2001	Low Flow	Unknown	0.2000	J		
B-302S	6/2/2003	Unknown	SW7470		U	0.2000	
B-302S	10/7/2003	Unknown	SW7470A		U	0.2000	
B-302S	12/11/2007	Low Flow	E1631	0.0085		0.0005	
B-302S	4/21/2008	Low Flow	E1631	0.0141		0.0005	
B-303	9/10/2001	Low Flow	Unknown	0.8000			
B-303	11/12/2001	Low Flow	Unknown	0.4000	J		
B-303	6/2/2003	Unknown	SW7470		U	0.2000	
B-303	10/6/2003	Unknown	SW7470A		U	0.2000	
MD-14	12/6/2000	Low Flow	Unknown	1.6000			
MD-14	1/4/2001	Low Flow	Unknown	2.6000			
MD-14	9/10/2001	Low Flow	Unknown	0.3000	J		
MD-14	11/12/2001	Low Flow	Unknown	1.1000			
MD-14	6/3/2003	Unknown	SW7470	1.3000		0.5000	
MD-14	10/6/2003	Unknown	SW7470A	0.5000		0.5000	
MD-15	12/6/2000	Low Flow	Unknown	10.7000			
MD-15	1/4/2001	Low Flow	Unknown	19.4000			
MD-15	9/10/2001	Low Flow	Unknown	6.0000			
MD-15	11/12/2001	Low Flow	Unknown	2.6000			
MD-15	6/3/2003	Unknown	SW7470	4.9000		0.5000	
MD-15	10/6/2003	Unknown	SW7470A	5.3000		0.5000	
MW-201A	12/6/2000	Low Flow	Unknown	0.5000			
MW-201A	1/4/2001	Low Flow	Unknown		U	0.2000	
MW-201A	9/11/2001	Low Flow	Unknown		U	0.2000	

Well Name	Date	Sample Collection Method	Analytical Method	Concentration (ug/L)	Lab Qualifier	Quantitation Limit (ug/L)	Comments
MW-201A	11/13/2001	Low Flow	Unknown	0.6000			
MW-201A	6/2/2003	Unknown	SW7470		U	0.2000	
MW-201A	10/7/2003	Unknown	SW7470A		U	0.2000	
MW-201A	12/12/2007	Low Flow	E1631	0.0314		0.0005	
MW-201A	4/21/2008	Low Flow	E1631	0.0060		0.0005	
MW-201B	12/6/2000	Low Flow	Unknown		U	0.2000	
MW-201B	1/4/2001	Low Flow	Unknown		U	0.2000	
MW-201B	9/11/2001	Low Flow	Unknown		U	0.2000	
MW-201B	11/13/2001	Low Flow	Unknown		U	0.2000	
MW-201B	6/2/2003	Unknown	SW7470		U	0.2000	
MW-201B	10/7/2003	Unknown	SW7470A		U	0.2000	
MW-201B	12/12/2007	Low Flow	E1631	0.0761		0.0025	
MW-201B	4/21/2008	Low Flow	E1631	0.0746		0.0030	
MW-202A	12/6/2000	Low Flow	Unknown	0.4000	J		
MW-202A	1/4/2001	Low Flow	Unknown		U	0.2000	
MW-202A	9/10/2001	Low Flow	Unknown		U	0.2000	
MW-202A	11/13/2001	Low Flow	Unknown	0.2000	J		
MW-202A	6/2/2003	Unknown	SW7470	0.6000		0.5000	
MW-202A	10/6/2003	Unknown	SW7470A	0.4000	J	0.5000	
MW-202A	12/12/2007	Low Flow	E1631	0.0090		0.0005	
MW-202A	4/21/2008	Low Flow	E1631	0.0163		0.0005	
MW-202B	12/6/2000	Low Flow	Unknown	1.6000			
MW-202B	1/4/2001	Low Flow	Unknown	1.5000			
MW-202B	9/10/2001	Low Flow	Unknown	1.3000			
MW-202B	11/13/2001	Low Flow	Unknown	1.2000			
MW-202B	6/2/2003	Unknown	SW7470	2.0000		0.5000	
MW-202B	10/6/2003	Unknown	SW7470A	1.8000		0.5000	
MW-202B	12/12/2007	Low Flow	E1631	0.1730		0.0051	
MW-202B	4/21/2008	Low Flow	E1631	0.1580		0.0010	
MW-401A	12/11/2007	Low Flow	E1631	0.3100		0.0052	
MW-401A	12/11/2007	Low Flow	E1631	0.1440		0.0051	Field Filtered
MW-401A	4/21/2008	Low Flow	E1631	0.2320		0.0020	
MW-401B	12/11/2007	Low Flow	E1631	0.1980		0.0050	
MW-401B	4/21/2008	Low Flow	E1631	0.8440		0.0050	
MW-402	12/12/2007	Low Flow	E1631	0.4020		0.0052	
MW-402	4/21/2008	Low Flow	E1631	0.0850		0.0010	

U= not detected
J = estimated

Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

__X__ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2]).

____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) - skip to #8 and enter "NO" status code, after providing an explanation.

____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s): The data in Table 1 indicate that mercury above the MEG exists directly beneath the former chloralkali plant location, but no plume with concentrations above the MEG from that source currently exists. The absence of a mercury plume with concentrations above the MEG may be due in part to the removal of contaminated soil in association with construction in the area and natural attenuation. Other contributing factors may be the installation of sheet piling to 20 feet and surface paving of the Commodity Storage Area. These efforts were intended to minimize water infiltration and flow of groundwater from the area.

Footnotes:

[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

4. Does "contaminated" groundwater discharge into surface water bodies?

__X__ If yes - continue after identifying potentially affected surface water bodies.

____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s): Mercury contamination in SWMU 1 may potentially discharge low-level mercury-contaminated groundwater to the Androscoggin River.

5. **Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?**

_X_ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

___ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

___ If unknown - enter "IN" status code in #8.

Rationale and Reference(s): References below show the results of groundwater sampling over the entire New Page site, including SWMU 1. References 1, 2, and 3 below report the results of groundwater sampling for the entire New Page site, including SWMU 1. Reference 4 is a risk analysis for the entire site, including SWMU 1.

1. Sevee and Maher Engineers Inc., June 2002, *Hydrogeologic Investigation Report for 2001 Phase I Assessment of Solid Waste Management Units, MeadWestvaco Rumford Mill, Rumford, Maine*;

2. Sevee and Maher Engineers Inc., August 13, 2004 letter to Scott Reed, *Results of Phase II Water Quality Sampling Rounds, MeadWestvaco Paper Division, Rumford Mill, Rumford, Maine*;

3. Sevee and Maher Engineers Inc., August 19, 2008, *Monitoring Well Installation and Sampling, New Page Corporation, Rumford, Maine.*

4. Stone and Webster Engineering, December 1991, *Risk Assessment, Commodity Storage Building and Immediate Area, Boise Cascade Paper Mill, Rumford, Maine.*

References 1 and 2 report water quality from monitoring wells for the entire New Page site, including the location of the former chloralkali plant (MD-14 and MD0-15). A January 4, 2001 mercury concentrations of 2.6 ppb was reported at MD-14. Mercury was reported above the MEG for six (6) successive rounds at MD-15 from year 2000 through year 2003 (see Table 1). Maine's Maximum Exposure Guideline (MEG) is 2 ppb. Prior to 2008 seven groundwater monitoring wells (B-301, MW-201A and MW-201B, B-302S and B-302D, and MW-202A and MW-202B), located down-gradient from MD-14 and MD-15, were used to detect whether a mercury plume was entering the Androscoggin River.

Reference 3 describes the 2007-08 installation of, and groundwater sampling from, three (3) additional monitoring wells to improve well coverage for detecting a mercury plume (MW07-402, MW07-401A, MW07-401B). Two rounds of sampling from all ten (10) wells resulted in no mercury detections above the Maine MEG. Since 2003, mercury levels in all ten (10) monitoring wells were below Maine's ambient surface water quality criteria, both chronic and acute. Data from the two rounds of sampling were used to calculate mercury loading to the Androscoggin River. The goal of the calculations was to determine whether Maine's standard for fish tissue had been exceeded (0.0002 ppb: per 38 MRSA, Chapter 3, Sections 420 (1-B) and 413 (11)). Table 2 shows the loading calculations which resulted in no exceedance.

Table 2
Summary of Mercury Loadings to the Androscoggin River
New Page Mill, Rumford, Maine

Data Set (Table 1)	Mercury Concentration in River (ppb)	Mercury Loading (pounds per year)	Mercury Loading 95% Confidence Limit (pounds per year)
Goal	0.0002 (2)	0.1	0.1
December 2007	0.000001139	0.006432	0.013
April 2008	0.000001101	0.00629	0.014
Average for Six Events, Ten Wells (1)	0.000004764	0.027	0.038

(1) The average for the 400 series wells is based on two events, not six (see Table 1).
(2) Based on the calculated bioaccumulation factor for human health per 38 MRSA, Chapter 3, Sections 420 (1-B) and 413 (11)

In 1991 Stone and Webster performed a risk analysis for the entire New Page facility, including SWMU 1 (Reference 4). The analysis examined mercury concentrations in Androscoggin River water and sediment, and in fish from the Androscoggin, and concluded the following:

- From 1983 to 1990, mercury in water samples taken less than one mile distant from the mill, upstream and downstream, ranged from non-detect to 0.8 ppb. These levels were less than Maine's ambient water quality criteria (chronic = 0.91 ppb, acute = 1.7 ppb);
- There is no significant difference in mercury concentrations in fish sampled upstream and downstream from the mill. Fish movement up the river is restricted by the Brookfield hydroelectric facility dam which does not have a fish passage;
- There is no significant difference in mercury concentrations in water and sediment upstream and downstream from the former mill outfall.

Footnotes:

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the **discharge of** "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

_____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable**") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s):_____

_____

_____

_____

Footnotes:

[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

   X If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

   __ If no - enter "NO" status code in #8.

   __ If unknown - enter "IN" status code in #8.

Rationale and Reference(s): As described in Section 4, groundwater sampling at SWMU 1 has been thorough and extensive.

- Remediation at SWMU 1 may have a) removed significant amounts of source material, b) reduced water infiltration by paving over contaminated area and c) reduced groundwater flow with sheet pilings driven 20 feet below the surface;
- Based on the results of multiple rounds of testing in ten monitoring wells, there is no evidence down-gradient from the source for a mercury plume above the MEG or Maine's ambient surface water quality criteria, both chronic and acute;
- Based on groundwater mercury loading calculations to the Androscoggin River, mercury loading from the site does not exceed the Maine standard;
- Based on mercury sampling of water, sediment from the Androscoggin, there is no evidence of significant contamination of those media.
- Based on mercury sampling of fish tissue samples from upstream and downstream of the site, there is no significant difference in mercury concentrations.

Additional groundwater monitoring will, however, be required to confirm existing groundwater mercury concentration data as follows:

- Groundwater will be tested for mercury semiannually under low- and high-water conditions at the ten monitoring wells used in Reference 3 (B-301, MW-201A and MW-201B, B-302S and B-302D, and MW-202A and MW-202B, MW07-402, MW07-401A, MW07-401B);

- Groundwater monitoring at SWMU 1 will cease if after three (3) years of additional sampling, no concentrations exceed the Maine's MEG, ambient surface water quality standard, or fish tissue criteria.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

__X__ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the New Page Corporation facility, EPA ID # MED001095041, located at Rumford, Maine. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

____ NO - Unacceptable migration of contaminated groundwater is observed or expected.

____ IN - More information is needed to make a determination.

Completed by Harold Nilsson Date 9/30/11
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Supervisor Stacy A. Ladner Date 9/30/11
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