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OGGETTO: *"Rapporto Analisi di Rischio ai sensi Art. 242 comma 4, del D.Lgs. n. 152/2006 e ss.mm.ii. ex discarica loc.tà Dietro Cimitero, Fossacesia (Ch)", scheda ARTA CH231801.*

COMMITTENTE: *Amministrazione Comunale Fossacesia (Ch).*

LOCALITA': *Dietro Cimitero, Comune di Fossacesia (Ch).*

ELABORATO:
Relazione Analisi di Rischio

PROGETTO:
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1.0 PREMESSA

Facendo seguito ai risultati della caratterizzazione ambientale acquisiti nell'area dell'ex discarica comunale del Comune di Fossacesia sita in località Dietro Cimitero, si predispone lo studio di Analisi di Rischio sito-specifica (AdR) ai sensi del D.Lgs 152/06 e ss.mm.ii. in relazione alla contaminazione riscontrata sulle matrici suolo superficiale e acqua di falda.

La procedura per l'applicazione di analisi di rischio alle discariche considera come sorgente di contaminazione il corpo rifiuti, sorgente primaria, poiché dalle sue caratteristiche dipendono quelle delle emissioni liquide e gassose.

La dettagliata caratterizzazione della sorgente, in questo caso del corpo rifiuti, è indispensabile per una buona stima delle emissioni.

Il rilevamento di superficie e le indagini realizzate hanno condotto alla ricostruzione di un quadro solo parziale vista l'estensione dell'area di discarica. La sorgente di contaminazione-discardica non risulta completamente definita nelle sue caratteristiche geometriche, sia in termini di perimetro che di spessore e profondità del corpo rifiuti, non si posseggono informazioni esaustive relative alla tipologia ed ai flussi di rifiuti, alle caratteristiche idrauliche e fisiche, così come le informazioni sulla composizione merceologica. Le caratteristiche risultano desumibili dal rilievo dei luoghi e dai saggi geognostici eseguiti nell'area di discarica.

L'analisi assoluta di rischio applicata alle discariche, come descritto nel manuale APAT, richiede una dettagliata caratterizzazione di tutte le componenti costituenti il sistema discarica. Nel caso in esame i dati necessari alla applicazione della procedura non risultano sufficienti al soddisfacimento di tutti i dati di input richiesti dai modelli di calcolo, facendo presupporre una grande incertezza sui risultati dell'analisi di rischio, venuta meno all'atto dell'analisi.

I rifiuti sono stati caratterizzati attraverso il prelievo di un campione dal corpo discarica e successivamente sottoposto a test di cessione all'acqua. Il risultato ha evidenziato l'assenza di rilascio di sostanze potenzialmente contaminanti.

Sulla base di quanto esposto si può verosimilmente considerare come mineralizzati i rifiuti abbancati in discarica e quindi non più attivo il rilascio di contaminanti dalla sorgente primaria.

Pertanto il presente documento viene elaborato con la procedura definita per i siti contaminati, seguendo l'approccio descritto nei *“Criteri metodologici per l'applicazione dell'analisi assoluta di rischio ai siti contaminati”* considerando quindi come sorgente secondaria di contaminazione il terreno e la falda sottostanti la discarica, rispetto ai superamenti dei limiti previsti dalla tabella 1 dell'allegato 5 al D.Lgs 152/2006.

2.0 ESTENSIONE DEL SITO

L'area è stata oggetto di una intensa attività di abbancamento di materiale di rifiuto la quale ha provocato un'importante modificazione della morfologia originaria. La composizione del materiale di ricoprimento è data sia da rifiuti assimilabili agli urbani sia da materiali provenienti dalle attività di scavo, costituiti da sabbie, ghiaie, limi e da attività di demolizione edilizia; costituendo, in buona parte dell'area essi stessi il materiale di discarica. Nella zona NE

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della discarica ai rifiuti descritti si aggiungono: 1) rifiuti provenienti da attività cimiteriale (resti organici vegetali, ceri votivi, imballaggi, ecc.); 2) rifiuti ingombranti. La descrizione della morfologia dei luoghi e della composizione dei materiali di ricoprimento è stata riportata nel documento di caratterizzazione ambientale del sito oggetto di studio.

Area Impattata	
Foglio	Particella
2	225
2	226
2	227
2	228
2	229
2	230
2	231
2	232
2	234
2	235
2	236
2	237
2	238
2	247
2	248
2	249
2	250
2	251
2	252
2	4048
2	4049

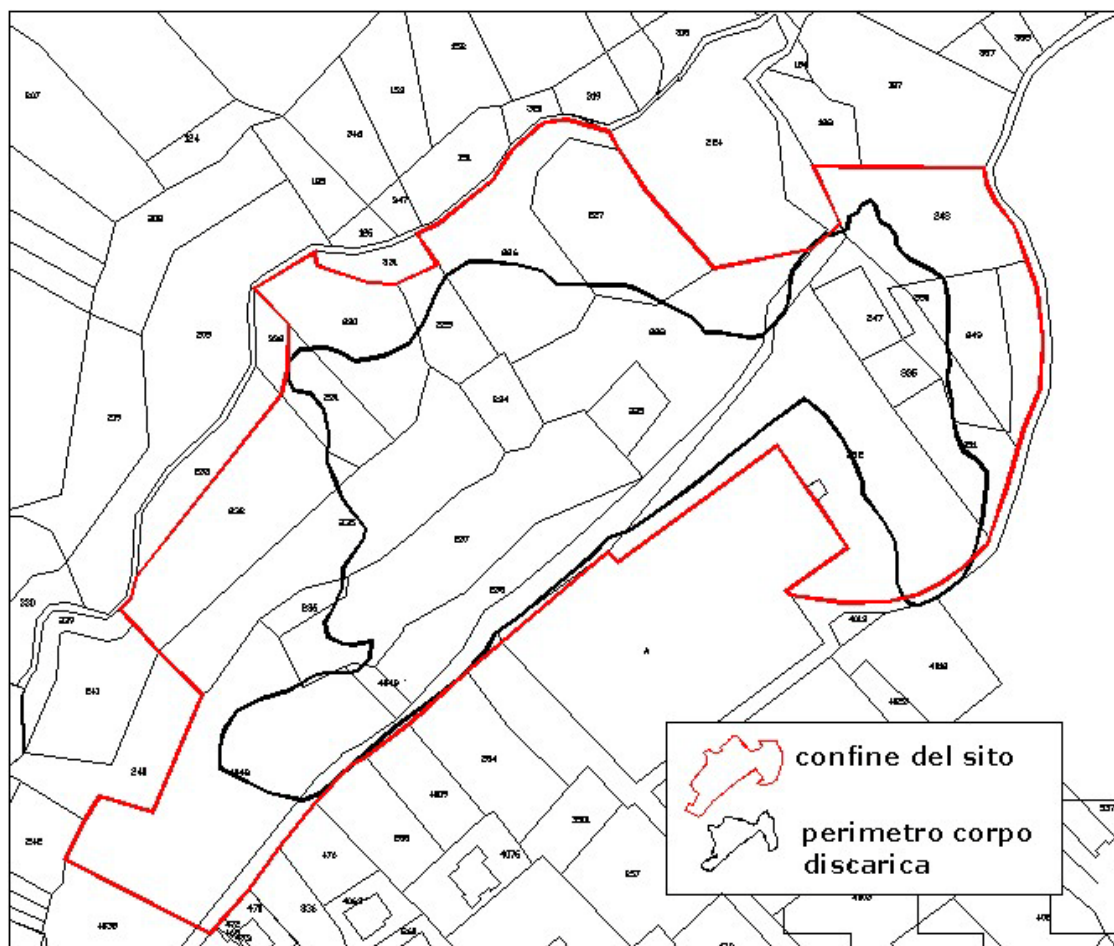


Fig.1. Perimetro della discarica e particelle impattate.

La dimensione areale complessiva delle particelle impattate dalla presenza della discarica è di circa 4,94 ettari, l'area coperta dai terreni di scavo e dalla presenza della dei rifiuti urbani è di circa 2,57 ettari.

3.0 INDAGINI

Sono stati realizzati complessivamente (indagine preliminare e caratterizzazione) n. 5 sondaggi, tutti attrezzati con piezometro, prelevando durante le operazioni di perforazione n. 9 campioni di terreno. La falda è stata intercettata nei sondaggi S1P1, S4 ed S5, di conseguenza sono stati prelevati tre campioni per caratterizzare la falda. All'interno del sito sono stati prelevati due campioni di top soil, mentre all'esterno del sito è stato prelevato un campione di acque

superficiali. Il rifiuto (R) è stato caratterizzato prelevandone sette campioni dal corpo rifiuti e sottoponendone tre al test di cessione in acqua. Nell'area sono stati realizzati due stendimenti geoelettrici.

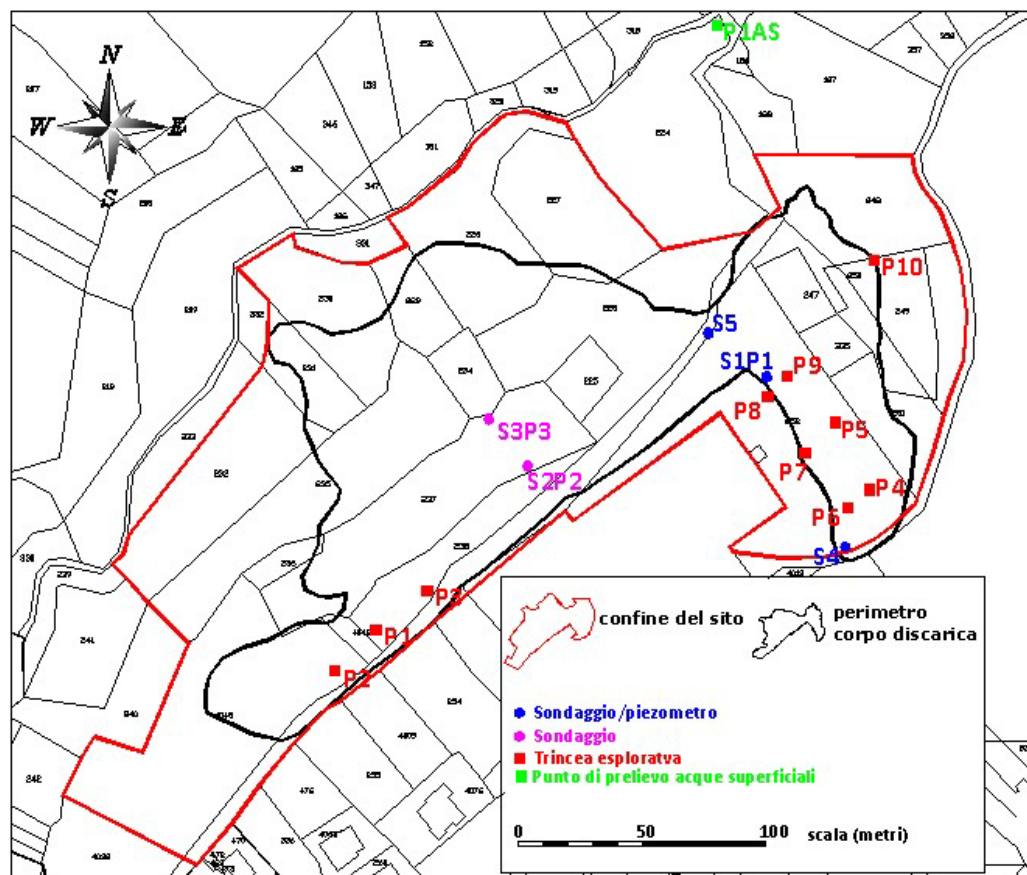


Fig. 2. Indagini realizzate nelle fasi preliminare e di caratterizzazione.

I campioni sono stati prelevati nelle matrici ambientali suolo superficiale, suolo profondo, acqua di falda e acque superficiali per l'applicazione della procedura di analisi di rischio.

Nella tabella sono riassunti i punti di indagine ed i relativi campionamenti eseguiti nelle varie matrici ambientali e nelle varie campagne d'indagine. In rosso sono evidenziati i superamenti degli analiti rispetto alla CSC.

	SS	SP	GW	SW	R	test di cessione su rifiuto
P1						
P2						
P3					X	X
P4						
P5						
P6						
P7		X			X	X
P8		X				
P9					X	X
P10					X	
S1P1		X	X		X	
S2P2	X				X	
S3P3		X			X	
S4	X	X	X			
S5		X	X			
C1S1P1				X		

I risultati analitici dei campioni di suolo superficiale hanno evidenziato superamenti solo per il sondaggio S4. I risultati analitici sui campioni di acqua di falda hanno evidenziato il superamento in due punti di monitoraggio.

Suolo Superficiale (mg/kg)		Pb	Co	C>12
S4		140	20	160

Falda (µg/l)	Cr tot	Ni	Fe	Mn	Nitriti	Solfati
S1P1	96		2138	123	3400	460
S4		28		3927		

Alla luce di quanto sopra riportato è possibile individuare nelle matrici Suolo Superficiale e Acqua di Falda le sorgenti secondarie di contaminazione.

3.0 SELEZIONE DEI CONTAMINANTI INDICE

Nella selezione dei contaminanti “indice” è stata seguita una procedura di valutazione che considera tutti i parametri (tra quelle presenti) che superano le concentrazioni di soglia di contaminazione CSC del Dlgs 152/06 per le acque sotterranee ed i suoli ad uso residenziale/verde pubblico.

3.1 Suolo superficiale

Per quanto riguarda la matrice terreno i dati a disposizione si riferiscono ai campioni prelevati in fase di Indagine preliminare (anno 2007) e di Caratterizzazione (anni 2010-2011).

I contaminanti che presentano superamenti nel suolo superficiale sono:

- ✎ Idrocarburi pesanti C>12
- ✎ Piombo
- ✎ Cobalto

Le elaborazioni sono basate sull'approccio proposto da APAT, 2006 (basato a sua volta sull'approccio del Massachusset Department of Environmental Protection (MADEP), Bureau of Waste Site Cleanup), in cui gli idrocarburi petroliferi risultano suddivisi in frazioni tossicologicamente affini.

Secondo tale classificazione, la miscela di idrocarburi viene ripartita secondo le seguenti cinque classi:

- Idrocarburi alifatici C5-C8
- Idrocarburi alifatici C9-C18
- Idrocarburi alifatici C19-C36
- Idrocarburi aromatici C9-C10
- Idrocarburi aromatici C11-C22

Le cinque classi indicate da APAT non considerano le frazioni più pesanti, ovvero le frazioni alifatiche C37-C40 e le aromatiche C23-C40, che per le loro caratteristiche chimico-fisiche (scarsa mobilità) non sono da considerarsi di interesse ai fini dell'analisi di rischio. In aggiunta a ciò, il database APAT definisce "immobili", le frazioni alifatiche, C19-C36, ovvero non in grado di volatilizzare o solubilizzare.

Non avendo a disposizione analisi fingerprint nel caso specifico, per l'analisi di rischio è stata selezionata un'unica frazione di idrocarburi come rappresentativa dei C>12.

In un'ottica di estrema cautela si è quindi supposto che l'intera miscela sia costituita dalla frazione alifatica C12-C16 e dalla frazione aromatica C11-C22.

3.2 Acqua di Falda

Per le acque di falda sono disponibili data sets relativi a due campagne di prelievo. Per ogni campagna di campionamento sono stati individuati i contaminanti che presentano superamenti delle CSC. E' da evidenziare che non tutti i contaminanti sono stati ritrovati nelle differenti campagne di prelievo. Infatti si ritiene che la presenza più o meno abbondante dei contaminanti possa essere conseguenza delle variazioni delle condizioni al contorno (variazione del livello piezometrico, differenti campi di flusso).

Per tale ragione per ogni contaminante individuato è stato selezionato il dataset corrispondente alla campagna di prelievo nella quale il contaminante stesso presenta valori di concentrazione al di sopra delle CSC. A tali data set è stata successivamente applicata un'analisi statistica utilizzando il software ProUCL.

I contaminanti che presentano concentrazioni superiori alle CSC sono:

1. **Manganese** – campionamento realizzato Novembre 2007 e Marzo 2012;
2. **Ferro** – campionamento realizzato Novembre 2007;
3. **Cromo tot** – campionamento realizzato Novembre 2007;
4. **Nichel** – campionamento realizzato Marzo 2012;
5. **Nitriti** – campionamento realizzato Marzo 2012;
6. **Solfati** – campionamento realizzato Novembre 2007.

4.0 MODELLO IDROGEOLOGICO

I rilievi piezometrici effettuati nei sondaggi S1, S4 ed S5 hanno permesso di concettualizzare il modello idrogeologico. Come meglio descritto nel documento di caratterizzazione e nel paragrafo 6, l'acquifero presente è costituito da differenti falde poco continue lateralmente e sovrapposte. Per la definizione dello spessore della zona insatura e dalla zona satura si è fatto riferimento alla soggiacenza minima riscontrata nei tre piezometri disponibili. La base dell'acquifero multifalda presente è costituita dall'unità geologica delle Argille Grigio-azzurre, non raggiunto dalle indagini geognostiche, individuabile ad una profondità di circa 50 m dal p.c..

Data Rilievo	Soggiacenza (m) S4	Soggiacenza (m) S5	Soggiacenza (m) S1P1
14/11/07			9,5
02/01/2012	10,255		
16/01/2012	10,12	8,64	
23/01/2012	9,51	8,62	
10/02/2012	8,79	8,09	
03/03/2012	8,47	8,04	
07/03/2012	9,13	8,74	
08/03/2012	9,08	8,75	
9/03/2012	9,16	8,8	

5.0 SORGENTE DI CONTAMINAZIONE

L'elaborazione dell'Analisi di Rischio sarà indirizzata alla determinazione degli effetti sui bersagli Uomo/Risorsa Idrica. Dal Suolo Superficiale saranno valutati gli effetti di eventuali vapori/polveri sul bersaglio Uomo e gli effetti della lisciviazione in falda; mentre delle Acque di Falda contaminate si valuteranno il rischio al POC ubicato ai confini del sito e al POE individuando come bersaglio della contaminazione le acque superficiali presenti a valle del sito.

I dati relativi ai rilievi piezometrici non permettono di definire la direzione di deflusso della falda freatica, essenzialmente per la mancanza di un sufficiente numero di punti di misura in rapporto alle caratteristiche geometriche dell'acquifero presente (acquifero multifalda). Per tale ragione nella definizione del verso di scorrimento della falda sarà considerato lo scenario più cautelativo assumendo questa orientata verso il POC.

Il diagramma di flusso riportato di seguito (modificato da “Criteri metodologici per l'applicazione dell'analisi assoluto di rischio ai siti contaminati rev.2”, APAT, marzo 2008) descrive il modello concettuale applicato al sito in esame. Vengono individuate le sorgenti, le modalità di trasporto ed i bersagli della contaminazione. Come evidenziato nelle tabelle precedenti le matrici contaminate, dunque le sorgenti secondarie di contaminazione sono individuabili nel Suolo Superficiale e nell'Acqua di Falda. Nel diagramma di flusso sono rappresentati con colori diversi i modelli concettuali applicati al sito.

5.1 Suolo Superficiale

La definizione delle dimensioni areali della sorgente di contaminazione nel suolo superficiale (area, larghezza lunghezza) è stata fatta attraverso la costruzione dei poligoni di Thiessen. Ne risulta che la sorgente di contaminazione è individuabile solo in una porzione orientale del sito.

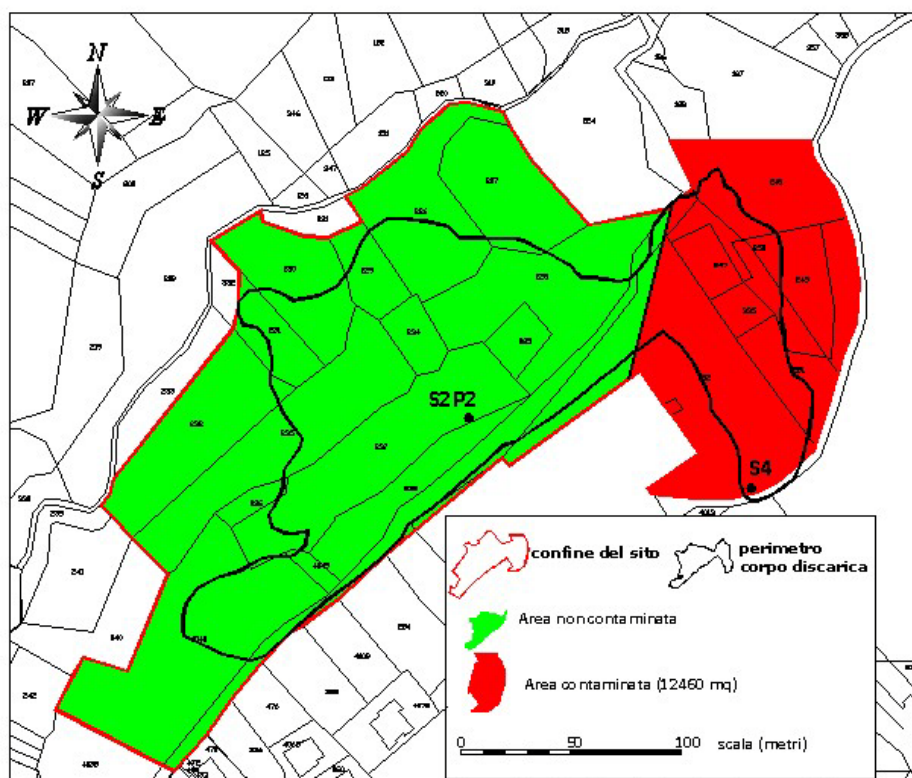


Fig.3. Area impattata - sorgente secondaria matrice suolo superficiale.

L'area del poligono relativo al suolo superficiale contaminato (evidenziato in colore rosso nella figura) è di circa 12.460 m².

5.2 Falda

La definizione delle dimensioni areali della sorgente di contaminazione nelle Acque di Falda (area, larghezza lunghezza) è stata fatta attraverso la costruzione dei poligoni di Thiessen. Ne risulta a seguito dei dati acquisiti che la sorgente di contaminazione è individuabile solo nella porzione orientale del sito.

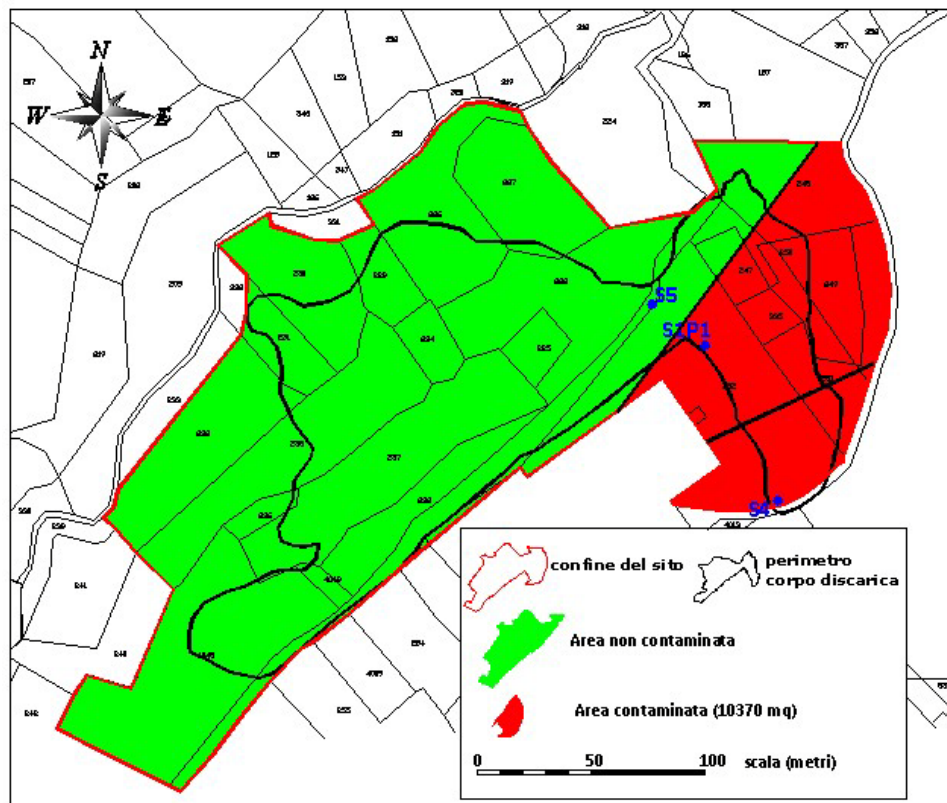


Fig.4. Area impattata - sorgente secondaria acqua profonda.

L'area del poligono relativo al suolo superficiale contaminato (evidenziato in colore rosso nella figura) è di circa 10.370 m².

6.0 CALCOLO DEL RISCHIO

Le matrici ambientali contaminate Suolo superficiale e Falda costituiscono sorgenti di contaminazione per i recettori Uomo e Risorsa idrica sotterranea. Il reticolo idrografico presenta due rami distinti che scorrono a valle topografico del sito con direzioni SW-NE (quello principale) fosso San Giovanni e SE-NW (affluente).

Saranno quindi verificati i rischi per il recettore Uomo/Bambino **fruttori del sito** derivante dalla presenza di suolo superficiale contaminato e da falda contaminata. Sarà verificata la concentrazione al punto di conformità (POC) per la risorsa idrica sotterranea e saranno verificati i limiti anche al corso d'acqua denominato fosso San Giovanni, considerato come punto di esposizione alla risorsa idrica superficiale (POE).

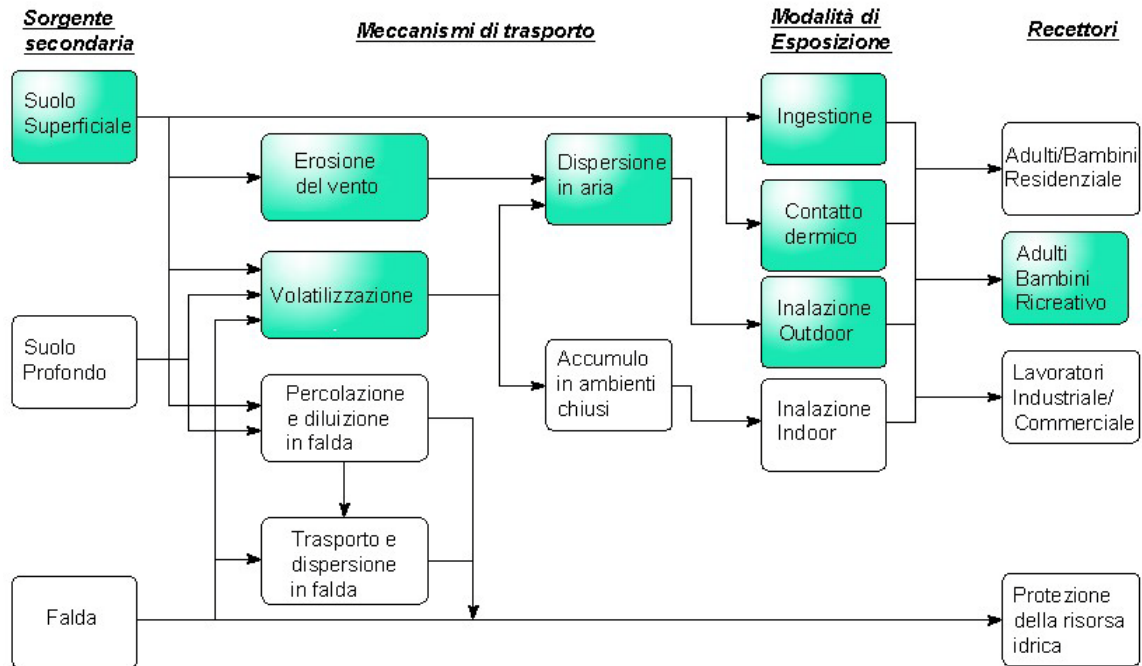
6.1 Calcolo del rischio per il recettore Uomo derivante da Suolo Superficiale – Scenario 1

Nel presente paragrafo viene calcolato il rischio per il recettore Adulto/Bambino derivante dal suolo superficiale contaminato. In particolare il rischio sarà valutato considerando come meccanismi di trasporto l'erosione del vento, la

volatilizzazione e la conseguente dispersione in aria. Le modalità di esposizioni considerate sono l'ingestione il contatto dermico e l'inalazione outdoor.

Di seguito si riporta il diagramma di flusso descrittivo per la sorgente considerata, per i meccanismi di trasporto e per le modalità di esposizione.

Calcolo del Rischio per l'Uomo derivante da Suolo Superficiale



La dimensione della sorgente individuata nel Suolo Superficiale per i recettori Uomo/Bambini, nello scenario di una fruizione del sito, è determinata nelle sue caratteristiche di larghezza e lunghezza dalla direzione prevalente del vento.

Non sono presenti nel sito stazioni di misura del parametro menzionato e per la sua determinazione si è fatto riferimento alla stazione meteo di Pescara-Aeroporto che indica una prevalenza dei venti dal quadrante sud-occidentale (Libeccio) e in misura inferiore da quelli dei quadranti nord orientali (Grecale).

Nella tabella riportata di seguito sono indicati i dati climatici nel periodo compreso tra il 1961 il 1990.

PESCARA AEROPORTO (1961-1990)	Mesi												Stagioni				Anno
	Gen	Feb	Mar	Apr	Mag	Giu	Lug	Ago	Set	Ott	Nov	Dic	Inv	Pri	Est	Aut	
T. max. media (°C)	10,5	11,6	14,1	17,8	22,2	26,0	28,9	28,6	25,4	20,5	15,7	11,8	11,3	18	27,8	20,5	19,4
T. min. media (°C)	1,7	2,6	4,4	7,0	11,0	14,7	17,1	17,1	14,4	10,6	6,4	3,2	2,5	7,5	16,3	10,5	9,2
T. max. assoluta (°C)	23,0 (1962)	25,0 (1968)	28,0 (1989)	30,4 (1989)	35,4 (1983)	34,4 (1962)	39,8 (1983)	40,0 (1988)	37,2 (1988)	30,2 (1979)	27,8 (1990)	27,8 (1989)	27,8	35,4	40	37,2	40
T. min. assoluta (°C)	-13,2 (1979)	-5,0 (1982)	-6,8 (1987)	-1,1 (1970)	0,8 (1970)	6,0 (1961)	10,0 (1971)	9,8 (1969)	5,0 (1977)	0,2 (1972)	-5,0 (1975)	-5,6 (1986)	-13,2	-6,8	6	-5	-13,2
Giorni di gelo ($T_{min} \leq 0^{\circ}C$)	11	7	4	1	0	0	0	0	0	0	1	6	24	5	0	1	30
Nuvolosità (okta al giorno)	5,0	5,1	4,7	4,3	3,9	3,3	2,2	2,4	3,1	4,0	4,7	5,0	5	4,3	2,6	3,9	4
Precipitazioni (mm)	54,7	52,6	62,9	55,3	34,6	43,9	33,8	53,7	61,2	73,5	71,3	76,8	184,1	152,8	131,4	206	674,3
Giorni di pioggia	6	7	7	6	5	5	4	5	6	7	7	9	22	18	14	20	74
Umidità relativa (%)	74	73	72	71	72	70	69	71	72	75	76	76	74,3	71,7	70	74,3	72,6
Eliofania assoluta (ore al giorno)	3,1	3,9	4,9	6,4	7,8	8,7	9,8	8,9	7,3	5,5	3,7	2,9	3,3	6,4	9,1	5,5	6,1
Radiazione solare globale media (centesimi di MJ/mq)	564	851	1 323	1 865	2 277	2 463	2 556	2 169	1 689	1 113	671	491	1 906	5 465	7 188	3 473	18 032
Pressione a 0 metri s.l.m. (hPa)	1 016	1 014	1 014	1 012	1 013	1 014	1 014	1 014	1 016	1 017	1 016	1 016	1 015,3	1 013	1 014	1 016,3	1 014,7
Vento (direzione-m/s)	SW 4,1	SW 4,2	SW 4,1	SW 3,9	NE 3,5	NE 3,4	NE 3,4	NE 3,3	SW 3,3	SW 3,3	SW 3,5	SW 3,8	4	3,8	3,4	3,4	3,7

Le dimensioni della sorgente sono state quindi ottenute tenendo conto della direzione prevalente. In direzione parallela a questa si determinano una lunghezza pari a 160 m una la larghezza pari a 150 m. Il termine di velocità è stato

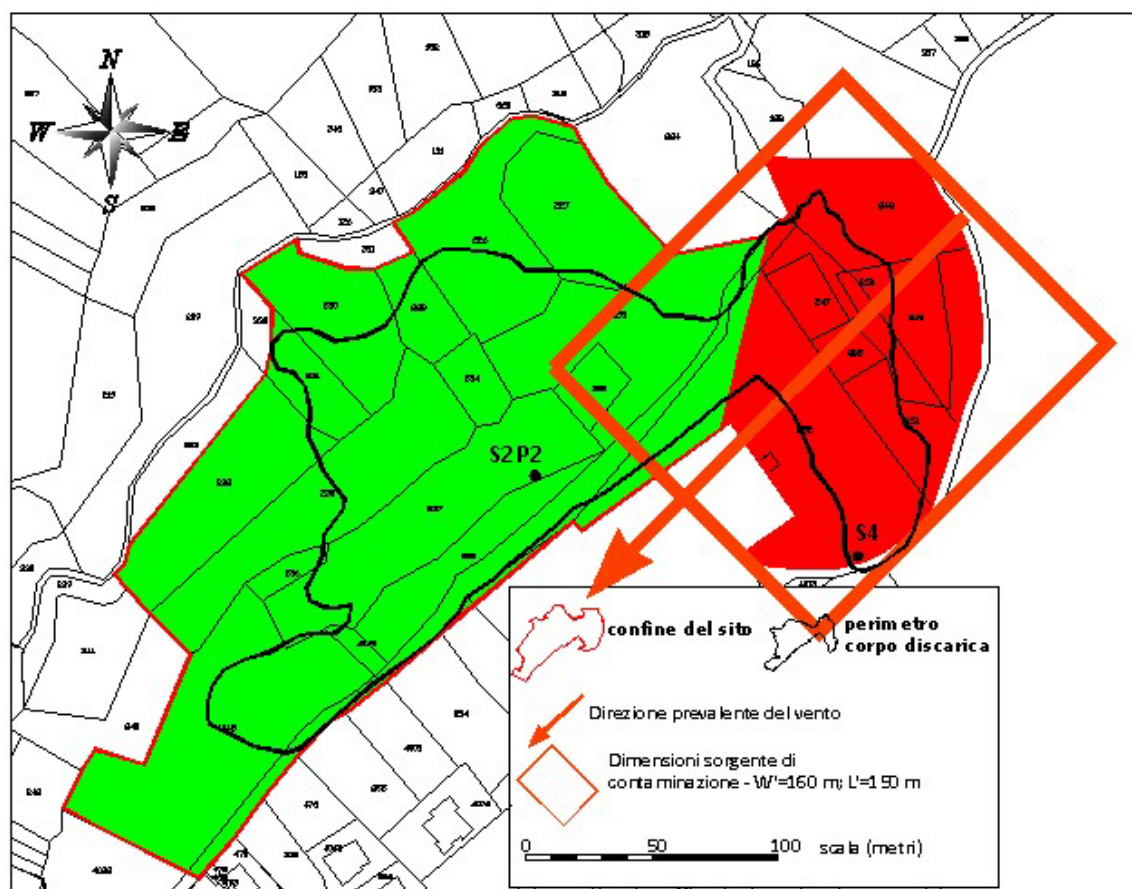


Fig.5. Dimensioni della sorgente in suolo superficiale per calcolo del rischio recettore uomo/bambino.

preso pari alla media annuale. Nella figura 5 è riportata la planimetria del sito con le dimensioni così determinate. L'altezza del box è fissata a 2 m.

6.1.1 Parametri di input

Di seguito si riporta in forma tabellare l'elenco dei parametri di input utilizzati per la elaborazione dell'analisi di rischio per lo scenario considerato: rischio per Uomo/Bambino derivante da suolo superficiale.

SIMBOLO	PARAMETRO	UNITA' DI MISURA	Valore di default*	Valore utilizzato
SUOLO SUPERFICIALE				
W'	Estensione della sorgente di contaminazione nella direzione principale del vento	cm	4500	16000
S_w'	Estensione della sorgente di contaminazione nella direzione ortogonale a quella principale del vento	cm	4500	15000
A'	Area della sorgente (rispetto alla direzione prevalente del vento)	cm ²	20250000	240000000
L_{s(ss)}	Profondità del top della sorgente nel suolo superficiale rispetto al p.c.	cm	0	0
L_i	Profondità della base della sorgente rispetto al p.c.	cm	300	100
da	Spessore della sorgente nel suolo superficiale	cm	100	100
ρ_s	Densità del suolo	g/cm ³	1.7	1.7
f_{oc}	Frazione di carbonio organico nel suolo insaturo	g-C/g-suolo	0.01	0.024
I_{ef}	Infiltrazione efficace	cm/anno	30	30
pH	pH del suolo insaturo	adim.	6.8	6.8

6.1.2 Bersagli della contaminazione

Per l'Analisi di Rischio sono considerati i seguenti recettori:

- Uomo/Bambino fruitori dell'area (outdoor on-site).

6.1.3 Criteri di accettabilità del Rischio

E' considerato accettabile come proposto da ISS e riportato nel D.Lgs 04/08, per gli effetti **cancerogeni** sulla salute umana, il valore di rischio pari a:

- sostanze cancerogene: $TR = 10^{-6}$ (valore di rischio individuale)
- sostanze cancerogene $TR_{CUM} = 10^{-5}$ (valore di rischio cumulativo)

Gli effetti tossici **non cancerogeni** sulla salute umana prevedono che l'Indice di Pericolo (individuale e cumulativo) siano inferiori all'unità.

Nella modalità di calcolo forward i suddetti valori sono confrontati con quelli ottenuti dall'applicazione della procedura (considerando i valori di CRS), mentre in modalità backward sono imposti a monte del calcolo per derivarne i valori di CSR.

6.1.4 Risultati - scenario 1

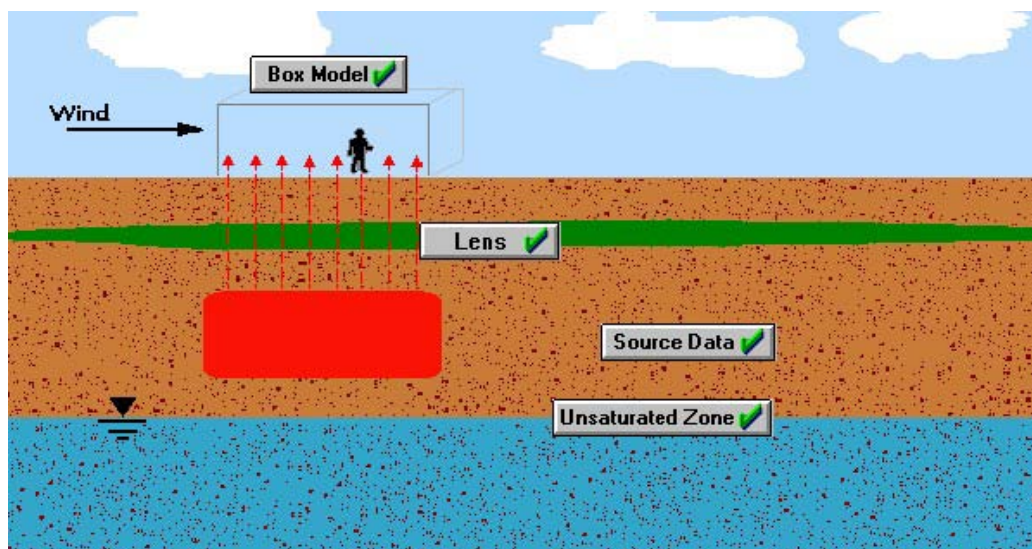
Valutazione dei rischi ai bersagli Uomo/Bambini derivante da suolo superficiale contaminato.

Le modalità di esposizione derivanti dalla contaminazione presente nel suolo superficiale comprendono, come evidenziato nel diagramma di flusso sopra riportato, l'esposizione diretta attraverso il contatto dermico e l'ingestione di suolo contaminato. Per queste modalità di esposizione non vengono utilizzati modelli di fate&transport, avendo come termine sorgente le concentrazioni presenti nel suolo stesso. Oltre queste due modalità di esposizione i bersagli presenti sono sottoposti alla inalazione dei vapori dei volatili generatisi dal suolo, implicando meccanismo di fate&transport necessari per la definizione delle concentrazioni outdoor sul sito.

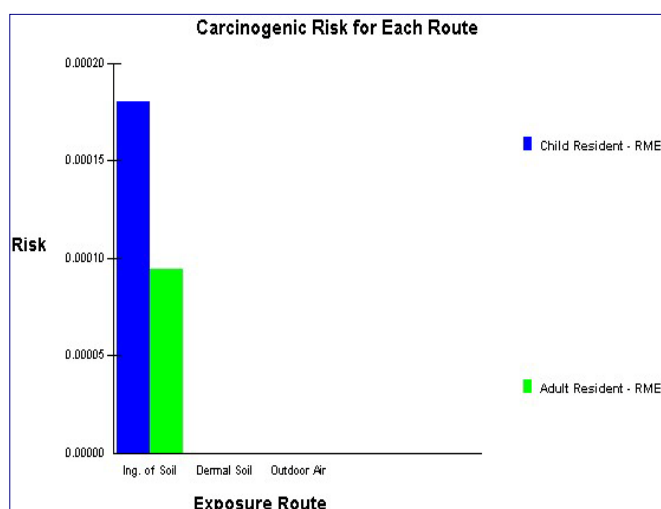
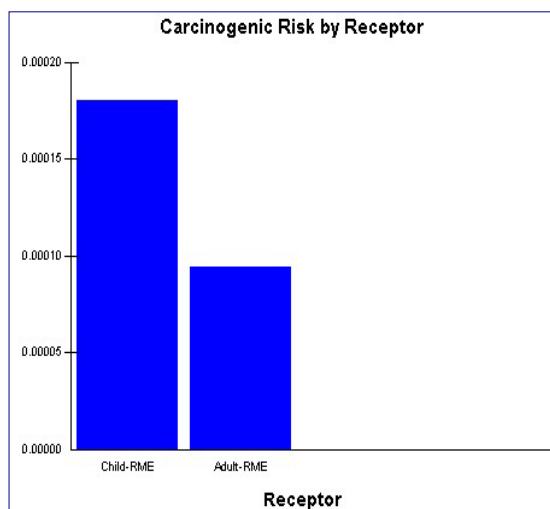
Il modello di Fate&Transport utilizzato per la stima delle concentrazioni in ambiente aperto è il *VAPOR MODEL FROM SOIL (Johnson and Ettinger)* con sorgente costituita da suolo del codice di calcolo RISC4.04

Le assunzioni e le limitazioni di tale modello di calcolo riguardano:

- la simulazione prevede una esposizione on-site, non considera quindi bersagli posti a distanza da esso;
- le dimensioni del box devono riflettere in modo ragionevole le dimensioni areali della contaminazione;
- la lunghezza del box non deve essere inferiore alla dimensione effettiva della contaminazione nel suolo;
- la velocità del vento è considerata costante;
- l'aria all'interno del box è considerata completamente miscelata ad ogni istante.



I risultati del calcolo evidenziano la presenza di Rischio cancerogeno superiore ai valori fissati dalla normativa. Nell'istogramma riportato di seguito è evidenziato il rischio cancerogeno associato ai bersagli Uomo/bambino fruitori del sito.

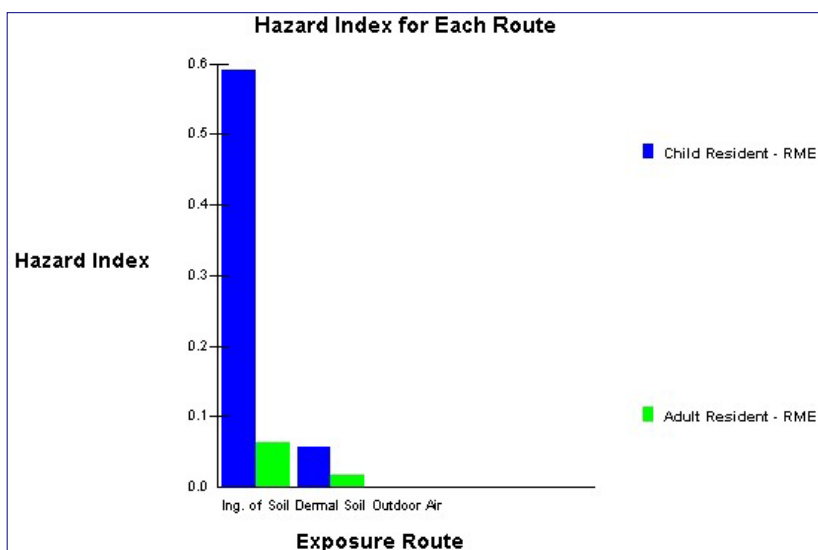
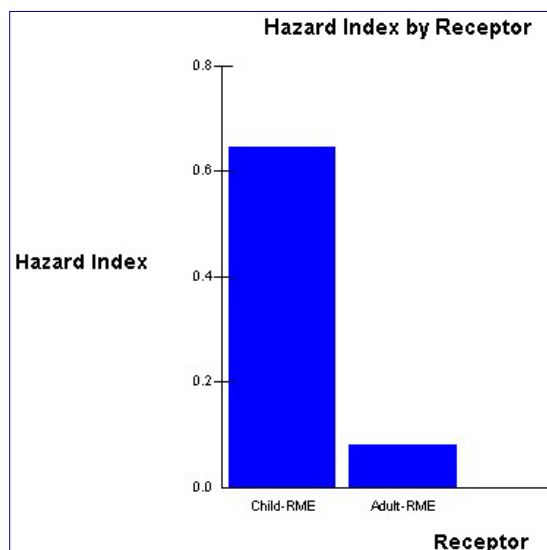


In particolare l'esposizione derivante dall'ingestione di suolo rappresenta da solo il principale fattore di rischio per i fruitori dell'area.

Il contaminante Cobalto costituisce il responsabile del rischio cancerogeno essendo l'unico dei contaminanti indice con caratteristiche carcinogeniche (per i risultati in forma estesa si rimanda all'allegato 1).

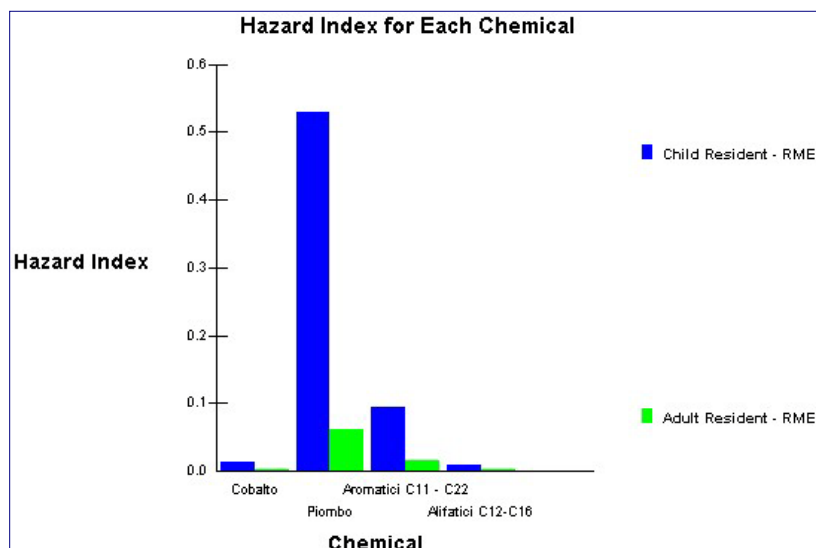
L'indice di pericolo HI per lo scenario considerato nel presente paragrafo non assume valori superiori o uguali all'unità.

Le seguenti figure evidenziano i valori di Hazard Index associati ai singoli bersagli considerati nel calcolo ed il valore del HI per ogni via di esposizione per i singoli bersagli presenti.



Come ottenuto per il rischio cancerogeno, per l'indice HI la principale via di esposizione è attraverso l'ingestione di suolo, subordinatamente il contatto dermico e il principale bersaglio è costituito dai bambini.

Diversamente che per il rischio cancerogeno per l'Hazard il principale contaminante responsabile dell'innalzamento dei valori di pericolo è costituito dal Piombo, come riportato nella figura successiva .



Riassumendo, per lo scenario considerato nel presente paragrafo il rischio associato all'uomo/bambino fruitore dell'area supera i valori indicati dalla normativa, mentre l'indice di pericolo non supera i valori limite imposti. I bersagli uomo/bambino presentano rischio associato al contaminante Cobalto per la via di esposizione legata all'ingestione di suolo. Gli altri contaminanti e le altre vie di esposizione considerate (contatto dermico e inalazione di vapori dal suolo) non costituiscono rischio per i fruitori dell'area.

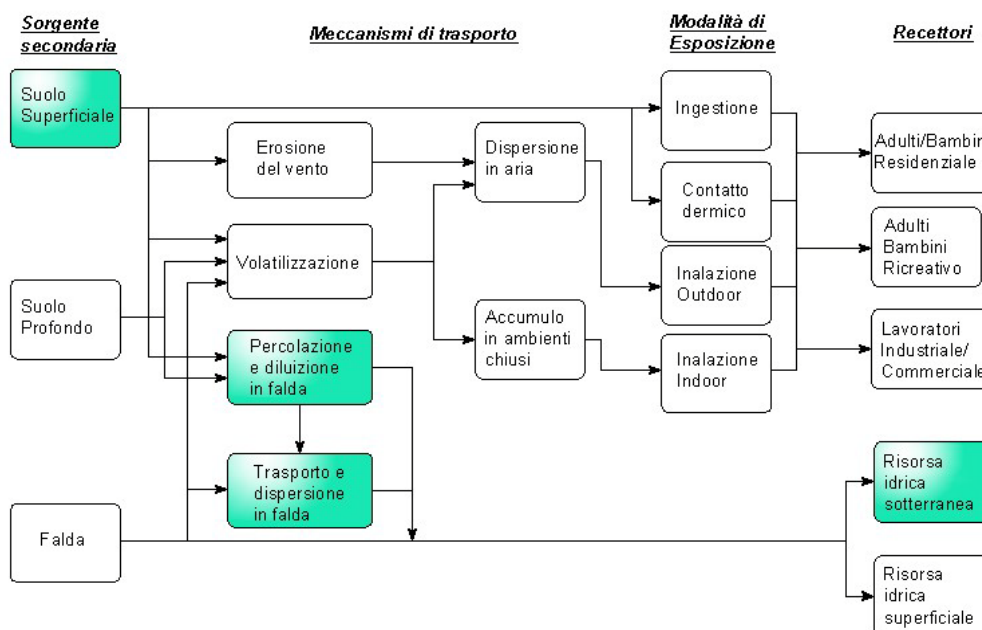
Nei riguardi della tossicità dei contaminanti presenti, nessuno di essi, per nessuna via di esposizione supera i valori imposti dalla normativa, ma a differenza del rischio cancerogeno nel caso del rischio tossicologico il principale contaminante responsabile dei valori più alti di HI è da ricercarsi nel Piombo, ovviamente anche nel caso del rischio tossicologico i bersagli maggiormente coinvolti sono i bambini.

6.2 Calcolo del rischio per la Falda derivante da Suolo Superficiale – Scenario 2

Nel presente paragrafo viene calcolato il rischio per il recettore Falda derivante dal Suolo Superficiale contaminato. In particolare il rischio sarà valutato considerando come meccanismi di trasporto la percolazione e diluizione in falda ed il conseguente trasporto al punto di conformità. Il recettore considerato nel presente scenario è dunque la risorsa idrica sotterranea ed il rischio è valutato al punto di conformità, che è definito nelle linee guida come il punto al confine del sito nella direzione di scorrimento della falda.

Di seguito si riporta il diagramma di flusso descrittivo per la sorgente considerata, per i meccanismi di trasporto e per le modalità di esposizione.

Calcolo del Rischio per la Risorsa Idrica sotterranea da Suolo Superficiale - al POC



La dimensione della sorgente individuata nel Suolo Superficiale nei confronti della Risorsa idrica sotterranea è determinata nelle sue caratteristiche di larghezza e lunghezza dalla direzione di deflusso della falda.

Come evidenziato nel documento di Caratterizzazione, i piezometri installati sul sito hanno messo in luce la presenza di una falda di tipo sospesa, costituita da più livelli impermeabili che ospitano livelli permeabili saturi, a carattere prevalentemente stagionale. I dati piezometrici disponibili sono insufficienti a stabilire il complesso sistema di flusso presente. Si ritiene opportuno semplificare nel modello concettuale assumendo un drenaggio preferenziale delle acque di falda verso il fosso San Giovanni che rappresenta il principale elemento idrologico di drenaggio.

Nelle sue caratteristiche geometriche di soggiacenza e di spessore, la falda viene concettualizzata considerando rispettivamente il livello piezometrico che più rappresenta la condizione sfavorevole a preservare il livello di rischio ed uno spessore pari a tutto l'acquifero fino all'impermeabile costituito dalle Argille grigio-azzurre.

Il livello di rischio sarà determinato confrontando la concentrazione dei contaminanti calcolata con le equazioni che descrivono i meccanismi di fate&transport e la concentrazione degli stessi previsti dalla normativa vigente. In sostanza la concentrazione dei contaminanti lisciviati dal suolo superficiale dovrà essere inferiore alle concentrazioni CSC.

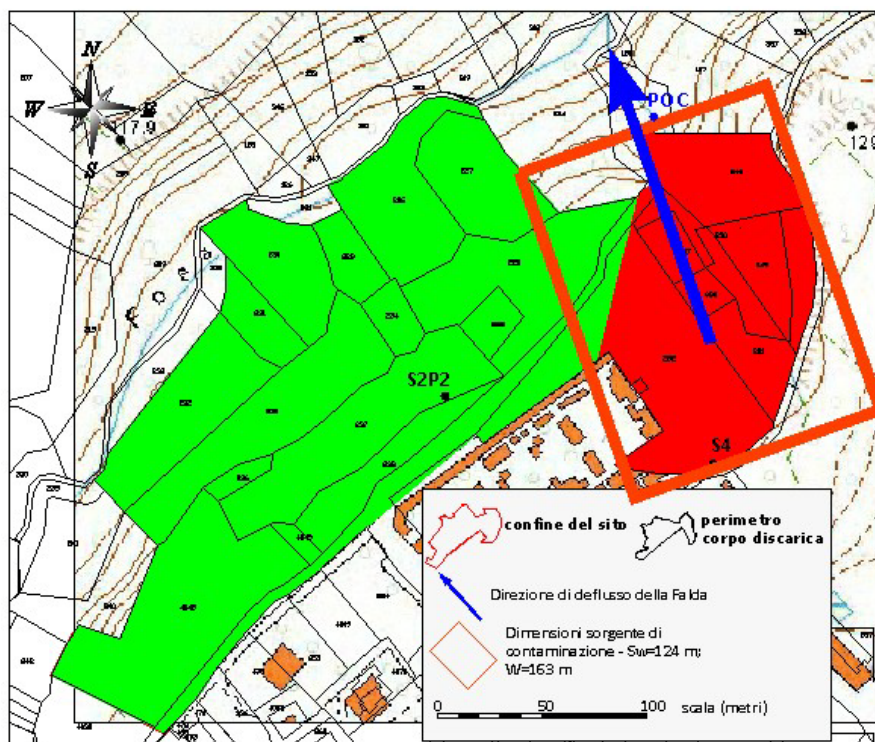


Fig.6. Dimensioni della sorgente in suolo superficiale per calcolo del rischio recettore risorsa idrica sotterranea.

6.2.1 Parametri di input

Di seguito si riporta in forma tabellare l'elenco dei parametri di input utilizzati per la elaborazione dell'analisi di rischio per lo scenario considerato: Rischio per la risorsa idrica sotterranea derivante da Suolo Superficiale.

SIMBOLO	PARAMETRO	UNITA' DI MISURA	Valore di default*	Valore utilizzato
SUOLO INSATURO				
L_{GW}	Profondità del piano di falda	cm	300	850
h_v	Spessore della zona insatura	cm	281.2	850
d_a	Spessore della falda	cm	---	
W	Estensione della sorgente nella direzione del flusso di falda	cm	4500	16300
S_w	Estensione della sorgente nella direzione ortogonale al flusso di falda	cm	4500	12400
A	Area della sorgente (rispetto alla direzione del flusso di falda)	cm ²	20250000	202120000
$L_{s(ss)}$	Profondità del top della sorgente nel suolo superficiale rispetto al p.c.	cm	0	0
L_f	Profondità della base della sorgente rispetto al p.c.	cm	300	100
da	Spessore della sorgente nel suolo superficiale	cm	100	100
L_F	Soggiacenza della falda rispetto al top della sorgente	cm	300	850
ρ_s	Densità del suolo	g/cm ³	1.7	1.7
f_{oc}	Frazione di carbonio organico nel suolo insaturo	g-C/g-suolo	0.01	0.024
I_{ef}	Infiltrazione efficace	cm/anno	30	20
pH	pH del suolo insaturo	adim.	6.8	6.8
SUOLO SATURO/FALDA				
v_{gw}	Velocità di Darcy	cm/anno	2500	
K_{sat}	Conducibilità idraulica del terreno saturo	cm/anno	---	0,86
i	Gradiente idraulico	adim.	---	0,001
f_{oc}	Frazione di carbonio organico nel suolo saturo	g-C/g-suolo	0.001	0,024
pH	pH del suolo saturo	adim.	6.8	

6.2.2 Bersagli della contaminazione

Per l'Analisi di Rischio viene considerato il seguente recettore:

- Risorsa Idrica Sotterranea.

6.2.3 Criteri di accettabilità del Rischio

Il rapporto tra la concentrazione in falda (C_{GW}) e i valori di riferimento per la falda (CSC_{GW}) previsti dalla normativa vigente definisce numericamente il “rischio per la risorsa idrica sotterranea” (R_{GW}) ed affinché sia accettabile deve essere:

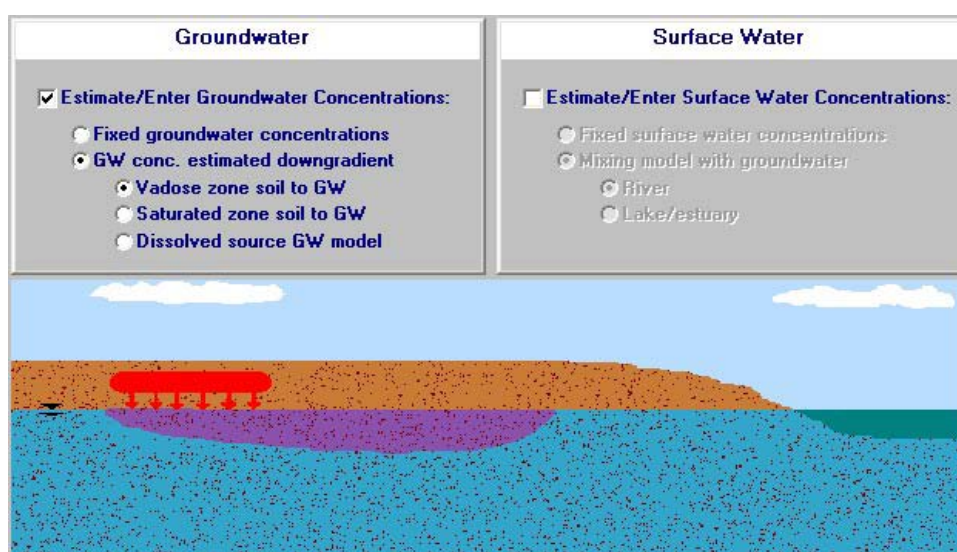
$$R_{GW} = C_{GW} / CSC_{GW} \text{ con } R_{GW \text{ accettabile}} \leq 1$$

6.2.4 Risultati - scenario 2

Il modello di calcolo utilizzato per la stima delle concentrazioni presenti in falda e dovute alla lisciviazione del suolo profondo è quello relativo al VADOSE ZONE MODEL del codice di calcolo RISC 4.0.

Le assunzione e le limitazioni di tale modello di calcolo riguardano:

- la simulazione del trasporto della fase disciolta verso il basso;
- è un modello monodimensionale;
- la zona vadosa è considerata omogenea e uniforme;
- non sono considerate le variazioni di soggiacenza della tavola d'acqua.



E' stato considerato un tempo di simulazione pari a 100 anni, durante i quali si ha una perdita di massa dalla sorgente conseguente al trasferimento nella fase liquida ed un trasporto attraverso la zona vadosa fino alla tavola d'acqua. La lisciviazione del contaminante avviene essenzialmente per trasporto advettivo ad opera delle acque di infiltrazione.

Al termine della simulazione viene fornito il valore di concentrazione degli analiti al punto di conformità (POC) ubicato al confine del sito; nello specifico il valore di input, della distanza tra sorgente di contaminazione e pozzo di controllo ipotetico è stata fissata pari a 0,01 m. Nel caso in esame il confine del sito viene fatto coincidere con il limite della sorgente di contaminazione.

tempo (anni)	Concentrazione al pozzo (mg/l)			
	Piombo	Cobalto	Alifatici C12-C16	Aromatici C11-C22
100	0	0	0	0

La tabella sopra riportata evidenzia l'assenza di contaminante al punto di conformità.

Il motivo dell'assenza dei contaminanti in falda è da ricercarsi nelle loro caratteristiche di solubilità e mobilità in acqua. Il piombo presenta tendenza a formare legami con carbonati, argille, sostanza organica, ossidi di Ferro e

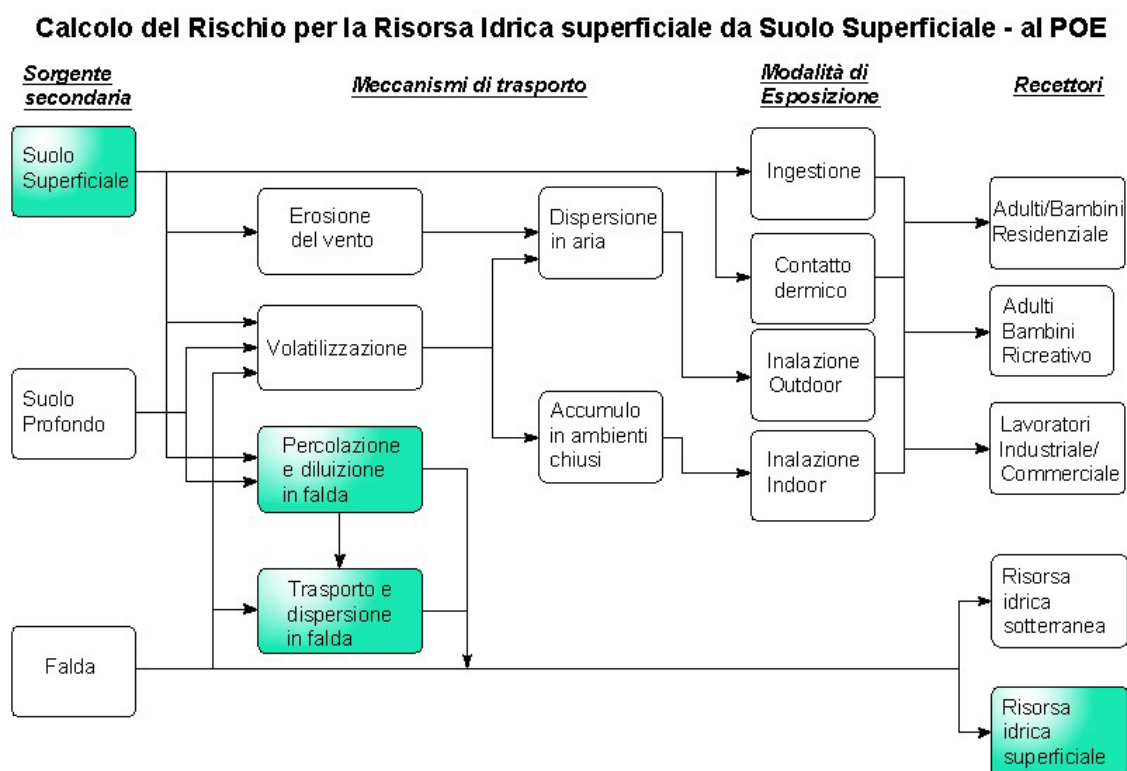
Manganese risultando in tal modo una bassissima mobilità. Gli ossidi e i sali di cobalto (carbonati, solfati, solfuri) sono insolubili in acqua, mentre in soluzioni a carattere acido presentano solubilità maggiore. Gli idrocarburi pesanti, sia alifatici che aromatici sono scarsamente solubili in acqua.

Il rapporto tra la concentrazione calcolata in falda ed i valori di riferimento previsti dalla normativa vigente è per tutti gli analiti uguale a zero, risultando quindi l'assenza per la risorsa idrica sotterranea di contaminazione derivante dal suolo superficiale contaminato.

6.3 Calcolo del rischio per le acque superficiali derivante da Suolo Superficiale – Scenario 3

Nel presente paragrafo viene calcolato il rischio per il recettore Acque superficiali derivante dal Suolo Superficiale contaminato. In particolare il rischio sarà valutato considerando come meccanismi di trasporto la percolazione e diluizione in falda ed il conseguente trasporto al punto di esposizione ubicato prima della confluenza del canale di versante con il Fosso San Giovanni.

Di seguito si riporta il diagramma di flusso descrittivo per la sorgente considerata, per i meccanismi di trasporto e per le modalità di esposizione.



La dimensione della sorgente individuata nel Suolo Superficiale nei confronti della Risorsa idrica superficiale è determinata nelle sue caratteristiche di larghezza e lunghezza dalla direzione di deflusso della falda.

Nel capitolo precedente sono state calcolate le dimensioni della sorgente secondaria nel suolo superficiale, evidenziando le semplificazioni al modello concettuale. Si è calcolato una dimensione della sorgente parallela alla direzione di flusso della falda pari a 163 m ed una dimensione perpendicolarmente al flusso pari a 124 m.

Nelle sue caratteristiche geometriche di soggiacenza e di spessore, la falda viene concettualizzata considerando rispettivamente il livello piezometrico che più rappresenta la condizione sfavorevole a preservare il livello di rischio ed uno spessore pari a tutto l'acquifero fino all'impermeabile costituito dalle Argille grigio azzurre.

Le dimensioni e le caratteristiche idrauliche della zona di miscelamento sono riportate in forma estesa in allegato. Si è fatto riferimento ad un corso d'acqua con area della sezione trasversale pari a 2 m^2 , uno spessore pari ad 1 m della falda entrante nel corso d'acqua, considerando tale spessore completamente utilizzato per il miscelamento.

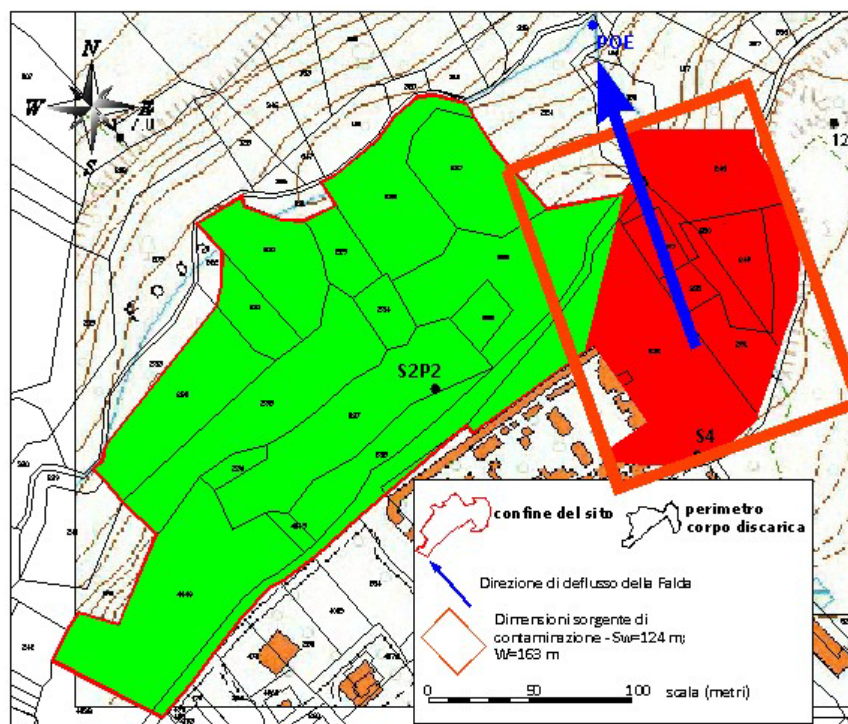


Fig.7. Dimensioni della sorgente in suolo superficiale per calcolo del rischio recettore risorsa idrica superficiale.

6.3.1 Parametri di input

Di seguito si riporta in forma tabellare l'elenco dei parametri di input utilizzati per la elaborazione dell'analisi di rischio per lo scenario considerato: Rischio per le acque superficiali derivante da suolo superficiale.

SIMBOLO	PARAMETRO	UNITA' DI MISURA	Valore di default*	Valore utilizzato
SUOLO INSATURO				
L_{GW}	Profondità del piano di falda	cm	300	850
h_v	Spessore della zona insatura	cm	281.2	850
d_a	Spessore della falda	cm	---	
W	Estensione della sorgente nella direzione del flusso di falda	cm	4500	16300
S_w	Estensione della sorgente nella direzione ortogonale al flusso di falda	cm	4500	12400
A	Area della sorgente (rispetto alla direzione del flusso di falda)	cm ²	20250000	202120000
$L_{s(ss)}$	Profondità del top della sorgente nel suolo superficiale rispetto al p.c.	cm	0	0
L_f	Profondità della base della sorgente rispetto al p.c.	cm	300	100
da	Spessore della sorgente nel suolo superficiale	cm	100	100
L_F	Soggiacenza della falda rispetto al top della sorgente	cm	300	850
ρ_s	Densità del suolo	g/cm ³	1.7	1.7
f_{oc}	Frazione di carbonio organico nel suolo insaturo	g-C/g-suolo	0.01	0.024
I_{ef}	Infiltrazione efficace	cm/anno	30	20
pH	pH del suolo insaturo	adim.	6.8	6.8

SUOLO SATURO/FALDA				
v_{gw}	Velocità di Darcy	cm/anno	2500	
K_{sat}	Conducibilità idraulica del terreno saturo	cm/anno	---	0,86
i	Gradiente idraulico	adim.	---	0,001
f_{oc}	Frazione di carbonio organico nel suolo saturo	g-C/g-suolo	0.001	0,024
pH	pH del suolo saturo	adim.	6.8	

FALDA/ACQUE SUPERFICIALI		
Distanza acque superficiali da sorgente in falda	cm	4000
Conducibilità idraulica del letto del corso d'acqua	m/giorno	10
Gradiente idraulico	adim.	0,05
Spessore dell'acquifero entrante nel corso d'acqua	m	1
Portata del corso d'acqua	m ³ /giorno	180
Frazione della sezione areale per il miscelamento	adim.	1
Frazione di carbonio organico nei sedimenti	g-C/g-suolo	0,02
Sezione trasversale corso d'acqua	m ²	2

6.3.2 Bersagli della contaminazione

Per l'Analisi di Rischio viene considerato il seguente recettore:

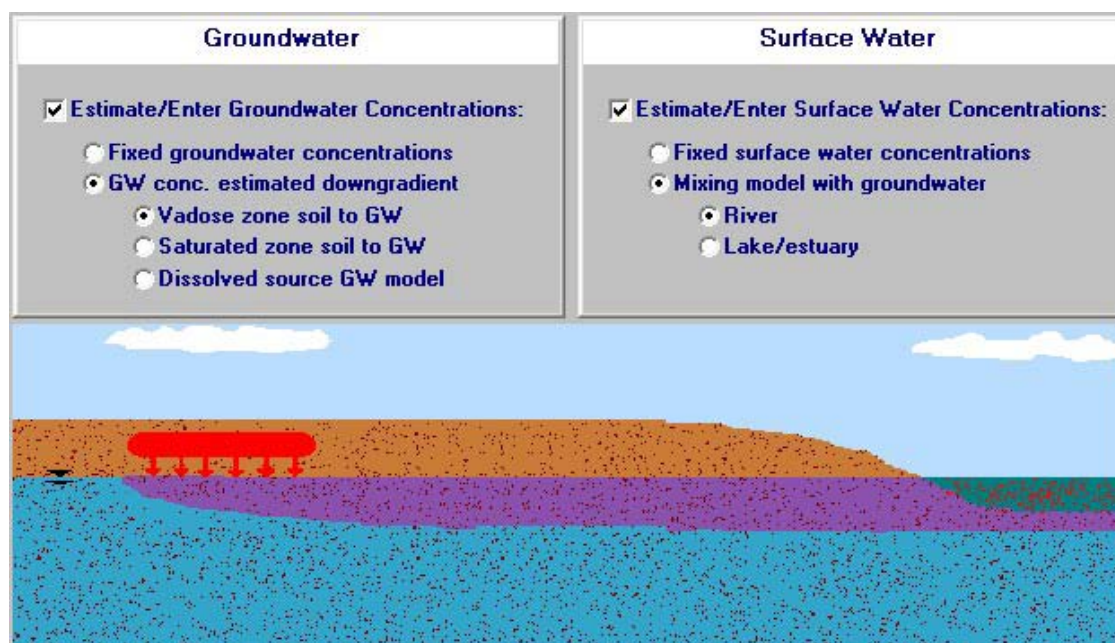
Committente: "Amministrazione Comunale Fossacesia – Dicembre 2013 –

"Rapporto AdR ai sensi art. 242 del D.Lgs. n. 152/2006 e ss.mm.ii. - Sito "Dietro Cimitero" scheda ARTA CH231801"

- Risorsa Idrica Superficiale.

6.3.3 Risultati – scenario 3

Il modello di calcolo utilizzato per la stima delle concentrazioni presenti in falda e dovute alla lisciviazione del suolo profondo è quello relativo al VADOSE ZONE MODEL, per il calcolo del termine sorgente in falda in prossimità del corso d'acqua, accoppiato con il modello Surface Water Mixing del codice di calcolo RISC 4.0.



E' stato considerato un tempo di simulazione pari a 100 anni, durante i quali si ha una perdita di massa dalla sorgente conseguente al trasferimento nella fase liquida ed un trasporto attraverso la zona vadosa fino alla tavola d'acqua. La lisciviazione del contaminante avviene essenzialmente per trasporto advettivo ad opera delle acque di infiltrazione.

Al termine della simulazione viene fornito il valore di concentrazione degli analiti al punto di esposizione (POE) ubicato in prossimità del corso del fosso san Giovanni ; nello specifico la distanza tra sorgente di contaminazione e corso d'acqua è stata fissata pari a 40 m.

tempo (anni)	Concentrazione al POE (mg/l)			
	Piombo	Cobalto	Alifatici C12-C16	Aromatici C11-C22
100	0	0	0	0

La tabella sopra riportata evidenzia l'assenza di contaminante al punto di esposizione

Il motivo dell'assenza dei contaminanti in falda è da ricercarsi nelle loro caratteristiche di solubilità e mobilità in acqua. Il piombo presenta tendenza a formare legami con carbonati, argille, sostanza organica e ossidi di Ferro e Manganese risultando in tal modo una bassissima mobilità. Gli ossidi e i sali di cobalto (carbonati, solfati, solfuri) sono

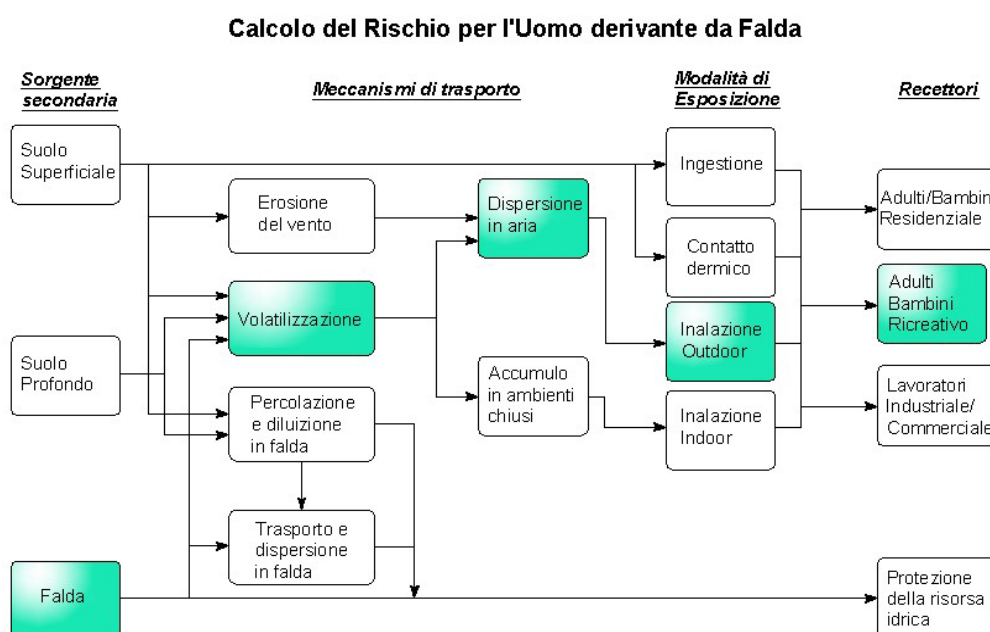
insolubili in acqua, mentre in soluzioni a carattere acido presentano solubilità maggiore. Anche gli idrocarburi pesanti, sia alifatici che aromatici sono scarsamente solubili in acqua.

Risulta quindi l'assenza di rischio per la risorsa idrica superficiali derivante dal suolo superficiale contaminato.

6.4 Calcolo del rischio per adulto/bambino derivante da Falda – Scenario 4

Nel presente paragrafo viene calcolato il rischio per il recettore Adulti/bambini derivante da falda contaminata. In particolare il rischio sarà valutato considerando come meccanismi di trasporto la volatilizzazione e la conseguente dispersione in aria; la modalità di esposizione ai volatili sarà di tipo outdoor on-site.

Di seguito si riporta il diagramma di flusso descrittivo per la sorgente considerata, per i meccanismi di trasporto e per le modalità di esposizione.



La dimensione della sorgente individuata nella falda per i recettori Uomo/Bambini, nello scenario di una fruizione del sito, è determinata nelle sue caratteristiche di larghezza e lunghezza dalla direzione prevalente del vento. Non sono presenti nel sito stazioni di misura del parametro menzionato e per la sua determinazione si è fatto riferimento alla stazione meteo di Pescara-Aeroporto che indica una prevalenza dei venti dal quadrante sud-occidentale (Libeccio) e in misura inferiore da quelli dei quadranti nord orientali (Grecale).

I dati climatici sono stati riportati nel paragrafo 4.

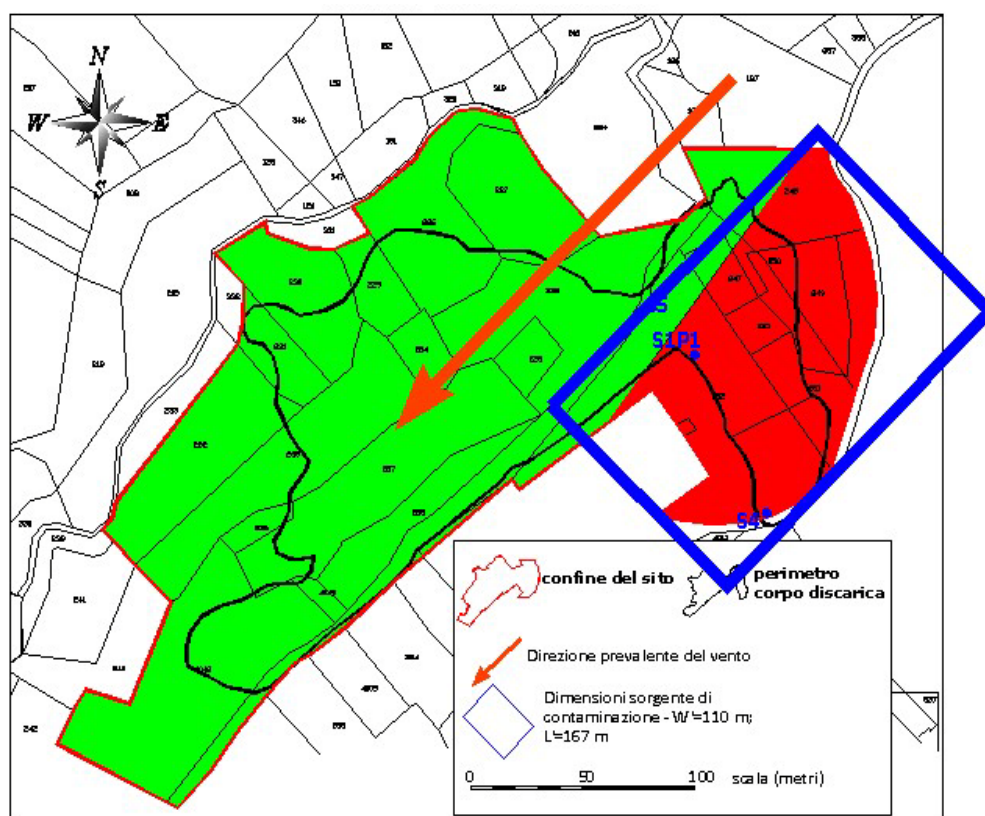


Fig.8. Dimensioni della sorgente in falda per calcolo del rischio recettore uomo.

Le dimensioni della sorgente sono state quindi ottenute tenendo conto della direzione prevalente. In direzione parallela a questa si determinano una lunghezza pari a 167 m una la larghezza pari a 110 m. Nella figura è riportata la planimetria del sito con le dimensioni così determinate. L'altezza del box è fissata a 2 m.

6.4.1 Parametri di input

Di seguito si riporta in forma tabellare l'elenco dei parametri di input utilizzati per la elaborazione dell'analisi di rischio per lo scenario considerato: rischio per Uomo/Bambino derivante da falda contaminata.

SUOLO SATURO/FALDA

d_a	Spessore della falda	cm	---	
W	Estensione della sorgente nella direzione del flusso di falda	cm	4500	6000
S_w	Estensione della sorgente nella direzione ortogonale al flusso di falda	cm	4500	10000
A	Area della sorgente (rispetto alla direzione del flusso di falda)	cm ²	20250000	60000000
W'	Estensione della sorgente di contaminazione nella direzione principale del vento	cm	4500	
S_w'	Estensione della sorgente di contaminazione nella direzione ortogonale a quella principale del vento	cm	4500	
A'	Area della sorgente (rispetto alla direzione prevalente del vento)	cm ²	20250000	
v_{gw}	Velocità di Darcy	cm/anno	2500	
K_{sat}	Conducibilità idraulica del terreno saturo	cm/anno	---	
i	Gradiente idraulico	adim.	---	
f_{oc}	Frazione di carbonio organico nel suolo saturo	g-C/g-suolo	0.001	1
pH	pH del suolo saturo	adim.	6.8	

AMBIENTI APERTI/CONFINATI

U_{air}	Velocità del vento	cm/s	225	
A_b	Superficie totale coinvolta nell'infiltrazione	cm ²	700000	
L_{crak}	Spessore delle fondazioni/muri	cm	15	
L_b	Rapporto tra volume indoor ed area di infiltrazione (RES o IND)	cm	200	
L_T	Distanza tra il top della sorgente nel sito insaturo (in falda) e la base delle fondazioni	cm	Sorgente nell'insaturo: 0 Sorgente in falda: 285	
Z_{crak}	Profondità delle fondazioni	cm	15	

6.4.2 Bersagli della contaminazione

Per l'Analisi di Rischio sono considerati i seguenti recettori:

- Uomo/Bambino fruitori dell'area (outdoor on-site).

6.4.3 Criteri di accettabilità del Rischio

Si considerano accettabili (come proposto da ISS e riportato nel D.Lgs 04/08) per gli effetti **cancerogeni** sulla salute umana valori di rischio pari a:

- sostanze cancerogene: $TR = 10^{-6}$ (valore di rischio individuale)
- sostanze cancerogene $TR_{CUM} = 10^{-5}$ (valore di rischio cumulativo)

Gli effetti tossici **non cancerogeni** sulla salute umana hanno come limite valori dell'Indice di Pericolo (individuale e cumulativo) inferiore all'unità.

Nella modalità di calcolo forward i suddetti valori sono confrontati con quelli ottenuti dall'applicazione della procedura (considerando i valori di CRS), mentre in modalità backward sono imposti a monte del calcolo per derivarne i valori di CSR.

6.4.4 Risultati – scenario 4

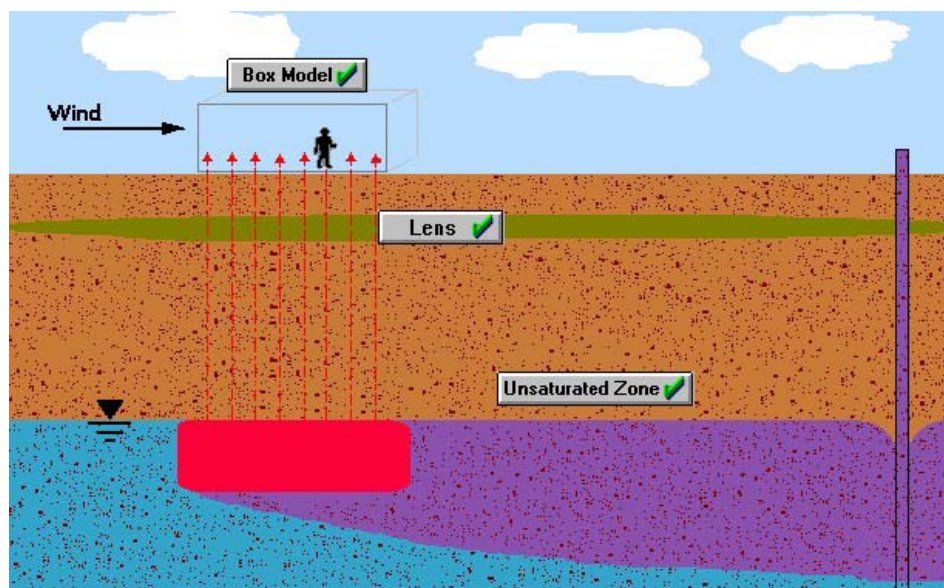
Valutazione dei rischi ai bersagli Uomo/Bambini derivante da falda contaminata.

Le modalità di esposizione derivanti dalla contaminazione presente nella falda comprendono, come evidenziato nel diagramma di flusso sopra riportato, l'esposizione attraverso l'inalazione dei vapori dei volatili generatisi dalla falda, implicando un meccanismo di fate&transprt per la definizione delle concentrazioni outdoor sul sito.

Il modello di Fate&Transport utilizzato per la stima delle concentrazioni in ambiente aperto è il *GROUNDWATER VAPOR MODEL* con sorgente in falda del codice di calcolo RISC4.04

Le assunzioni e le limitazioni di tale modello di calcolo riguardano:

- la simulazione prevede la sorgente esclusivamente in falda;
- i contaminanti diffondono dalla falda attraverso la frangia capillare e attraverso la zona vadosa raggiungono la zona di esposizione;
- la diffusione della fase vapore nella zona vadosa è considerata costante nel tempo;
- non è considerata la biodegradazione;
- il modello stima la concentrazione nel suolo utilizzando la legge di Hery, quindi il tasso di diffusione attraverso la frangia capillare, a questo punto il programma utilizza il modello *Johnson and Ettinger* per la diffusione in ambiente aperto.



I risultati del calcolo evidenziano la presenza di Rischio zero e Hazard Index zero per i bersagli adulti/bambini fruitori del sito.

	RISCHIO					
bersagli	Cr tot	Ni	Fe	Mn	Nitriti	Solfati
bambino	0	0	0	0	0	0
adulto	0	0	0	0	0	0

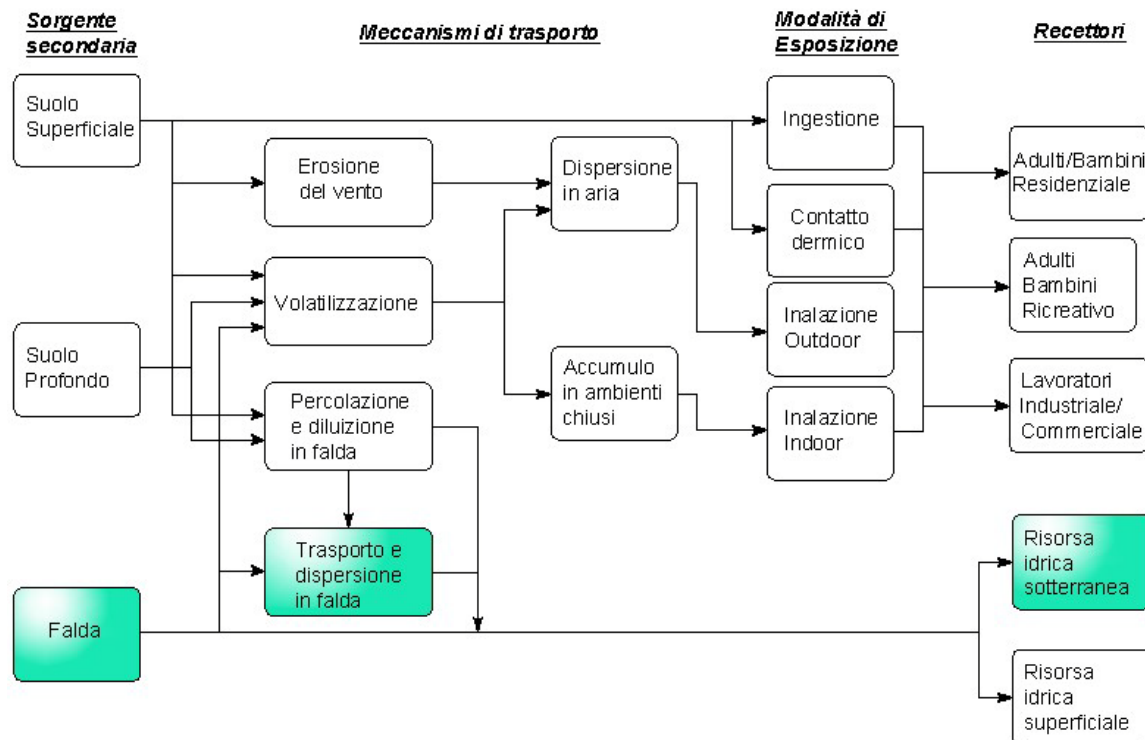
	Hazard Index					
bersagli	Cr tot	Ni	Fe	Mn	Nitriti	Solfati
bambino	0	0	0	0	0	0
adulto	0	0	0	0	0	0

6.5 Calcolo del rischio per Risorsa idrica sotterranea derivante da Falda – Scenario 5

Nel presente paragrafo viene calcolato il rischio per la risorsa idrica sotterranea derivante da Falda contaminata. In particolare il rischio sarà valutato considerando i meccanismi di trasporto e dispersione in falda. Il recettore considerato nel presente scenario è dunque la risorsa idrica sotterranea ed il rischio è valutato al punto di conformità, che è definito nelle linee guida come il punto al confine del sito nella direzione di scorrimento della falda.

Di seguito si riporta il diagramma di flusso descrittivo per la sorgente considerata, per i meccanismi di trasporto e per le modalità di esposizione.

Calcolo del Rischio per la Risorsa Idrica sotterranea da Falda - al POC



La dimensione della sorgente individuata nella Falda nei confronti della Risorsa idrica sotterranea è determinata nelle sue caratteristiche di larghezza e lunghezza dalla direzione di deflusso.

Come evidenziato nel documento di Caratterizzazione, i piezometri installati sul sito hanno messo in luce la presenza di una falda di tipo sospesa, costituita da più livelli impermeabili che ospitano livelli permeabili saturi, a carattere prevalentemente stagionale. I dati piezometrici disponibili sono insufficienti a stabilire il complesso sistema di flusso presente. Si ritiene opportuno semplificare nel modello concettuale assumendo un drenaggio preferenziale delle acque di falda verso il fosso San Giovanni che rappresenta il principale elemento idrologico di drenaggio.

Nelle sue caratteristiche geometriche di soggiacenza e di spessore, la falda viene concettualizzata considerando rispettivamente il livello piezometrico che più rappresenta la condizione sfavorevole a preservare il livello di rischio ed uno spessore pari a tutto l'acquifero fino all'impermeabile costituito dalle Argille grigio azzurre.

Il livello di rischio sarà determinato confrontando la concentrazione dei contaminanti calcolata con le equazioni che descrivono i meccanismi di fate&transport e la concentrazione degli stessi previsti dalla normativa vigente.

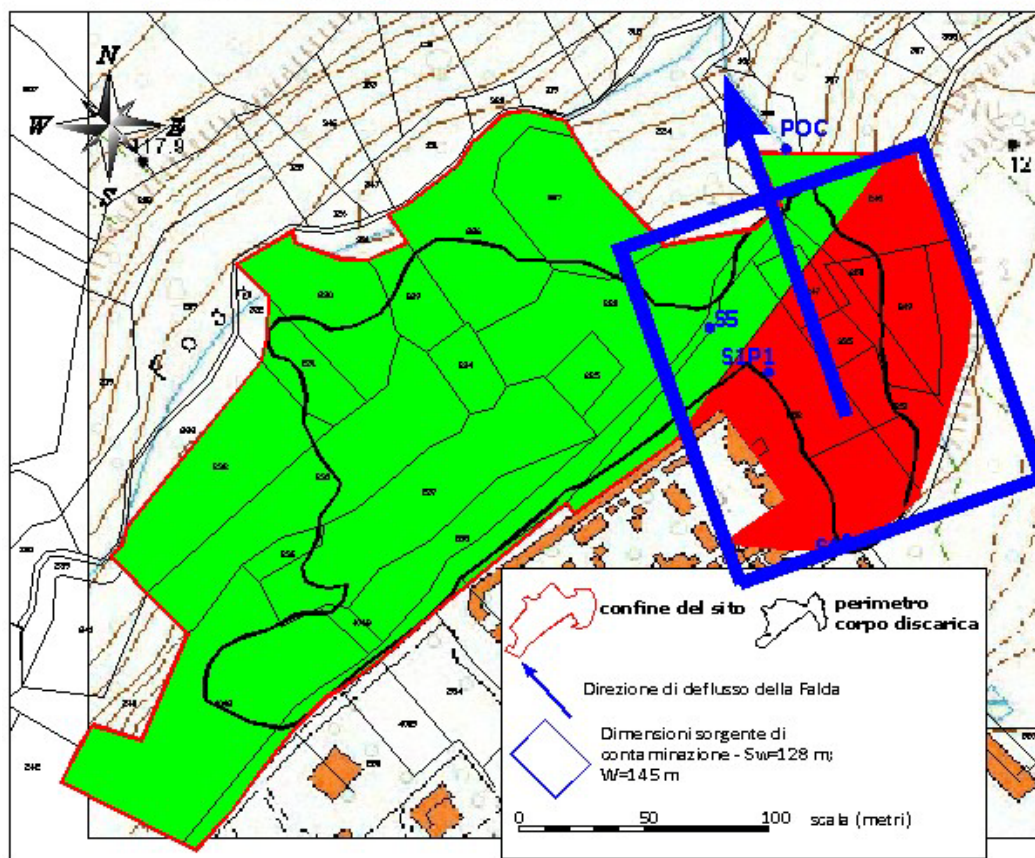


Fig.9. Dimensioni della sorgente in falda per calcolo del rischio risorsa idrica sotterranea al POC.

Il punto di conformità POC è stato ubicato al confine del sito in corrispondenza del centro del canale di versante, in corrispondenza del confine del sito e ad una distanza pari a 15 m dalla sorgente di contaminazione. Tale canale di versante rappresenta, attraverso le acque di risorgiva che stagionalmente alimentano il recettore superficiale, un possibile punto di emersione della falda contaminata.

6.5.1 Parametri di input

Di seguito si riporta in forma tabellare l'elenco dei parametri di input utilizzati per la elaborazione dell'analisi di rischio per lo scenario considerato: rischio per la Risorsa idrica sotterranea derivante da Falda contaminata.

SUOLO SATURO/FALDA				
d_a	Spessore della falda	cm	----	
W	Estensione della sorgente nella direzione del flusso di falda	cm	4500	6000
S_w	Estensione della sorgente nella direzione ortogonale al flusso di falda	cm	4500	10000
A	Area della sorgente (rispetto alla direzione del flusso di falda)	cm ²	20250000	60000000
W'	Estensione della sorgente di contaminazione nella direzione principale del vento	cm	4500	
S_w'	Estensione della sorgente di contaminazione nella direzione ortogonale a quella principale del vento	cm	4500	
A'	Area della sorgente (rispetto alla direzione prevalente del vento)	cm ²	20250000	
v_{gw}	Velocità di Darcy	cm/anno	2500	
K_{sat}	Conducibilità idraulica del terreno saturo	cm/anno	---	
i	Gradiente idraulico	adim.	---	
f_{oc}	Frazione di carbonio organico nel suolo saturo	g-C/g-suolo	0.001	1
pH	pH del suolo saturo	adim.	6.8	

6.5.2 Bersagli della contaminazione

Per l'Analisi di Rischio viene considerato il seguente recettore:

- Risorsa Idrica Sotterranea.

6.5.3 Criteri di accettabilità del Rischio

Il rapporto tra la concentrazione in falda (C_{GW}) e i valori di riferimento per la falda (CSC_{GW}) previsti dalla normativa vigente definisce numericamente il "rischio per la risorsa idrica sotterranea" (R_{GW}) ed affinché sia accettabile deve essere:

$$R_{GW} = C_{GW} / CSC_{GW} \text{ con } R_{GW \text{ accettabile}} \leq 1$$

6.5.4 Risultati – scenario 5

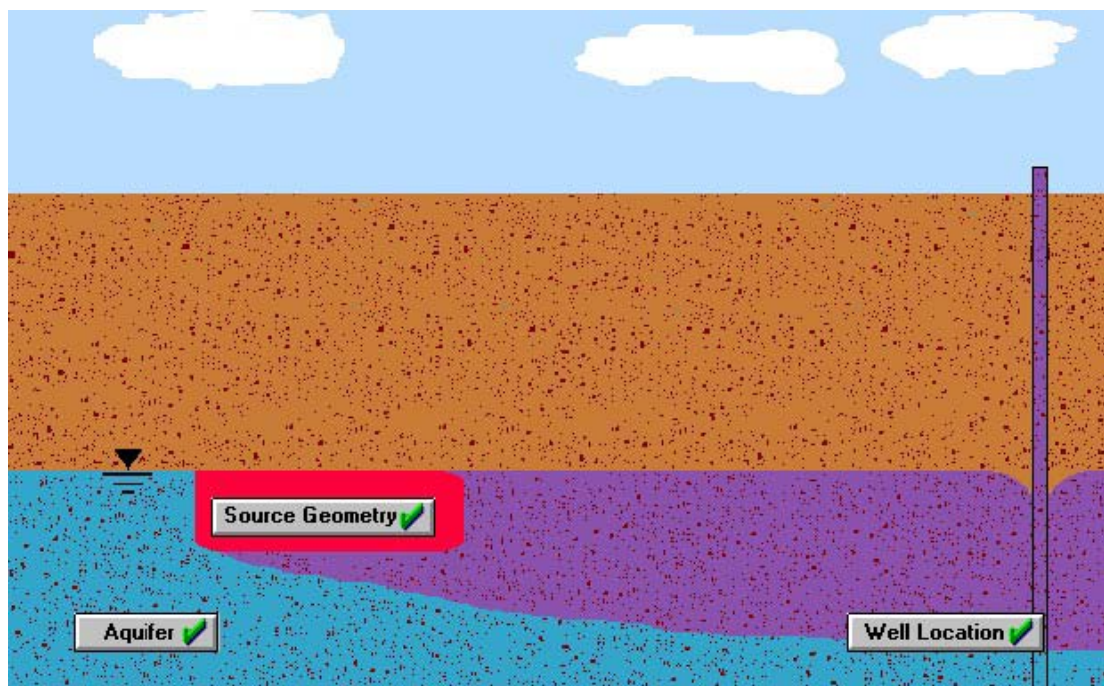
Valutazione dei rischi per la risorsa idrica sotterranea derivante da falda contaminata.

Il modello di Fate&Transport utilizzato per la stima delle concentrazioni in ambiente aperto è il *SATURATED ZONE MODEL* del codice di calcolo RISC4.04

Le assunzioni e le limitazioni di tale modello di calcolo riguardano:

- la simulazione prevede il trasporto della fase disciolta dei contaminanti (non simula liquidi in fase non acquosa);

- la concentrazione stimata si riferisce alla concentrazione in falda;
- l'acquifero è considerato isotropo ed omogeneo;
- le oscillazioni della tavola d'acqua non influenzano il campo di flusso dell'acquifero.



E' stato considerato un tempo di simulazione pari a 100 anni, durante i quali si ha il trasporto in falda (considerando un flusso monodimensionale), una dispersione nelle tre dimensioni dalla sorgente, i termini di ritardo dovuti all'adsorbimento e una degradazione dei contaminanti.

Al termine della simulazione viene fornito il valore di concentrazione degli analiti al punto di conformità (POC) ubicato al confine del sito, con distanza tra sorgente di contaminazione e pozzo di controllo ipotetico pari a 15 m.

bersagli	Cr tot	Ni	Fe	Mn	Nitriti	Solfati
FALDA (µg/l)	0	0	0	1,31E-012	3,38E-006	239

Il rapporto tra la concentrazione calcolata in falda ed i valori di riferimento previsti dalla normativa vigente è in tutti gli analiti uguale a zero (Cr tot, Ni, Fe), risultando quindi l'assenza di rischio per la risorsa idrica sotterranea derivante da falda contaminata.

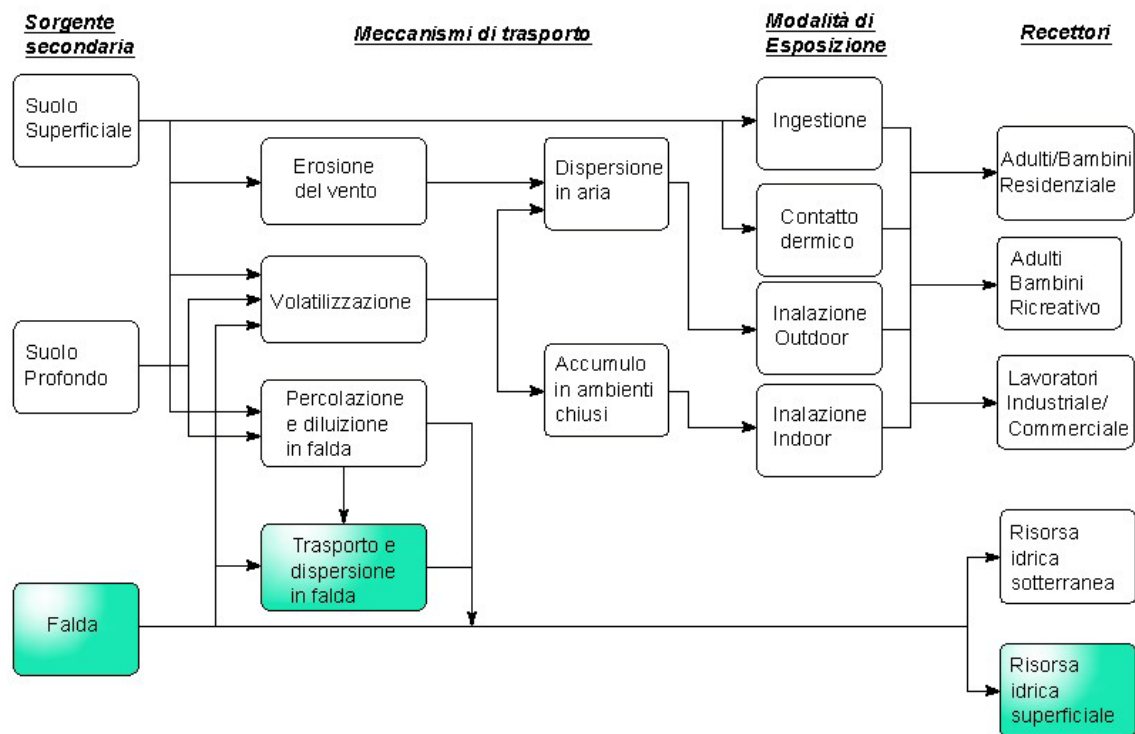
6.6 Calcolo del rischio per Risorsa idrica superficiale derivante da Falda – Scenario 6

Nel presente paragrafo viene calcolato il rischio per la risorsa idrica superficiale derivante da falda contaminata. In particolare il rischio sarà valutato considerando i meccanismi di trasporto e dispersione in falda.. Il recettore considerato

nel presente scenario è dunque la risorsa idrica superficiale ed il rischio è valutato al punto di esposizione, che è definito nelle linee guida come il punto al confine del sito nella direzione di scorrimento della falda.

Di seguito si riporta il diagramma di flusso descrittivo per la sorgente considerata, per i meccanismi di trasporto e per le modalità di esposizione.

Calcolo del Rischio per la Risorsa Idrica superficiale da Falda - al POE



La dimensione della sorgente individuata nella Falda nei confronti della Risorsa idrica Superficiale è determinata nelle sue caratteristiche di larghezza e lunghezza dalla direzione di deflusso.

Nelle sue caratteristiche geometriche di soggiacenza e di spessore, la falda viene concettualizzata considerando rispettivamente il livello piezometrico che più rappresenta la condizione sfavorevole a preservare il livello di rischio ed uno spessore pari a tutto l'acquifero fino all'impermeabile costituito dalle argille azzurre.

Il livello di rischio sarà determinato confrontando la concentrazione dei contaminanti calcolata con le equazioni che descrivono i meccanismi di fate&transport e la concentrazione degli stessi previsti dalla normativa vigente. In sostanza la concentrazione dei contaminanti trasportati in falda dovrà essere inferiore alle concentrazioni CSC in falda in prossimità del corso d'acqua superficiale (POE). Saranno confrontati anche i valori dei contaminanti calcolati nell'acqua superficiale con i valori limite tabellari di scarichi fognari in acque superficiali.

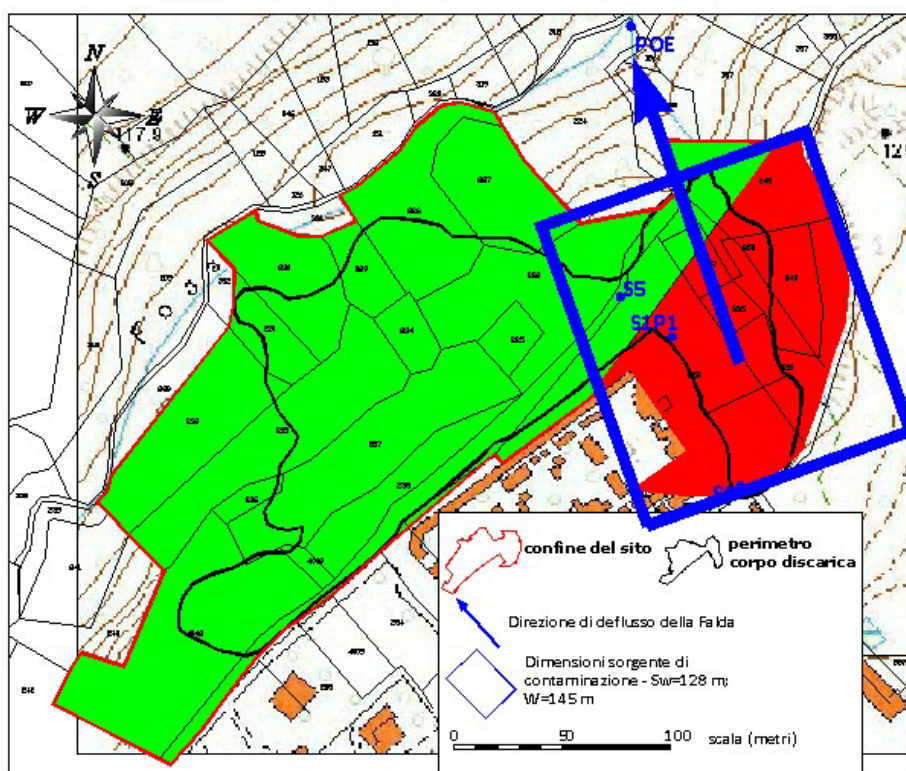


Fig.10. Dimensioni della sorgente in falda per calcolo del rischio risorsa idrica sotterranea al POE.

Il calcolo è realizzato considerando come punto di esposizione un ipotetico pozzo ubicato in prossimità del corso d'acqua in maniera tale da verificare i valori di concentrazione dei contaminanti in falda prima del miscelamento con le acque superficiali. E' inoltre calcolata la concentrazione nelle acque superficiali e confrontate con i limiti di emissione degli scarichi nelle acque superficiali.

6.6.1 Parametri di input

Di seguito si riporta in forma tabellare l'elenco dei parametri di input utilizzati per la elaborazione dell'analisi di rischio per lo scenario considerato: rischio per la Risorsa idrica superficiale derivante da Falda contaminata.

SIMBOLO	PARAMETRO	UNITA' DI MISURA	Valore di default*	Valore utilizzato
SUOLO INSATURO				
L_{GW}	Profondità del piano di falda	cm	300	850
h_v	Spessore della zona insatura	cm	281.2	850
d_a	Spessore della falda	cm	---	
W	Estensione della sorgente nella direzione del flusso di falda	cm	4500	16300
S_w	Estensione della sorgente nella direzione ortogonale al flusso di falda	cm	4500	12400
A	Area della sorgente (rispetto alla direzione del flusso di falda)	cm ²	20250000	202120000
$L_{s(ss)}$	Profondità del top della sorgente nel suolo superficiale rispetto al p.c.	cm	0	0
L_f	Profondità della base della sorgente rispetto al p.c.	cm	300	100
da	Spessore della sorgente nel suolo superficiale	cm	100	100
L_F	Soggiacenza della falda rispetto al top della sorgente	cm	300	850
ρ_s	Densità del suolo	g/cm ³	1.7	1.7
f_{oc}	Frazione di carbonio organico nel suolo insaturo	g-C/g-suolo	0.01	0.024
I_{ef}	Infiltrazione efficace	cm/anno	30	20
pH	pH del suolo insaturo	adim.	6.8	6.8

SUOLO SATURO/FALDA				
v_{gw}	Velocità di Darcy	cm/anno	2500	
K_{sat}	Conducibilità idraulica del terreno saturo	cm/anno	---	0,86
i	Gradiente idraulico	adim.	---	0,001
f_{oc}	Frazione di carbonio organico nel suolo saturo	g-C/g-suolo	0.001	0,024
pH	pH del suolo saturo	adim.	6.8	

FALDA/ACQUE SUPERFICIALI		
Distanza acque superficiali da sorgente in falda	cm	7500
Conducibilità idraulica del letto del corso d'acqua	m/giorno	100
Gradiente idraulico	adim.	0,05
Spessore dell'acquifero entrante nel corso d'acqua	m	1
Portata del corso d'acqua	m ³ /giorno	180
Frazione della sezione areale per il miscelamento	adim.	1
Frazione di carbonio organico nei sedimenti	g-C/g-suolo	0,02
Sezione trasversale corso d'acqua	m ²	2

6.6.2 Bersagli della contaminazione

Per l'Analisi di Rischio viene considerato il seguente recettore:

Committente: "Amministrazione Comunale Fossacesia – Dicembre 2013 –

"Rapporto AdR ai sensi art. 242 del D.Lgs. n. 152/2006 e ss.mm.ii. - Sito "Dietro Cimitero" scheda ARTA CH231801"

- Risorsa Idrica Superficiale.

6.6.3 Criteri di accettabilità del Rischio

Il rapporto tra la concentrazione in falda (C_{GW}) e i valori di riferimento per la falda (CSC_{GW}) previsti dalla normativa vigente definisce numericamente il “rischio per la risorsa idrica sotterranea” (R_{GW}) ed affinché sia accettabile deve essere:

$$R_{GW} = C_{GW} / CSC_{GW} \text{ con } R_{GW_{accettabile}} \leq 1$$

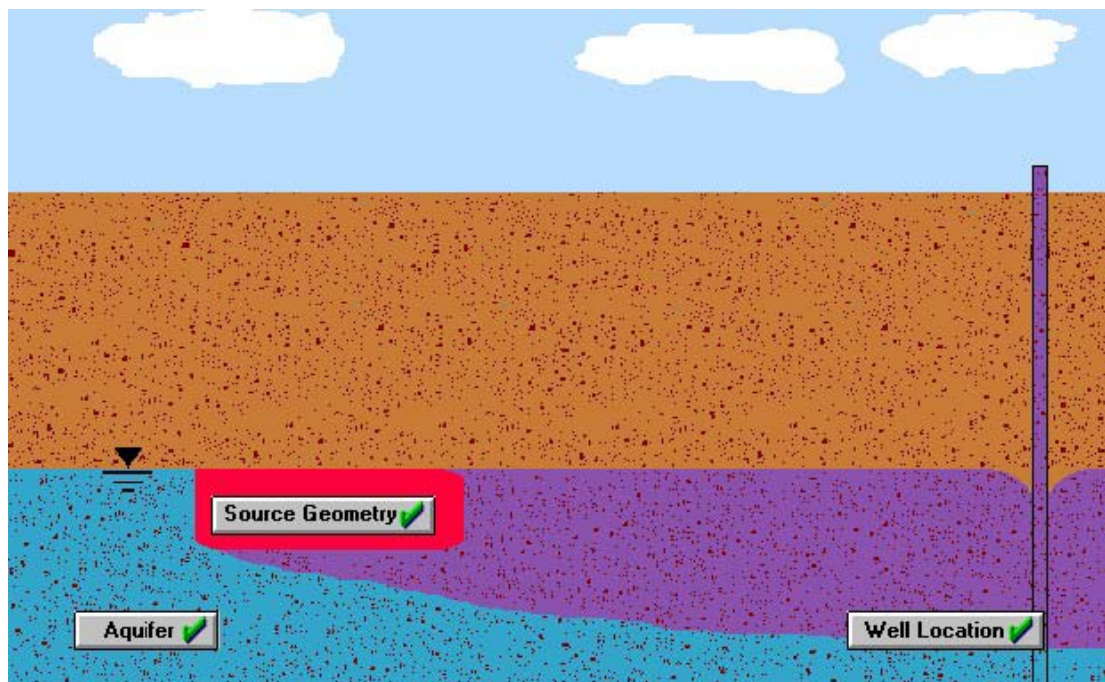
6.6.4 Risultati – scenario 6

Valutazione dei rischi per la risorsa idrica sotterranea derivante da Falda contaminata.

Il modello di Fate&Transport utilizzato per la stima delle concentrazioni in ambiente aperto è il *SATURATED ZONE MODEL* del codice di calcolo RISC4.04

Le assunzioni e le limitazioni di tale modello di calcolo riguardano:

- la simulazione prevede il trasporto della fase disciolta dei contaminanti (non simula liquidi in fase non acquosa);
- la concentrazione stimata si riferisce alla concentrazione in falda;
- l'acquifero è considerato isotropo ed omogeneo;
- le oscillazioni della tavola d'acqua non influenzano il campo di flusso dell'acquifero.



E' stato considerato un tempo di simulazione pari a 100 anni, durante i quali si ha il trasporto in falda (considerando un flusso monodimensionale), una dispersione nelle tre dimensioni dalla sorgente, ritardi dovuti all'adsorbimento e alla degradazione dei contaminanti.

Al termine della simulazione viene fornito il valore di concentrazione degli analiti al punto di conformità (POE) ubicato in prossimità del corso d'acqua superficiale, con distanza tra sorgente di contaminazione e pozzo di controllo ipotetico pari a 75 m.

	concentrazione al POE (µg/l)					
bersagli	Cr tot	Ni	Fe	Mn	Nitriti	Solfati
FALDA (µg/l)	0	0	0	0	0	68,4

Il rapporto tra la concentrazione calcolata in falda ed i valori di riferimento previsti dalla normativa vigente è per tutti gli analiti uguale a zero (Cr tot, Ni, Fe), risultando quindi l'assenza di rischio per la risorsa idrica sotterranea derivante da falda contaminata.

Nelle successive due tabelle si riportano i valori delle concentrazioni dei contaminanti calcolate nelle acque superficiali ed i valori limite allo scarico.

concentrazione in acque superficiali (µg/l)					
Cr tot	Ni	Fe	Mn	Nitriti	Solfati
0	0	0	0	0	24,6

	concentrazione limite acque superficiali (tab.3 allegato5 alla parte III Dlgs n.152/06)					
	Cr tot	Ni	Fe	Mn	Nitriti	Solfati
mg/l	2	2	2	2	-	1000

7.0 INTERVENTI DI BONIFICA E/O MESSA IN SICUREZZA.

Il superamento dei limiti CSR previsti dallo scenario 1, fa sì che il sito oggetto di studio sia da considerarsi contaminato per quanto riguarda la presenza dell'analita Cobalto. La via di esposizione per la quale esiste rischio per i recettori/fruitori dell'area è l'ingestione. La normativa vigente, in particolare l'art.242 comma 7 prevede nel caso vi sia superamento delle CSR l'esecuzione d'interventi di bonifica o messa in sicurezza permanente.

Nel caso specifico visto che trattandosi di rischio indotto da ingestione di suolo superficiale contaminato, si potrebbero adottare sia procedure di messa in sicurezza permanente sia interventi di bonifica.

La progettazione degli interventi descritti in precedenza deve essere preceduta da una fase di approfondimento analitico per l'accertamento della concentrazione e della diffusione all'interno dell'area contaminata dell'inquinante.

Le migliori tecniche ingegneristiche necessarie alla realizzazione degli interventi di messa in sicurezza saranno valutate nella seguente fase progettuale.

Nel caso si voglia procedere alla completa bonifica dell'area si rende necessaria l'asportazione dell'intero volume di materiale di ricoprimento presente.

8.0 CONCLUSIONI

I dati derivanti dai documenti di Indagine preliminare e Caratterizzazione del sito hanno permesso vista l'estensione una ricostruzione solo parziale dell'area. Le variabili concernenti la matrice terreno sono state desunte da cinque sondaggi, dieci trincee esplorative, tre piezometri ed un punto di prelievo di acque superficiali.

I superamenti sono individuabili nel suolo superficiale (sondaggio S4) e nella falda (sondaggi S4 e S1P1). Si è considerato come confine del sito il perimetro complessivo delle particelle impattate dalla presenza del corpo discarica.

All'interno di tale perimetro è stata individuata la sorgente di contaminazione sia nel suolo superficiale sia nella falda. Nella determinazione delle aree sorgente non si è tenuto conto del perimetro del corpo discarica ma si è scelto di estenderne i limiti sino al confine del sito.

I contaminanti che presentano superamenti nella matrice suolo superficiale sono:

- ✎ Idrocarburi pesanti C>12
- ✎ Piombo
- ✎ Cobalto

I contaminanti che presentano superamenti nella matrice falda sono:

- ✎ Manganese
- ✎ Ferro
- ✎ Cromo tot
- ✎ Nichel
- ✎ Nitriti
- ✎ Solfati

I bersagli della contaminazione considerati sono i fruitori dell'area (adulti/bambini), la risorsa idrica sotterranea e le acque superficiali del fosso San Giovanni.

Sono stati così verificati sei possibili scenari:

- 1- rischio per uomo (adulto/bambino) derivante da suolo superficiale contaminato;
- 2- rischio per la risorsa idrica sotterranea derivante da suolo superficiale contaminato;
- 3- rischio per le acque superficiali derivante da suolo superficiale contaminato;
- 4- rischio per uomo (adulto/bambino) derivante da falda contaminata;
- 5- rischio per la risorsa idrica sotterranea derivante da falda contaminata;
- 6- rischio per le acque superficiali derivante da falda contaminata.

L'esposizione per i fruitori dell'area è di tipo on-site, il POC è stato ubicato al confine del sito nella direzione di scorrimento della falda ed in corrispondenza dell'asse di drenaggio, il punto di esposizione POE è stato ubicato alla confluenza tra il fosso San Giovanni e il canale di versante sito ad est dell'area.

I risultati derivanti dai vari scenari mostrano che vi è superamento dei valori di riferimento legati al rischio derivante dalla presenza di suolo superficiale contaminato sui bersagli adulti/bambini fruitori dell'area (scenario 1). In particolare l'analita che è responsabile del rischio è il Cobalto, attraverso l'ingestione di suolo.

Le concentrazioni di output dei modelli di calcolo nella falda sia al POC che al POE risultano inferiori alle relative CSC degli analiti esaminati, non si riscontra quindi rischio per la risorsa idrica sotterranea ne per la risorsa idrica superficiale.

Si resta a disposizione per eventuali chiarimento in merito.

Pennadomo, lì Dicembre 2013

Il collaboratore

Dott. Geol. Giancristofaro Francesco



Il tecnico

Dott. Geol. Gianluca Giovannelli



ALLEGATI

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D.Lgs 3 Aprile 2006 n.152 e ss.mm.ii..

User's Manual RISK-INTEGRATED SOFTWARE FOR CLEAN-UPS, RISC 4.0.

"Rischio per il recettore Uomo derivante da Suolo Superficiale" – Scenario 1 - Input

FATE AND TRANSPORT MODEL INPUT SUMMARY FILE

Model Description:

Johnson and Ettinger model for outdoor air

with volatile emissions from soil

Title:

New Project

Simulation time (years).

100

Soil Source for Vapor Model

Total porosity in source (cm ³ /cm ³).	0.25
Water content in source (cm ³ /cm ³)	0.15
Fraction organic carbon in source(mg/mg)	2.40E-02
Soil bulk density in source (g/cm ³).	1.7

Unsaturated Zone Properties for Vapor Model

Total porosity (cm ³ /cm ³)	0.15
Water content(cm ³ /cm ³)	0.15
Distance from source to surface (m)	1.00E-02

OUTDOOR AIR PARAMETERS

Height of box (breathing zone) (m)	2.0
Length of box (m).	1.60E+02
Wind speed (m/s)	3.7

TPH Data for Vapor Model Source

Concentration of TPH (mg/kg)	0.0
Molecular weight of TPH (g/mol).	0.0

CHEMICAL DATA FOR: Cobalto

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	8.75E+04
Vapor pressure (mmHg)	0.0
Kd (partition coefficient) (L/kg)	2.04E+03
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	59.

Source Concentrations:

Source conc. in soil for outdoor air model (mg/kg) 20.

CHEMICAL DATA FOR: Piombo

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	9.58E+03
Vapor pressure (mmHg)	7.28E-11
Kd (partition coefficient) (L/kg)	6.68E+03
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	2.07E+02

Source Concentrations:

Source conc. in soil for outdoor air model (mg/kg)	1.40E+02
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CHEMICAL DATA FOR: Aromatici C11 - C22

Diffusion coefficient in air (cm ² /s)	6.00E-02
Diffusion coefficient in water (cm ² /s)	1.00E-05
Solubility (mg/l)	5.8
Vapor pressure (mmHg)	2.43E-02
KOC (L/kg).	5.00E+03
Henry's Law coefficient (-).	3.00E-02
Molecular weight (g/mol).	1.50E+02

Source Concentrations:

Source conc. in soil for outdoor air model (mg/kg)	1.60E+02
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CHEMICAL DATA FOR: Alifatici C12-C16

Diffusion coefficient in air (cm ² /s)	4.06E-02
Diffusion coefficient in water (cm ² /s)	4.61E-06
Solubility (mg/l)	3.50E-04
Vapor pressure (mmHg)	2.96E-02
KOC (L/kg).	5.01E+06
Henry's Law coefficient (-).	1.60E+02
Molecular weight (g/mol).	2.10E+02

Source Concentrations:

Source conc. in soil for outdoor air model (mg/kg)	1.60E+02
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"Rischio per il recettore Uomo derivante da Suolo Superficiale" – Scenario 1 - Output

Title:
New Project
11/03/13 12:35

Scenarios:
Child Resident - RME
Adult Resident - RME

Routes:
INGESTION OF SOIL
DERMAL CONTACT WITH SOIL
INHALATION OF OUTDOOR AIR

Chemicals:
Cobalto
Piombo
Aromatici C11 - C22
Alifatici C12-C16

SUMMARY OF INPUT PARAMETERS	SCENARIO:	
	1	2

LIFETIME AND BODY WEIGHT		
Body Weight (kg)	15.0	70.0
Lifetime (years)	70.0	70.0
INGESTION OF SOIL		
Soil Ingestion Rate (mg/day)	200.	100.
Exp. Frequency Soil (events/year)	350.	350.
Exp. Duration Soil (years)	6.00	30.0
Absorption Adjustment Factor for Ingestion of Soil (-)		
Cobalto	1.0	1.0
Piombo	1.0	1.0
Aromatici C11 - C22	1.0	1.0
Alifatici C12-C16	ND	ND
Soil Bioavailability (-)		
Cobalto	1.0	1.0
Piombo	1.0	1.0
Aromatici C11 - C22	1.0	1.0
Alifatici C12-C16	1.0	1.0
DERMAL CONTACT WITH SOIL		
Total Skin Surface Area (cm ²)	7.280E+03	2.300E+04
Fraction Skin Exposed to Soil (-)	0.550	0.250
Adherence Factor for Soil (mg/cm ²)	0.200	0.200
Exposure Freq. Soil (events/year)	350.	350.
Exposure Duration Soil (years)	6.00	30.0
Absorption Adjustment Factor for Dermal Exposure to Soil (-)		
Cobalto	1.00E-02	1.00E-02
Piombo	1.00E-02	1.00E-02
Aromatici C11 - C22	0.10	0.10
Alifatici C12-C16	0.10	0.10
Soil Bioavailability (-)		
Cobalto	1.0	1.0
Piombo	1.0	1.0
Aromatici C11 - C22	1.0	1.0
Alifatici C12-C16	1.0	1.0
INHALATION OF OUTDOOR AIR		
Inhalation rate (m ³ /hr)	0.830	0.830

Time outdoors (hours/day)	24.0	2.50
Lung Retention Factor (-)	1.00	1.00
Exp. Freq. Outdoor Air (events/yr)	350.	350.
Exp. Duration Outdoor Air (yr)	6.00	30.0
Absorption Adjustment Factor for Inhalation (-)		
Cobalto	1.0	1.0
Piombo	1.0	1.0
Aromatici C11 - C22	1.0	1.0
Alifatici C12-C16	1.0	1.0

MEDIA CONCENTRATIONS

Concentration in Surficial Soil (mg/kg)
- Used to calculate risk and hazard index.

Cobalto	20.	20.
Piombo	1.40E+02	1.40E+02
Aromatici C11 - C22	1.60E+02	1.60E+02
Alifatici C12-C16	1.60E+02	1.60E+02

Concentration in Outdoor Air (mg/m³)

Obtained from Fate and Transport output

AVERAGE Concentration (over exposure duration)

(used to calculate carcinogenic risk)

Exposure Duration (years)	6.0	30.
Cobalto	0.0	0.0
Piombo	0.0	0.0
Aromatici C11 - C22	2.30E-04	2.30E-04
Alifatici C12-C16	2.78E-08	2.78E-08

Concentration used to calculate hazard index

(Averaged over 7 years or exposure duration, if less than 7 years)

Exposure Duration (years)	6.0	7.0
Cobalto	0.0	0.0
Piombo	0.0	0.0
Aromatici C11 - C22	2.30E-04	2.30E-04
Alifatici C12-C16	2.78E-08	2.78E-08

SLOPE FACTORS AND REFERENCE DOSES

Ingestion Slope Factor [1/(mg/kg-day)]

Cobalto	ND	ND
Piombo	ND	ND
Aromatici C11 - C22	ND	ND
Alifatici C12-C16	ND	ND

Ingestion Reference Dose (mg/kg-day)

Cobalto	2.00E-02	2.00E-02
Piombo	3.50E-03	3.50E-03
Aromatici C11 - C22	3.00E-02	3.00E-02
Alifatici C12-C16	0.10	0.10

Inhalation Slope Factor [1/(mg/kg-day)]

Cobalto	9.8	9.8
Piombo	ND	ND
Aromatici C11 - C22	ND	ND
Alifatici C12-C16	ND	ND

Inhalation Reference Dose (mg/kg-day)

Cobalto	5.71E-06	5.71E-06
Piombo	3.50E-02	3.50E-02
Aromatici C11 - C22	ND	ND
Alifatici C12-C16	0.28	0.28

Dermal Slope Factor [1/(mg/kg-day)]

Cobalto	ND	ND
Piombo	ND	ND
Aromatici C11 - C22	ND	ND

Alifatici C12-C16	ND	ND
Derma] Reference Dose (mg/kg-day)		
Cobalto	2.00E-02	2.00E-02
Piombo	3.50E-03	3.50E-03
Aromatici C11 - C22	3.00E-02	3.00E-02
Alifatici C12-C16	0.10	0.10

SCENARIO:

SUMMARY OF RESULTS	1	2	Added
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INGESTION OF SOIL

Daily Doses and Risk for : Cobalto

CADD (mg/kg-day)	2.56E-04	2.74E-05	
LADD (mg/kg-day)	2.19E-05	1.17E-05	3.37E-05
Cancer Risk (-)	0.000E+00	0.000E+00	0.000E+00
Hazard Index (-)	1.279E-02	1.370E-03	

Daily Doses and Risk for : Piombo

CADD (mg/kg-day)	1.79E-03	1.92E-04	
LADD (mg/kg-day)	1.53E-04	8.22E-05	2.36E-04
Cancer Risk (-)	0.000E+00	0.000E+00	0.000E+00
Hazard Index (-)	5.114E-01	5.479E-02	

Daily Doses and Risk for : Aromatici C11 - C22

CADD (mg/kg-day)	2.05E-03	2.19E-04	
LADD (mg/kg-day)	1.75E-04	9.39E-05	2.69E-04
Cancer Risk (-)	0.000E+00	0.000E+00	0.000E+00
Hazard Index (-)	6.819E-02	7.306E-03	

Daily Doses and Risk for : Alifatici C12-C16

CADD (mg/kg-day)	0.00E+00	0.00E+00	
LADD (mg/kg-day)	0.00E+00	0.00E+00	0.00E+00
Cancer Risk (-)	1.753E-04	9.393E-05	2.693E-04
Hazard Index (-)	0.000E+00	0.000E+00	

DERMAL CONTACT WITH SOIL

Daily Doses and Risk for : Cobalto

CADD (mg/kg-day)	1.02E-05	3.15E-06	
LADD (mg/kg-day)	8.78E-07	1.35E-06	2.23E-06
Cancer Risk (-)	0.000E+00	0.000E+00	0.000E+00
Hazard Index (-)	5.119E-04	1.575E-04	

Daily Doses and Risk for : Piombo

CADD (mg/kg-day)	7.17E-05	2.21E-05	
LADD (mg/kg-day)	6.14E-06	9.45E-06	1.56E-05
Cancer Risk (-)	0.000E+00	0.000E+00	0.000E+00
Hazard Index (-)	2.048E-02	6.301E-03	

Daily Doses and Risk for : Aromatici C11 - C22

CADD (mg/kg-day)	8.19E-04	2.52E-04	
LADD (mg/kg-day)	7.02E-05	1.08E-04	1.78E-04
Cancer Risk (-)	0.000E+00	0.000E+00	0.000E+00
Hazard Index (-)	2.730E-02	8.402E-03	

Daily Doses and Risk for : Alifatici C12-C16

CADD (mg/kg-day)	8.19E-04	2.52E-04	
LADD (mg/kg-day)	7.02E-05	1.08E-04	1.78E-04
Cancer Risk (-)	0.000E+00	0.000E+00	0.000E+00

Hazard Index (-)	8.191E-03	2.521E-03
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INHALATION OF OUTDOOR AIR

Daily Doses and Risk for : Cobalto

CADD (mg/kg-day)	0.00E+00	0.00E+00	
LADD (mg/kg-day)	0.00E+00	0.00E+00	0.00E+00
Cancer Risk (-)	0.000E+00	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00	

Daily Doses and Risk for : Piombo

CADD (mg/kg-day)	0.00E+00	0.00E+00	
LADD (mg/kg-day)	0.00E+00	0.00E+00	0.00E+00
Cancer Risk (-)	0.000E+00	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00	

Daily Doses and Risk for : Aromatici C11 - C22

CADD (mg/kg-day)	2.92E-04	6.53E-06	
LADD (mg/kg-day)	2.51E-05	2.80E-06	2.79E-05
Cancer Risk (-)	0.000E+00	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00	

Daily Doses and Risk for : Alifatici C12-C16

CADD (mg/kg-day)	3.54E-08	7.90E-10	
LADD (mg/kg-day)	3.03E-09	3.39E-10	3.37E-09
Cancer Risk (-)	0.000E+00	0.000E+00	0.000E+00
Hazard Index (-)	1.264E-07	2.822E-09	

"Rischio per la Falda derivante da Suolo Superficiale - Scenario 2" - Input

FATE AND TRANSPORT MODEL INPUT SUMMARY FILE

Model Description:

Unsaturated zone model linked with saturated zone model

Title:

New Project

Simulation time (years).

100

Vadose Zone Source Parameters

Thickness of contamination (m)	1.0
Depth to top of contamination (m).	0.0
Length of source (m)	1.63E+02
Width of source (m).	1.24E+02

Unsaturated Zone Properties

Total Porosity in vadose zone (cm ³ /cm ³)	0.25
Residual water content (cm ³ /cm ³)	0.12
Fraction organic carbon (g oc/g soil).	2.40E-02
Soil bulk density (g/cm ³).	1.7
Infiltration Rate (cm/yr).	20.
Saturated conductivity (m/d)	0.86
Van Genuchten's N.	1.5
Thickness of vadose zone (m)	8.5

Aquifer Properties

Effective porosity (cm ³ /cm ³)	0.20
Fraction organic carbon (g oc/g soil).	2.40E-02
Hydraulic conductivity (m/d)	0.86
Soil bulk density (g/cm ³).	1.7
Hydraulic gradient (m/m)	1.00E-03
***Longitudinal dispersivity (m). code calculated	
***Transverse dispersivity (m). code calculated	
***Vertical dispersivity (m). code calculated	

Receptor Well Location

Distance downgradient (m).	1.00E-02
Distance cross-gradient (m).	0.0
Depth to top of well screen (m).	0.0
Depth to bottom of well screen (m).	1.0
Number of points used to calc. conc.	2

TPH Data for Unsaturated Zone Source

Concentration of TPH in soil (mg/kg)	0.0
Molecular weight of TPH (g/mol).	0.0

CHEMICAL DATA FOR: Cobalto

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	8.75E+04
Vapor pressure (mmHg)	0.0
K _d (partition coefficient) (L/kg)	2.04E+03
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	59.
Degradation rate, saturated zone (1/d).	0.0
Degradation rate, vadose zone (1/d).	0.0

Source Concentrations:

Source conc. for unsaturated zone model (mg/kg).	20.
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CHEMICAL DATA FOR: Piombo

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	9.58E+03
Vapor pressure (mmHg)	7.28E-11
K _d (partition coefficient) (L/kg)	6.68E+03
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	2.07E+02
Degradation rate, saturated zone (1/d).	0.0
Degradation rate, vadose zone (1/d).	0.0

Source Concentrations:

Source conc. for unsaturated zone model (mg/kg).	1.40E+02
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CHEMICAL DATA FOR: Aromatici C11 - C22

Diffusion coefficient in air (cm ² /s)	6.00E-02
Diffusion coefficient in water (cm ² /s)	1.00E-05
Solubility (mg/l)	5.8
Vapor pressure (mmHg)	2.43E-02
K _{OC} (L/kg).	5.00E+03
Henry's Law coefficient (-).	3.00E-02
Molecular weight (g/mol).	1.50E+02
Degradation rate, saturated zone (1/d).	0.0
Degradation rate, vadose zone (1/d).	0.0

Source Concentrations:

Source conc. for unsaturated zone model (mg/kg).	1.60E+02
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CHEMICAL DATA FOR: Alifatici C12-C16

Diffusion coefficient in air (cm ² /s)	4.06E-02
Diffusion coefficient in water (cm ² /s)	4.61E-06
Solubility (mg/l)	3.50E-04
Vapor pressure (mmHg)	2.96E-02
K _{OC} (L/kg).	5.01E+06
Henry's Law coefficient (-).	1.60E+02

Molecular weight (g/mol).	2.10E+02
Degradation rate, saturated zone (1/d).	0.0
Degradation rate, vadose zone (1/d).	0.0
Source Concentrations:	

Source conc. for unsaturated zone model (mg/kg).	1.60E+02

"Rischio per la Falda derivante da Suolo Superficiale - Scenario 2" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Alifatici C12-C16

Start of VADOSE ZONE MODEL OUTPUT

Effective Diffusion Coefficient for Vadose zone

Total thickness of subunit [cm].....	26.
Air-filled porosity [-].....	8.08E-02
Water-filled porosity [-].....	0.17
Total porosity [-].....	0.25
Effective diff. coeff. for subunit....[cm ² /s]	1.48E-04

Data Summary and Initial Calculations

Unsaturated Zone

Distance from ground surface to source...	1.00E-02	m
Thickness of source.....	1.0	m
Thickness of vadose zone.....	8.5	m
Infiltration rate (vDarcy).....	5.48E-04	m/d
Porosity in vadose zone.....	0.25	[-]
Moisture content in vadose zone.....	0.17	[-]
Soil bulk density.....	1.7	g/cm ³
Fraction organic carbon in soil.....	2.40E-02	g/g
Calculated pore water velocity.....	3.24E-03	m/d

Chemical-Specific Parameters

Solubility.....	3.50E-04	mg/l
Henrys Law Coefficient.....	1.60E+02	[-]
Koc, organic carbon partition coeff.....	5.01E+06	ml/g

Calculating Dissolved Phase Source Concentration

Chemical solubility (from database).....	3.50E-04	mg/l
Dissolved phase concentration calculated using equilibrium partitioning (3-phase).....	1.33E-03	mg/l

***The lesser value of the (effective) solubility and the dissolved phase

***concentration calculated using equilibrium partitioning (see above)

will

***be used as the maximum concentration in the unsaturated zone

***model source.

Results from above calculation (limiting concentration):

Initial dissolved phase concentration.....	3.50E-04	mg/l
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Residual concentration level calculated using the full solubility.....	42.	mg/kg
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***The source concentration is ABOVE the residual concentration

Source Decay Terms

Source total decay term--Beta.....	5.18E-07
Source loss term--liquids only [1/day].....	7.05E-10
Source loss term--vapor only [1/day].....	5.17E-07
Initial source vapor concentration [kg/m ³]	5.60E-05
Diffusion path length [m].....	0.51
Average vertical thickness of the source[m]	1.0

CUMULATIVE LOSSES (from the Unsaturated Zone)
Alifatici C12-C16

Liq. Mass Lost Time From Source (yr) (kg)	Total Mass in Source (kg)	Mass Loading to Groundwater (kg)	Volatilization Losses (kg)
-----	-----	-----	-----
0.0	5.50E+03	0.00E+00	0.00E+00
0.00E+00			
1.0	5.50E+03	0.00E+00	1.04E+00
1.41E-03			
2.0	5.50E+03	0.00E+00	2.07E+00
2.83E-03			
3.0	5.49E+03	0.00E+00	3.11E+00
4.24E-03			
4.0	5.49E+03	0.00E+00	4.15E+00
5.66E-03			
5.0	5.49E+03	0.00E+00	5.18E+00
7.07E-03			
6.0	5.49E+03	0.00E+00	6.22E+00
8.48E-03			
7.0	5.49E+03	0.00E+00	7.26E+00
9.90E-03			
8.0	5.49E+03	0.00E+00	8.29E+00
1.13E-02			
9.0	5.49E+03	0.00E+00	9.33E+00
1.27E-02			
10.0	5.49E+03	0.00E+00	1.04E+01
1.41E-02			
11.0	5.49E+03	0.00E+00	1.14E+01
1.55E-02			
12.0	5.49E+03	0.00E+00	1.24E+01
1.70E-02			
13.0	5.48E+03	0.00E+00	1.35E+01
1.84E-02			
14.0	5.48E+03	0.00E+00	1.45E+01
1.98E-02			
15.0	5.48E+03	0.00E+00	1.55E+01
2.12E-02			
16.0	5.48E+03	0.00E+00	1.66E+01
2.26E-02			
17.0	5.48E+03	0.00E+00	1.76E+01
2.40E-02			
18.0	5.48E+03	0.00E+00	1.86E+01
2.54E-02			
19.0	5.48E+03	0.00E+00	1.97E+01
2.68E-02			
20.0	5.48E+03	0.00E+00	2.07E+01
2.82E-02			
21.0	5.48E+03	0.00E+00	2.17E+01
2.97E-02			
22.0	5.47E+03	0.00E+00	2.28E+01
3.11E-02			
23.0	5.47E+03	0.00E+00	2.38E+01
3.25E-02			
24.0	5.47E+03	0.00E+00	2.48E+01
3.39E-02			
25.0	5.47E+03	0.00E+00	2.59E+01
3.53E-02			
26.0	5.47E+03	0.00E+00	2.69E+01

3.67E-02			
27.0	5.47E+03	0.00E+00	2.79E+01
3.81E-02			
28.0	5.47E+03	0.00E+00	2.90E+01
3.95E-02			
29.0	5.47E+03	0.00E+00	3.00E+01
4.09E-02			
30.0	5.47E+03	0.00E+00	3.10E+01
4.23E-02			
31.0	5.47E+03	0.00E+00	3.21E+01
4.37E-02			
32.0	5.46E+03	0.00E+00	3.31E+01
4.51E-02			
33.0	5.46E+03	0.00E+00	3.41E+01
4.65E-02			
34.0	5.46E+03	0.00E+00	3.52E+01
4.80E-02			
35.0	5.46E+03	0.00E+00	3.62E+01
4.94E-02			
36.0	5.46E+03	0.00E+00	3.72E+01
5.08E-02			
37.0	5.46E+03	0.00E+00	3.82E+01
5.22E-02			
38.0	5.46E+03	0.00E+00	3.93E+01
5.36E-02			
39.0	5.46E+03	0.00E+00	4.03E+01
5.50E-02			
40.0	5.46E+03	0.00E+00	4.13E+01
5.64E-02			
41.0	5.46E+03	0.00E+00	4.24E+01
5.78E-02			
42.0	5.45E+03	0.00E+00	4.34E+01
5.92E-02			
43.0	5.45E+03	0.00E+00	4.44E+01
6.06E-02			
44.0	5.45E+03	0.00E+00	4.55E+01
6.20E-02			
45.0	5.45E+03	0.00E+00	4.65E+01
6.34E-02			
46.0	5.45E+03	0.00E+00	4.75E+01
6.48E-02			
47.0	5.45E+03	0.00E+00	4.85E+01
6.62E-02			
48.0	5.45E+03	0.00E+00	4.96E+01
6.76E-02			
49.0	5.45E+03	0.00E+00	5.06E+01
6.90E-02			
50.0	5.45E+03	0.00E+00	5.16E+01
7.04E-02			
51.0	5.44E+03	0.00E+00	5.27E+01
7.18E-02			
52.0	5.44E+03	0.00E+00	5.37E+01
7.32E-02			
53.0	5.44E+03	0.00E+00	5.47E+01
7.46E-02			
54.0	5.44E+03	0.00E+00	5.57E+01
7.60E-02			
55.0	5.44E+03	0.00E+00	5.68E+01
7.74E-02			
56.0	5.44E+03	0.00E+00	5.78E+01
7.88E-02			
57.0	5.44E+03	0.00E+00	5.88E+01
8.02E-02			
58.0	5.44E+03	0.00E+00	5.98E+01
8.16E-02			
59.0	5.44E+03	0.00E+00	6.09E+01
8.30E-02			
60.0	5.44E+03	0.00E+00	6.19E+01

8.44E-02			
61.0	5.43E+03	0.00E+00	6.29E+01
8.58E-02			
62.0	5.43E+03	0.00E+00	6.39E+01
8.72E-02			
63.0	5.43E+03	0.00E+00	6.50E+01
8.86E-02			
64.0	5.43E+03	0.00E+00	6.60E+01
9.00E-02			
65.0	5.43E+03	0.00E+00	6.70E+01
9.14E-02			
66.0	5.43E+03	0.00E+00	6.80E+01
9.28E-02			
67.0	5.43E+03	0.00E+00	6.91E+01
9.42E-02			
68.0	5.43E+03	0.00E+00	7.01E+01
9.56E-02			
69.0	5.43E+03	0.00E+00	7.11E+01
9.70E-02			
70.0	5.43E+03	0.00E+00	7.21E+01
9.84E-02			
71.0	5.42E+03	0.00E+00	7.32E+01
9.98E-02			
72.0	5.42E+03	0.00E+00	7.42E+01
1.01E-01			
73.0	5.42E+03	0.00E+00	7.52E+01
1.03E-01			
74.0	5.42E+03	0.00E+00	7.62E+01
1.04E-01			
75.0	5.42E+03	0.00E+00	7.73E+01
1.05E-01			
76.0	5.42E+03	0.00E+00	7.83E+01
1.07E-01			
77.0	5.42E+03	0.00E+00	7.93E+01
1.08E-01			
78.0	5.42E+03	0.00E+00	8.03E+01
1.10E-01			
79.0	5.42E+03	0.00E+00	8.13E+01
1.11E-01			
80.0	5.42E+03	0.00E+00	8.24E+01
1.12E-01			
81.0	5.41E+03	0.00E+00	8.34E+01
1.14E-01			
82.0	5.41E+03	0.00E+00	8.44E+01
1.15E-01			
83.0	5.41E+03	0.00E+00	8.54E+01
1.17E-01			
84.0	5.41E+03	0.00E+00	8.65E+01
1.18E-01			
85.0	5.41E+03	0.00E+00	8.75E+01
1.19E-01			
86.0	5.41E+03	0.00E+00	8.85E+01
1.21E-01			
87.0	5.41E+03	0.00E+00	8.95E+01
1.22E-01			
88.0	5.41E+03	0.00E+00	9.05E+01
1.23E-01			
89.0	5.41E+03	0.00E+00	9.16E+01
1.25E-01			
90.0	5.40E+03	0.00E+00	9.26E+01
1.26E-01			
91.0	5.40E+03	0.00E+00	9.36E+01
1.28E-01			
92.0	5.40E+03	0.00E+00	9.46E+01
1.29E-01			
93.0	5.40E+03	0.00E+00	9.56E+01
1.30E-01			
94.0	5.40E+03	0.00E+00	9.67E+01

1.32E-01			
95.0	5.40E+03	0.00E+00	9.77E+01
1.33E-01			
96.0	5.40E+03	0.00E+00	9.87E+01
1.35E-01			
97.0	5.40E+03	0.00E+00	9.97E+01
1.36E-01			
98.0	5.40E+03	0.00E+00	1.01E+02
1.37E-01			
99.0	5.40E+03	0.00E+00	1.02E+02
1.39E-01			
100.0	5.39E+03	0.00E+00	1.03E+02
1.40E-01			

VADOSE ZONE CONCENTRATION WITH DEPTH
Alifatici C12-C16

TIME = 0.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.50E-04	4.21E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 1.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.50E-04	4.21E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 2.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.50E-04	4.21E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00

5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 3.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	3.50E-04	4.21E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 4.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	3.50E-04	4.21E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 5.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	3.50E-04	4.20E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 10.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	3.49E-04	4.20E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00

4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 15.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.49E-04	4.20E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 20.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.49E-04	4.19E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 25.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.48E-04	4.19E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 30.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.48E-04	4.19E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

1.0	3.48E-04	4.18E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 35.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.48E-04	4.18E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 40.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.47E-04	4.18E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 45.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.47E-04	4.17E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 50.0 years

Liquid Phase

Total Soil

Depth	Concentration	Concentration Below Source
(m)	(mg/l)	(mg/kg)
1.0	3.47E-04	4.17E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 55.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
1.0	3.46E-04	4.17E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 60.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
1.0	3.46E-04	4.16E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 65.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
1.0	3.46E-04	4.16E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 70.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.45E-04	4.15E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 75.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.45E-04	4.15E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 80.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.45E-04	4.15E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 85.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.44E-04	4.14E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00

6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 90.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.44E-04	4.14E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 95.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.44E-04	4.13E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME100.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.43E-04	4.13E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

LIQUID PHASE CONCENTRATION
Alifatici C12-C16

Time (yr)	Concentration at source (mg/l)	Concentration at water Table (mg/l)
0.0	3.50E-04	0.00E+00
1.0	3.50E-04	0.00E+00
2.0	3.50E-04	0.00E+00
3.0	3.50E-04	0.00E+00
4.0	3.50E-04	0.00E+00
5.0	3.50E-04	0.00E+00
6.0	3.50E-04	0.00E+00
7.0	3.50E-04	0.00E+00
8.0	3.50E-04	0.00E+00
9.0	3.49E-04	0.00E+00
10.0	3.49E-04	0.00E+00
11.0	3.49E-04	0.00E+00
12.0	3.49E-04	0.00E+00
13.0	3.49E-04	0.00E+00
14.0	3.49E-04	0.00E+00
15.0	3.49E-04	0.00E+00
16.0	3.49E-04	0.00E+00
17.0	3.49E-04	0.00E+00
18.0	3.49E-04	0.00E+00
19.0	3.49E-04	0.00E+00
20.0	3.49E-04	0.00E+00
21.0	3.49E-04	0.00E+00
22.0	3.49E-04	0.00E+00
23.0	3.49E-04	0.00E+00
24.0	3.48E-04	0.00E+00
25.0	3.48E-04	0.00E+00
26.0	3.48E-04	0.00E+00
27.0	3.48E-04	0.00E+00
28.0	3.48E-04	0.00E+00
29.0	3.48E-04	0.00E+00
30.0	3.48E-04	0.00E+00
31.0	3.48E-04	0.00E+00
32.0	3.48E-04	0.00E+00
33.0	3.48E-04	0.00E+00
34.0	3.48E-04	0.00E+00
35.0	3.48E-04	0.00E+00
36.0	3.48E-04	0.00E+00
37.0	3.48E-04	0.00E+00
38.0	3.48E-04	0.00E+00
39.0	3.47E-04	0.00E+00
40.0	3.47E-04	0.00E+00
41.0	3.47E-04	0.00E+00
42.0	3.47E-04	0.00E+00
43.0	3.47E-04	0.00E+00
44.0	3.47E-04	0.00E+00
45.0	3.47E-04	0.00E+00
46.0	3.47E-04	0.00E+00
47.0	3.47E-04	0.00E+00
48.0	3.47E-04	0.00E+00
49.0	3.47E-04	0.00E+00
50.0	3.47E-04	0.00E+00
51.0	3.47E-04	0.00E+00
52.0	3.47E-04	0.00E+00
53.0	3.47E-04	0.00E+00
54.0	3.46E-04	0.00E+00
55.0	3.46E-04	0.00E+00
56.0	3.46E-04	0.00E+00
57.0	3.46E-04	0.00E+00
58.0	3.46E-04	0.00E+00
59.0	3.46E-04	0.00E+00
60.0	3.46E-04	0.00E+00
61.0	3.46E-04	0.00E+00
62.0	3.46E-04	0.00E+00
63.0	3.46E-04	0.00E+00

64.0	3.46E-04	0.00E+00
65.0	3.46E-04	0.00E+00
66.0	3.46E-04	0.00E+00
67.0	3.46E-04	0.00E+00
68.0	3.46E-04	0.00E+00
69.0	3.45E-04	0.00E+00
70.0	3.45E-04	0.00E+00
71.0	3.45E-04	0.00E+00
72.0	3.45E-04	0.00E+00
73.0	3.45E-04	0.00E+00
74.0	3.45E-04	0.00E+00
75.0	3.45E-04	0.00E+00
76.0	3.45E-04	0.00E+00
77.0	3.45E-04	0.00E+00
78.0	3.45E-04	0.00E+00
79.0	3.45E-04	0.00E+00
80.0	3.45E-04	0.00E+00
81.0	3.45E-04	0.00E+00
82.0	3.45E-04	0.00E+00
83.0	3.45E-04	0.00E+00
84.0	3.45E-04	0.00E+00
85.0	3.44E-04	0.00E+00
86.0	3.44E-04	0.00E+00
87.0	3.44E-04	0.00E+00
88.0	3.44E-04	0.00E+00
89.0	3.44E-04	0.00E+00
90.0	3.44E-04	0.00E+00
91.0	3.44E-04	0.00E+00
92.0	3.44E-04	0.00E+00
93.0	3.44E-04	0.00E+00
94.0	3.44E-04	0.00E+00
95.0	3.44E-04	0.00E+00
96.0	3.44E-04	0.00E+00
97.0	3.44E-04	0.00E+00
98.0	3.44E-04	0.00E+00
99.0	3.44E-04	0.00E+00
100.0	3.43E-04	0.00E+00

End of VADOSE ZONE MODEL OUTPUT

Start of GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Calculated height of GW source (linked) (m)..... 1.04E+02

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.86
Koc (m ³ /kg).....	5.01E+03
Foc (g/g).....	2.40E-02
Retardation coefficient.....	1.02E+06
Seepage velocity (m/d).....	4.30E-03
Retarded seepage velocity (m/d).....	4.21E-09

Dispersion Calculations in Saturated Zone

Distance used for dispersion calculations (m).....	82.
Distance = (Dist. to well) + (Source Length)/2	

Calculated longitudinal dispersivity (m).....	9.1
Calculated transverse dispersivity (m).....	3.0
Calculated vertical dispersivity (m).....	3.48E-02

GROUNDWATER CONCENTRATION (annual average)
Alifatici C12-C16

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00
18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00
52.0	0.00E+00
53.0	0.00E+00

54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00
86.0	0.00E+00
87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of GROUNDWATER MODEL OUTPUT

"Rischio per la Falda derivante da Suolo Superficiale - Scenario 2" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Aromatici C11 - C22

Start of VADOSE ZONE MODEL OUTPUT

Effective Diffusion Coefficient for Vadose zone

Total thickness of subunit [cm].....	26.
Air-filled porosity [-].....	8.08E-02
Water-filled porosity [-].....	0.17
Total porosity [-].....	0.25
Effective diff. coeff. for subunit....[cm ² /s]	2.33E-04

Data Summary and Initial Calculations

Unsaturated Zone

Distance from ground surface to source...	1.00E-02	m
Thickness of source.....	1.0	m
Thickness of vadose zone.....	8.5	m
Infiltration rate (vDarcy).....	5.48E-04	m/d
Porosity in vadose zone.....	0.25	[-]
Moisture content in vadose zone.....	0.17	[-]
Soil bulk density.....	1.7	g/cm ³
Fraction organic carbon in soil.....	2.40E-02	g/g
Calculated pore water velocity.....	3.24E-03	m/d

Chemical-Specific Parameters

Solubility.....	5.8	mg/l
Henrys Law Coefficient.....	3.00E-02	[-]
Koc, organic carbon partition coeff.....	5.00E+03	ml/g

Calculating Dissolved Phase Source Concentration

Chemical solubility (from database).....	5.8	mg/l
Dissolved phase concentration calculated using equilibrium partitioning (3-phase).....	1.3	mg/l

***The lesser value of the (effective) solubility and the dissolved phase

***concentration calculated using equilibrium partitioning (see above)

will

***be used as the maximum concentration in the unsaturated zone

***model source.

Results from above calculation (limiting concentration):

Initial dissolved phase concentration.....	1.3	mg/l
Residual concentration level calculated using the full solubility.....	6.97E+02	mg/kg
***The source concentration is BELOW the residual concentration		

Source Decay Terms

Source total decay term--Beta.....	3.26E-06
Source loss term--liquids only [1/day].....	2.68E-06
Source loss term--vapor only [1/day].....	5.81E-07
Initial source vapor concentration [kg/m ³]	4.00E-05
Diffusion path length [m].....	0.51
Average vertical thickness of the source[m]	1.0

***Dispersion limited to dispmax:

6.66E-04

CUMULATIVE LOSSES (from the Unsaturated Zone)
Aromatici C11 - C22

Liq. Mass Lost Time From Source (yr) (kg)	Total Mass in Source (kg)	Mass Loading to Groundwater (kg)	Volatilization Losses (kg)
-----	-----	-----	-----
0.0	5.50E+03	0.00E+00	0.00E+00
0.00E+00			
1.0	5.49E+03	0.00E+00	1.16E+00
5.38E+00			
2.0	5.48E+03	0.00E+00	2.33E+00
1.08E+01			
3.0	5.48E+03	0.00E+00	3.49E+00
1.61E+01			
4.0	5.47E+03	0.00E+00	4.65E+00
2.15E+01			
5.0	5.47E+03	0.00E+00	5.81E+00
2.68E+01			
6.0	5.46E+03	0.00E+00	6.97E+00
3.22E+01			
7.0	5.45E+03	0.00E+00	8.12E+00
3.75E+01			
8.0	5.45E+03	0.00E+00	9.28E+00
4.29E+01			
9.0	5.44E+03	0.00E+00	1.04E+01
4.82E+01			
10.0	5.43E+03	0.00E+00	1.16E+01
5.35E+01			
11.0	5.43E+03	0.00E+00	1.27E+01
5.89E+01			
12.0	5.42E+03	0.00E+00	1.39E+01
6.42E+01			
13.0	5.41E+03	0.00E+00	1.50E+01
6.95E+01			
14.0	5.41E+03	0.00E+00	1.62E+01
7.48E+01			
15.0	5.40E+03	0.00E+00	1.73E+01
8.01E+01			
16.0	5.39E+03	0.00E+00	1.85E+01
8.53E+01			
17.0	5.39E+03	0.00E+00	1.96E+01
9.06E+01			
18.0	5.38E+03	0.00E+00	2.08E+01
9.59E+01			
19.0	5.37E+03	0.00E+00	2.19E+01
1.01E+02			
20.0	5.37E+03	0.00E+00	2.30E+01
1.06E+02			
21.0	5.36E+03	0.00E+00	2.42E+01
1.12E+02			
22.0	5.36E+03	0.00E+00	2.53E+01
1.17E+02			
23.0	5.35E+03	0.00E+00	2.64E+01
1.22E+02			
24.0	5.34E+03	0.00E+00	2.76E+01
1.27E+02			

25.0	5.34E+03	0.00E+00	2.87E+01
1.33E+02			
26.0	5.33E+03	0.00E+00	2.98E+01
1.38E+02			
27.0	5.32E+03	0.00E+00	3.10E+01
1.43E+02			
28.0	5.32E+03	0.00E+00	3.21E+01
1.48E+02			
29.0	5.31E+03	0.00E+00	3.32E+01
1.54E+02			
30.0	5.30E+03	0.00E+00	3.43E+01
1.59E+02			
31.0	5.30E+03	0.00E+00	3.55E+01
1.64E+02			
32.0	5.29E+03	0.00E+00	3.66E+01
1.69E+02			
33.0	5.29E+03	0.00E+00	3.77E+01
1.74E+02			
34.0	5.28E+03	0.00E+00	3.88E+01
1.79E+02			
35.0	5.27E+03	0.00E+00	4.00E+01
1.85E+02			
36.0	5.27E+03	0.00E+00	4.11E+01
1.90E+02			
37.0	5.26E+03	0.00E+00	4.22E+01
1.95E+02			
38.0	5.25E+03	0.00E+00	4.33E+01
2.00E+02			
39.0	5.25E+03	0.00E+00	4.44E+01
2.05E+02			
40.0	5.24E+03	0.00E+00	4.55E+01
2.10E+02			
41.0	5.24E+03	0.00E+00	4.66E+01
2.15E+02			
42.0	5.23E+03	0.00E+00	4.77E+01
2.21E+02			
43.0	5.22E+03	0.00E+00	4.89E+01
2.26E+02			
44.0	5.22E+03	0.00E+00	5.00E+01
2.31E+02			
45.0	5.21E+03	0.00E+00	5.11E+01
2.36E+02			
46.0	5.20E+03	0.00E+00	5.22E+01
2.41E+02			
47.0	5.20E+03	0.00E+00	5.33E+01
2.46E+02			
48.0	5.19E+03	0.00E+00	5.44E+01
2.51E+02			
49.0	5.19E+03	0.00E+00	5.55E+01
2.56E+02			
50.0	5.18E+03	0.00E+00	5.66E+01
2.61E+02			
51.0	5.17E+03	0.00E+00	5.77E+01
2.66E+02			
52.0	5.17E+03	0.00E+00	5.88E+01
2.72E+02			
53.0	5.16E+03	0.00E+00	5.99E+01
2.77E+02			
54.0	5.16E+03	0.00E+00	6.10E+01
2.82E+02			
55.0	5.15E+03	0.00E+00	6.20E+01
2.87E+02			
56.0	5.14E+03	0.00E+00	6.31E+01
2.92E+02			
57.0	5.14E+03	0.00E+00	6.42E+01
2.97E+02			
58.0	5.13E+03	0.00E+00	6.53E+01
3.02E+02			

59.0	5.12E+03	0.00E+00	6.64E+01
3.07E+02			
60.0	5.12E+03	0.00E+00	6.75E+01
3.12E+02			
61.0	5.11E+03	0.00E+00	6.86E+01
3.17E+02			
62.0	5.11E+03	0.00E+00	6.97E+01
3.22E+02			
63.0	5.10E+03	0.00E+00	7.07E+01
3.27E+02			
64.0	5.09E+03	0.00E+00	7.18E+01
3.32E+02			
65.0	5.09E+03	0.00E+00	7.29E+01
3.37E+02			
66.0	5.08E+03	0.00E+00	7.40E+01
3.42E+02			
67.0	5.08E+03	0.00E+00	7.51E+01
3.47E+02			
68.0	5.07E+03	0.00E+00	7.61E+01
3.52E+02			
69.0	5.06E+03	0.00E+00	7.72E+01
3.57E+02			
70.0	5.06E+03	0.00E+00	7.83E+01
3.62E+02			
71.0	5.05E+03	0.00E+00	7.93E+01
3.67E+02			
72.0	5.05E+03	0.00E+00	8.04E+01
3.72E+02			
73.0	5.04E+03	0.00E+00	8.15E+01
3.77E+02			
74.0	5.03E+03	0.00E+00	8.26E+01
3.81E+02			
75.0	5.03E+03	0.00E+00	8.36E+01
3.86E+02			
76.0	5.02E+03	0.00E+00	8.47E+01
3.91E+02			
77.0	5.02E+03	0.00E+00	8.57E+01
3.96E+02			
78.0	5.01E+03	0.00E+00	8.68E+01
4.01E+02			
79.0	5.00E+03	0.00E+00	8.79E+01
4.06E+02			
80.0	5.00E+03	0.00E+00	8.89E+01
4.11E+02			
81.0	4.99E+03	0.00E+00	9.00E+01
4.16E+02			
82.0	4.99E+03	0.00E+00	9.10E+01
4.21E+02			
83.0	4.98E+03	0.00E+00	9.21E+01
4.26E+02			
84.0	4.97E+03	0.00E+00	9.32E+01
4.30E+02			
85.0	4.97E+03	0.00E+00	9.42E+01
4.35E+02			
86.0	4.96E+03	0.00E+00	9.53E+01
4.40E+02			
87.0	4.96E+03	0.00E+00	9.63E+01
4.45E+02			
88.0	4.95E+03	0.00E+00	9.74E+01
4.50E+02			
89.0	4.94E+03	0.00E+00	9.84E+01
4.55E+02			
90.0	4.94E+03	0.00E+00	9.95E+01
4.60E+02			
91.0	4.93E+03	0.00E+00	1.01E+02
4.64E+02			
92.0	4.93E+03	0.00E+00	1.02E+02
4.69E+02			

93.0	4.92E+03	0.00E+00	1.03E+02
4.74E+02			
94.0	4.92E+03	0.00E+00	1.04E+02
4.79E+02			
95.0	4.91E+03	0.00E+00	1.05E+02
4.84E+02			
96.0	4.90E+03	0.00E+00	1.06E+02
4.89E+02			
97.0	4.90E+03	0.00E+00	1.07E+02
4.93E+02			
98.0	4.89E+03	0.00E+00	1.08E+02
4.98E+02			
99.0	4.89E+03	0.00E+00	1.09E+02
5.03E+02			
100.0	4.88E+03	0.00E+00	1.10E+02
5.08E+02			

VADOSE ZONE CONCENTRATION WITH DEPTH
Aromatici C11 - C22

TIME = 0.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.33E+00	1.60E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 1.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.33E+00	1.60E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 2.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.33E+00	1.60E+02
1.8	0.00E+00	0.00E+00

2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 3.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.33E+00	1.59E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 4.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.33E+00	1.59E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 5.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.32E+00	1.59E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 10.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.32E+00	1.58E+02

1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 15.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	1.31E+00	1.57E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 20.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	1.30E+00	1.56E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 25.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	1.29E+00	1.55E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 30.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration
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(m)	(mg/l)	Below Source (mg/kg)
1.0	1.29E+00	1.54E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 35.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.28E+00	1.53E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 40.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.27E+00	1.53E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 45.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.26E+00	1.52E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 50.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.26E+00	1.51E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 55.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.25E+00	1.50E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 60.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.24E+00	1.49E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 65.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.23E+00	1.48E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00

6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 70.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.23E+00	1.47E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 75.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.22E+00	1.46E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 80.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.21E+00	1.45E+02
1.8	0.00E+00	0.00E+00
2.7	3.25E-71	3.90E-69
3.5	1.04E-74	1.24E-72
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 85.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.20E+00	1.45E+02
1.8	0.00E+00	0.00E+00
2.7	9.98E-67	1.20E-64

3.5	3.83E-70	4.61E-68
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 90.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.20E+00	1.44E+02
1.8	0.00E+00	0.00E+00
2.7	9.71E-63	1.17E-60
3.5	4.41E-66	5.30E-64
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 95.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.19E+00	1.43E+02
1.8	0.00E+00	0.00E+00
2.7	3.59E-59	4.32E-57
3.5	1.90E-62	2.28E-60
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME100.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.18E+00	1.42E+02
1.8	0.00E+00	0.00E+00
2.7	5.84E-56	7.01E-54
3.5	3.53E-59	4.24E-57
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

LIQUID PHASE CONCENTRATION
Aromatici C11 - C22

Time (yr)	Concentration at source (mg/l)	Concentration at water Table (mg/l)
0.0	1.33E+00	0.00E+00
1.0	1.33E+00	0.00E+00
2.0	1.33E+00	0.00E+00
3.0	1.33E+00	0.00E+00
4.0	1.33E+00	0.00E+00
5.0	1.33E+00	0.00E+00
6.0	1.32E+00	0.00E+00
7.0	1.32E+00	0.00E+00
8.0	1.32E+00	0.00E+00
9.0	1.32E+00	0.00E+00
10.0	1.32E+00	0.00E+00
11.0	1.32E+00	0.00E+00
12.0	1.31E+00	0.00E+00
13.0	1.31E+00	0.00E+00
14.0	1.31E+00	0.00E+00
15.0	1.31E+00	0.00E+00
16.0	1.31E+00	0.00E+00
17.0	1.31E+00	0.00E+00
18.0	1.30E+00	0.00E+00
19.0	1.30E+00	0.00E+00
20.0	1.30E+00	0.00E+00
21.0	1.30E+00	0.00E+00
22.0	1.30E+00	0.00E+00
23.0	1.30E+00	0.00E+00
24.0	1.30E+00	0.00E+00
25.0	1.29E+00	0.00E+00
26.0	1.29E+00	0.00E+00
27.0	1.29E+00	0.00E+00
28.0	1.29E+00	0.00E+00
29.0	1.29E+00	0.00E+00
30.0	1.29E+00	0.00E+00
31.0	1.28E+00	0.00E+00
32.0	1.28E+00	0.00E+00
33.0	1.28E+00	0.00E+00
34.0	1.28E+00	0.00E+00
35.0	1.28E+00	0.00E+00
36.0	1.28E+00	0.00E+00
37.0	1.28E+00	0.00E+00
38.0	1.27E+00	0.00E+00
39.0	1.27E+00	0.00E+00
40.0	1.27E+00	0.00E+00
41.0	1.27E+00	0.00E+00
42.0	1.27E+00	0.00E+00
43.0	1.27E+00	0.00E+00
44.0	1.26E+00	0.00E+00
45.0	1.26E+00	0.00E+00
46.0	1.26E+00	0.00E+00
47.0	1.26E+00	0.00E+00
48.0	1.26E+00	0.00E+00
49.0	1.26E+00	0.00E+00
50.0	1.26E+00	0.00E+00
51.0	1.25E+00	0.00E+00
52.0	1.25E+00	0.00E+00
53.0	1.25E+00	0.00E+00
54.0	1.25E+00	0.00E+00
55.0	1.25E+00	0.00E+00
56.0	1.25E+00	0.00E+00
57.0	1.25E+00	0.00E+00
58.0	1.24E+00	0.00E+00
59.0	1.24E+00	0.00E+00
60.0	1.24E+00	0.00E+00

61.0	1.24E+00	0.00E+00
62.0	1.24E+00	0.00E+00
63.0	1.24E+00	0.00E+00
64.0	1.24E+00	0.00E+00
65.0	1.23E+00	0.00E+00
66.0	1.23E+00	0.00E+00
67.0	1.23E+00	0.00E+00
68.0	1.23E+00	0.00E+00
69.0	1.23E+00	0.00E+00
70.0	1.23E+00	0.00E+00
71.0	1.22E+00	0.00E+00
72.0	1.22E+00	0.00E+00
73.0	1.22E+00	0.00E+00
74.0	1.22E+00	0.00E+00
75.0	1.22E+00	0.00E+00
76.0	1.22E+00	0.00E+00
77.0	1.22E+00	0.00E+00
78.0	1.21E+00	0.00E+00
79.0	1.21E+00	0.00E+00
80.0	1.21E+00	0.00E+00
81.0	1.21E+00	0.00E+00
82.0	1.21E+00	0.00E+00
83.0	1.21E+00	0.00E+00
84.0	1.21E+00	0.00E+00
85.0	1.20E+00	0.00E+00
86.0	1.20E+00	0.00E+00
87.0	1.20E+00	0.00E+00
88.0	1.20E+00	0.00E+00
89.0	1.20E+00	0.00E+00
90.0	1.20E+00	0.00E+00
91.0	1.20E+00	0.00E+00
92.0	1.19E+00	0.00E+00
93.0	1.19E+00	0.00E+00
94.0	1.19E+00	0.00E+00
95.0	1.19E+00	0.00E+00
96.0	1.19E+00	0.00E+00
97.0	1.19E+00	0.00E+00
98.0	1.19E+00	0.00E+00
99.0	1.18E+00	0.00E+00
100.0	1.18E+00	0.00E+00

End of VADOSE ZONE MODEL OUTPUT

Start of GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Calculated height of GW source (linked) (m)..... 1.04E+02

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.86
Koc (m3/kg).....	5.0
Foc (g/g).....	2.40E-02
Retardation coefficient.....	1.02E+03
Seepage velocity (m/d).....	4.30E-03
Retarded seepage velocity (m/d).....	4.21E-06

Dispersion Calculations in Saturated Zone

Distance used for dispersion calculations (m)..... 82.
Distance = (Dist. to well) + (Source Length)/2

Calculated longitudinal dispersivity (m)..... 9.1
Calculated transverse dispersivity (m)..... 3.0
Calculated vertical dispersivity (m)..... 3.48E-02

GROUNDWATER CONCENTRATION (annual average)
Aromatici C11 - C22

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00
18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00

51.0	0.00E+00
52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00
86.0	0.00E+00
87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of GROUNDWATER MODEL OUTPUT

"Rischio per la Falda derivante da Suolo Superficiale - Scenario 2" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Cobalto

Start of VADOSE ZONE MODEL OUTPUT

Effective Diffusion Coefficient for Vadose zone

Total thickness of subunit [cm].....	1.0
Air-filled porosity [-].....	8.08E-02
Water-filled porosity [-].....	0.17
Total porosity [-].....	0.25
Effective diff. coeff. for subunit....[cm ² /s]	1.00E-20

***Diffusion coeff. in air and water = 0.
Effective diffusion coefficient set to 1E-20

Data Summary and Initial Calculations

Unsaturated Zone

Distance from ground surface to source...	1.00E-02	m
Thickness of source.....	1.0	m
Thickness of vadose zone.....	8.5	m
Infiltration rate (vDarcy).....	5.48E-04	m/d
Porosity in vadose zone.....	0.25	[-]
Moisture content in vadose zone.....	0.17	[-]
Soil bulk density.....	1.7	g/cm ³
Fraction organic carbon in soil.....	1.0	g/g
Calculated pore water velocity.....	3.24E-03	m/d

Chemical-Specific Parameters

Solubility.....	8.75E+04	mg/l
Henrys Law Coefficient.....	0.0	[-]
Koc, organic carbon partition coeff.....	2.04E+03	ml/g

Calculating Dissolved Phase Source Concentration

Chemical solubility (from database).....	8.75E+04	mg/l
Dissolved phase concentration calculated using equilibrium partitioning (3-phase).....	9.80E-03	mg/l

***The lesser value of the (effective) solubility and the dissolved phase

***concentration calculated using equilibrium partitioning (see above)

***be used as the maximum concentration in the unsaturated zone

***model source.

Results from above calculation (limiting concentration):

Initial dissolved phase concentration.....	9.80E-03	mg/l
Residual concentration level calculated using the full solubility.....	1.79E+08	mg/kg

***The source concentration is BELOW the residual concentration

Source Decay Terms

Source total decay term--Beta.....	1.58E-07
Source loss term--liquids only [1/day].....	1.58E-07
Source loss term--vapor only [1/day].....	0.0
Initial source vapor concentration [kg/m ³]	0.0

Diffusion path length [m].....	0.51
Average vertical thickness of the source[m]	1.0

CUMULATIVE LOSSES (from the Unsaturated Zone)
Cobalto

Liq. Mass Lost Time From Source (yr) (kg) -----	Total Mass in Source (kg) -----	Mass Loading to Groundwater (kg) -----	Volatilization Losses (kg) -----
0.0	6.87E+02	0.00E+00	0.00E+00
0.00E+00			
1.0	6.87E+02	0.00E+00	0.00E+00
3.96E-02			
2.0	6.87E+02	0.00E+00	0.00E+00
7.93E-02			
3.0	6.87E+02	0.00E+00	0.00E+00
1.19E-01			
4.0	6.87E+02	0.00E+00	0.00E+00
1.58E-01			
5.0	6.87E+02	0.00E+00	0.00E+00
1.98E-01			
6.0	6.87E+02	0.00E+00	0.00E+00
2.38E-01			
7.0	6.87E+02	0.00E+00	0.00E+00
2.77E-01			
8.0	6.87E+02	0.00E+00	0.00E+00
3.17E-01			
9.0	6.87E+02	0.00E+00	0.00E+00
3.57E-01			
10.0	6.87E+02	0.00E+00	0.00E+00
3.96E-01			
11.0	6.87E+02	0.00E+00	0.00E+00
4.36E-01			
12.0	6.87E+02	0.00E+00	0.00E+00
4.75E-01			
13.0	6.87E+02	0.00E+00	0.00E+00
5.15E-01			
14.0	6.87E+02	0.00E+00	0.00E+00
5.55E-01			
15.0	6.87E+02	0.00E+00	0.00E+00
5.94E-01			
16.0	6.87E+02	0.00E+00	0.00E+00
6.34E-01			
17.0	6.87E+02	0.00E+00	0.00E+00
6.73E-01			
18.0	6.86E+02	0.00E+00	0.00E+00
7.13E-01			
19.0	6.86E+02	0.00E+00	0.00E+00
7.53E-01			
20.0	6.86E+02	0.00E+00	0.00E+00
7.92E-01			
21.0	6.86E+02	0.00E+00	0.00E+00
8.32E-01			
22.0	6.86E+02	0.00E+00	0.00E+00
8.71E-01			
23.0	6.86E+02	0.00E+00	0.00E+00
9.11E-01			
24.0	6.86E+02	0.00E+00	0.00E+00
9.50E-01			

25.0	6.86E+02	0.00E+00	0.00E+00
9.90E-01			
26.0	6.86E+02	0.00E+00	0.00E+00
1.03E+00			
27.0	6.86E+02	0.00E+00	0.00E+00
1.07E+00			
28.0	6.86E+02	0.00E+00	0.00E+00
1.11E+00			
29.0	6.86E+02	0.00E+00	0.00E+00
1.15E+00			
30.0	6.86E+02	0.00E+00	0.00E+00
1.19E+00			
31.0	6.86E+02	0.00E+00	0.00E+00
1.23E+00			
32.0	6.86E+02	0.00E+00	0.00E+00
1.27E+00			
33.0	6.86E+02	0.00E+00	0.00E+00
1.31E+00			
34.0	6.86E+02	0.00E+00	0.00E+00
1.35E+00			
35.0	6.86E+02	0.00E+00	0.00E+00
1.39E+00			
36.0	6.86E+02	0.00E+00	0.00E+00
1.43E+00			
37.0	6.86E+02	0.00E+00	0.00E+00
1.46E+00			
38.0	6.86E+02	0.00E+00	0.00E+00
1.50E+00			
39.0	6.86E+02	0.00E+00	0.00E+00
1.54E+00			
40.0	6.86E+02	0.00E+00	0.00E+00
1.58E+00			
41.0	6.86E+02	0.00E+00	0.00E+00
1.62E+00			
42.0	6.86E+02	0.00E+00	0.00E+00
1.66E+00			
43.0	6.86E+02	0.00E+00	0.00E+00
1.70E+00			
44.0	6.85E+02	0.00E+00	0.00E+00
1.74E+00			
45.0	6.85E+02	0.00E+00	0.00E+00
1.78E+00			
46.0	6.85E+02	0.00E+00	0.00E+00
1.82E+00			
47.0	6.85E+02	0.00E+00	0.00E+00
1.86E+00			
48.0	6.85E+02	0.00E+00	0.00E+00
1.90E+00			
49.0	6.85E+02	0.00E+00	0.00E+00
1.94E+00			
50.0	6.85E+02	0.00E+00	0.00E+00
1.98E+00			
51.0	6.85E+02	0.00E+00	0.00E+00
2.02E+00			
52.0	6.85E+02	0.00E+00	0.00E+00
2.06E+00			
53.0	6.85E+02	0.00E+00	0.00E+00
2.10E+00			
54.0	6.85E+02	0.00E+00	0.00E+00
2.14E+00			
55.0	6.85E+02	0.00E+00	0.00E+00
2.18E+00			
56.0	6.85E+02	0.00E+00	0.00E+00
2.22E+00			
57.0	6.85E+02	0.00E+00	0.00E+00
2.26E+00			
58.0	6.85E+02	0.00E+00	0.00E+00
2.29E+00			

59.0	6.85E+02	0.00E+00	0.00E+00
2.33E+00			
60.0	6.85E+02	0.00E+00	0.00E+00
2.37E+00			
61.0	6.85E+02	0.00E+00	0.00E+00
2.41E+00			
62.0	6.85E+02	0.00E+00	0.00E+00
2.45E+00			
63.0	6.85E+02	0.00E+00	0.00E+00
2.49E+00			
64.0	6.85E+02	0.00E+00	0.00E+00
2.53E+00			
65.0	6.85E+02	0.00E+00	0.00E+00
2.57E+00			
66.0	6.85E+02	0.00E+00	0.00E+00
2.61E+00			
67.0	6.85E+02	0.00E+00	0.00E+00
2.65E+00			
68.0	6.85E+02	0.00E+00	0.00E+00
2.69E+00			
69.0	6.84E+02	0.00E+00	0.00E+00
2.73E+00			
70.0	6.84E+02	0.00E+00	0.00E+00
2.77E+00			
71.0	6.84E+02	0.00E+00	0.00E+00
2.81E+00			
72.0	6.84E+02	0.00E+00	0.00E+00
2.85E+00			
73.0	6.84E+02	0.00E+00	0.00E+00
2.89E+00			
74.0	6.84E+02	0.00E+00	0.00E+00
2.93E+00			
75.0	6.84E+02	0.00E+00	0.00E+00
2.97E+00			
76.0	6.84E+02	0.00E+00	0.00E+00
3.01E+00			
77.0	6.84E+02	0.00E+00	0.00E+00
3.04E+00			
78.0	6.84E+02	0.00E+00	0.00E+00
3.08E+00			
79.0	6.84E+02	0.00E+00	0.00E+00
3.12E+00			
80.0	6.84E+02	0.00E+00	0.00E+00
3.16E+00			
81.0	6.84E+02	0.00E+00	0.00E+00
3.20E+00			
82.0	6.84E+02	0.00E+00	0.00E+00
3.24E+00			
83.0	6.84E+02	0.00E+00	0.00E+00
3.28E+00			
84.0	6.84E+02	0.00E+00	0.00E+00
3.32E+00			
85.0	6.84E+02	0.00E+00	0.00E+00
3.36E+00			
86.0	6.84E+02	0.00E+00	0.00E+00
3.40E+00			
87.0	6.84E+02	0.00E+00	0.00E+00
3.44E+00			
88.0	6.84E+02	0.00E+00	0.00E+00
3.48E+00			
89.0	6.84E+02	0.00E+00	0.00E+00
3.52E+00			
90.0	6.84E+02	0.00E+00	0.00E+00
3.56E+00			
91.0	6.84E+02	0.00E+00	0.00E+00
3.60E+00			
92.0	6.84E+02	0.00E+00	0.00E+00
3.64E+00			

93.0	6.84E+02	0.00E+00	0.00E+00
3.68E+00			
94.0	6.83E+02	0.00E+00	0.00E+00
3.72E+00			
95.0	6.83E+02	0.00E+00	0.00E+00
3.75E+00			
96.0	6.83E+02	0.00E+00	0.00E+00
3.79E+00			
97.0	6.83E+02	0.00E+00	0.00E+00
3.83E+00			
98.0	6.83E+02	0.00E+00	0.00E+00
3.87E+00			
99.0	6.83E+02	0.00E+00	0.00E+00
3.91E+00			
100.0	6.83E+02	0.00E+00	0.00E+00
3.95E+00			

VADOSE ZONE CONCENTRATION WITH DEPTH
Cobalto

TIME = 0.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 1.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 2.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01
1.8	0.00E+00	0.00E+00

2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 3.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 4.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 5.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 10.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01

1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 15.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.79E-03	4.81E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 20.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.79E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 25.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.79E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 30.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration
-------	-------------------------------	-----------------------------

(m)	(mg/l)	Below Source (mg/kg)
1.0	9.79E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 35.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.78E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 40.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.78E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 45.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.78E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 50.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.78E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 55.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.77E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 60.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.77E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 65.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.77E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00

6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 70.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.76E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 75.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.76E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 80.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.76E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 85.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.76E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00

3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 90.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.75E-03	4.78E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 95.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.75E-03	4.78E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME100.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.75E-03	4.78E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

LIQUID PHASE CONCENTRATION
Cobalto

Time (yr)	Concentration at source (mg/l)	Concentration at water Table (mg/l)
0.0	9.80E-03	0.00E+00
1.0	9.80E-03	0.00E+00
2.0	9.80E-03	0.00E+00
3.0	9.80E-03	0.00E+00
4.0	9.80E-03	0.00E+00
5.0	9.80E-03	0.00E+00
6.0	9.80E-03	0.00E+00
7.0	9.80E-03	0.00E+00
8.0	9.80E-03	0.00E+00
9.0	9.80E-03	0.00E+00
10.0	9.80E-03	0.00E+00
11.0	9.80E-03	0.00E+00
12.0	9.80E-03	0.00E+00
13.0	9.80E-03	0.00E+00
14.0	9.80E-03	0.00E+00
15.0	9.80E-03	0.00E+00
16.0	9.79E-03	0.00E+00
17.0	9.79E-03	0.00E+00
18.0	9.79E-03	0.00E+00
19.0	9.79E-03	0.00E+00
20.0	9.79E-03	0.00E+00
21.0	9.79E-03	0.00E+00
22.0	9.79E-03	0.00E+00
23.0	9.79E-03	0.00E+00
24.0	9.79E-03	0.00E+00
25.0	9.79E-03	0.00E+00
26.0	9.79E-03	0.00E+00
27.0	9.79E-03	0.00E+00
28.0	9.79E-03	0.00E+00
29.0	9.79E-03	0.00E+00
30.0	9.79E-03	0.00E+00
31.0	9.79E-03	0.00E+00
32.0	9.79E-03	0.00E+00
33.0	9.79E-03	0.00E+00
34.0	9.78E-03	0.00E+00
35.0	9.78E-03	0.00E+00
36.0	9.78E-03	0.00E+00
37.0	9.78E-03	0.00E+00
38.0	9.78E-03	0.00E+00
39.0	9.78E-03	0.00E+00
40.0	9.78E-03	0.00E+00
41.0	9.78E-03	0.00E+00
42.0	9.78E-03	0.00E+00
43.0	9.78E-03	0.00E+00
44.0	9.78E-03	0.00E+00
45.0	9.78E-03	0.00E+00
46.0	9.78E-03	0.00E+00
47.0	9.78E-03	0.00E+00
48.0	9.78E-03	0.00E+00
49.0	9.78E-03	0.00E+00
50.0	9.78E-03	0.00E+00
51.0	9.77E-03	0.00E+00
52.0	9.77E-03	0.00E+00
53.0	9.77E-03	0.00E+00
54.0	9.77E-03	0.00E+00
55.0	9.77E-03	0.00E+00
56.0	9.77E-03	0.00E+00
57.0	9.77E-03	0.00E+00
58.0	9.77E-03	0.00E+00
59.0	9.77E-03	0.00E+00
60.0	9.77E-03	0.00E+00

61.0	9.77E-03	0.00E+00
62.0	9.77E-03	0.00E+00
63.0	9.77E-03	0.00E+00
64.0	9.77E-03	0.00E+00
65.0	9.77E-03	0.00E+00
66.0	9.77E-03	0.00E+00
67.0	9.77E-03	0.00E+00
68.0	9.77E-03	0.00E+00
69.0	9.76E-03	0.00E+00
70.0	9.76E-03	0.00E+00
71.0	9.76E-03	0.00E+00
72.0	9.76E-03	0.00E+00
73.0	9.76E-03	0.00E+00
74.0	9.76E-03	0.00E+00
75.0	9.76E-03	0.00E+00
76.0	9.76E-03	0.00E+00
77.0	9.76E-03	0.00E+00
78.0	9.76E-03	0.00E+00
79.0	9.76E-03	0.00E+00
80.0	9.76E-03	0.00E+00
81.0	9.76E-03	0.00E+00
82.0	9.76E-03	0.00E+00
83.0	9.76E-03	0.00E+00
84.0	9.76E-03	0.00E+00
85.0	9.76E-03	0.00E+00
86.0	9.76E-03	0.00E+00
87.0	9.75E-03	0.00E+00
88.0	9.75E-03	0.00E+00
89.0	9.75E-03	0.00E+00
90.0	9.75E-03	0.00E+00
91.0	9.75E-03	0.00E+00
92.0	9.75E-03	0.00E+00
93.0	9.75E-03	0.00E+00
94.0	9.75E-03	0.00E+00
95.0	9.75E-03	0.00E+00
96.0	9.75E-03	0.00E+00
97.0	9.75E-03	0.00E+00
98.0	9.75E-03	0.00E+00
99.0	9.75E-03	0.00E+00
100.0	9.75E-03	0.00E+00

End of VADOSE ZONE MODEL OUTPUT

Start of GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Calculated height of GW source (linked) (m)..... 1.04E+02

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.86
Kd (m3/kg).....	2.0
Retardation coefficient.....	1.73E+04
Seepage velocity (m/d).....	4.30E-03
Retarded seepage velocity (m/d).....	2.48E-07

Dispersion calculations in Saturated Zone

Distance used for dispersion calculations (m).....	82.
Distance = (Dist. to well) + (Source Length)/2	
Calculated longitudinal dispersivity (m).....	9.1
Calculated transverse dispersivity (m).....	3.0
Calculated vertical dispersivity (m).....	3.48E-02

GROUNDWATER CONCENTRATION (annual average)
Cobalto

The maximum groundwater concentration (mg/l): 0.00E+00
 Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00
18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00

52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00
86.0	0.00E+00
87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of GROUNDWATER MODEL OUTPUT

"Rischio per la Falda derivante da Suolo Superficiale - Scenario 2" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Piombo

Start of VADOSE ZONE MODEL OUTPUT

Effective Diffusion Coefficient for Vadose zone

Total thickness of subunit [cm].....	26.
Air-filled porosity [-].....	8.08E-02
Water-filled porosity [-].....	0.17
Total porosity [-].....	0.25
Effective diff. coeff. for subunit....[cm ² /s]	1.00E-20

***Diffusion coeff. in air and water = 0.
Effective diffusion coefficient set to 1E-20

Data Summary and Initial Calculations

Unsaturated Zone

Distance from ground surface to source...	1.00E-02	m
Thickness of source.....	1.0	m
Thickness of vadose zone.....	8.5	m
Infiltration rate (vDarcy).....	5.48E-04	m/d
Porosity in vadose zone.....	0.25	[-]
Moisture content in vadose zone.....	0.17	[-]
Soil bulk density.....	1.7	g/cm ³
Fraction organic carbon in soil.....	1.0	g/g
Calculated pore water velocity.....	3.24E-03	m/d

Chemical-Specific Parameters

Solubility.....	9.58E+03	mg/l
Henrys Law Coefficient.....	0.0	[-]
Koc, organic carbon partition coeff.....	6.68E+03	ml/g

Calculating Dissolved Phase Source Concentration

Chemical solubility (from database).....	9.58E+03	mg/l
Dissolved phase concentration calculated using equilibrium partitioning (3-phase).....	2.10E-02	mg/l

***The lesser value of the (effective) solubility and the dissolved phase

***concentration calculated using equilibrium partitioning (see above)

will

***be used as the maximum concentration in the unsaturated zone

***model source.

Results from above calculation (limiting concentration):

Initial dissolved phase concentration.....	2.10E-02	mg/l
Residual concentration level calculated using the full solubility.....	6.39E+07	mg/kg

***The source concentration is BELOW the residual concentration

Source Decay Terms

Source total decay term--Beta.....	4.83E-08
Source loss term--liquids only [1/day].....	4.83E-08
Source loss term--vapor only [1/day].....	0.0
Initial source vapor concentration [kg/m ³]	0.0

Diffusion path length [m].....	0.51
Average vertical thickness of the source[m]	1.0

CUMULATIVE LOSSES (from the Unsaturated Zone)
Piombo

Liq. Mass Lost Time From Source (yr) (kg) -----	Total Mass in Source (kg) -----	Mass Loading to Groundwater (kg) -----	Volatilization Losses (kg) -----
0.0	4.81E+03	0.00E+00	0.00E+00
0.00E+00			
1.0	4.81E+03	0.00E+00	0.00E+00
8.48E-02			
2.0	4.81E+03	0.00E+00	0.00E+00
1.70E-01			
3.0	4.81E+03	0.00E+00	0.00E+00
2.54E-01			
4.0	4.81E+03	0.00E+00	0.00E+00
3.39E-01			
5.0	4.81E+03	0.00E+00	0.00E+00
4.24E-01			
6.0	4.81E+03	0.00E+00	0.00E+00
5.09E-01			
7.0	4.81E+03	0.00E+00	0.00E+00
5.93E-01			
8.0	4.81E+03	0.00E+00	0.00E+00
6.78E-01			
9.0	4.81E+03	0.00E+00	0.00E+00
7.63E-01			
10.0	4.81E+03	0.00E+00	0.00E+00
8.48E-01			
11.0	4.81E+03	0.00E+00	0.00E+00
9.33E-01			
12.0	4.81E+03	0.00E+00	0.00E+00
1.02E+00			
13.0	4.81E+03	0.00E+00	0.00E+00
1.10E+00			
14.0	4.81E+03	0.00E+00	0.00E+00
1.19E+00			
15.0	4.81E+03	0.00E+00	0.00E+00
1.27E+00			
16.0	4.81E+03	0.00E+00	0.00E+00
1.36E+00			
17.0	4.81E+03	0.00E+00	0.00E+00
1.44E+00			
18.0	4.81E+03	0.00E+00	0.00E+00
1.53E+00			
19.0	4.81E+03	0.00E+00	0.00E+00
1.61E+00			
20.0	4.81E+03	0.00E+00	0.00E+00
1.70E+00			
21.0	4.81E+03	0.00E+00	0.00E+00
1.78E+00			
22.0	4.81E+03	0.00E+00	0.00E+00
1.86E+00			
23.0	4.81E+03	0.00E+00	0.00E+00
1.95E+00			
24.0	4.81E+03	0.00E+00	0.00E+00
2.03E+00			

25.0	4.81E+03	0.00E+00	0.00E+00
2.12E+00			
26.0	4.81E+03	0.00E+00	0.00E+00
2.20E+00			
27.0	4.81E+03	0.00E+00	0.00E+00
2.29E+00			
28.0	4.81E+03	0.00E+00	0.00E+00
2.37E+00			
29.0	4.81E+03	0.00E+00	0.00E+00
2.46E+00			
30.0	4.81E+03	0.00E+00	0.00E+00
2.54E+00			
31.0	4.81E+03	0.00E+00	0.00E+00
2.63E+00			
32.0	4.81E+03	0.00E+00	0.00E+00
2.71E+00			
33.0	4.81E+03	0.00E+00	0.00E+00
2.80E+00			
34.0	4.81E+03	0.00E+00	0.00E+00
2.88E+00			
35.0	4.81E+03	0.00E+00	0.00E+00
2.97E+00			
36.0	4.81E+03	0.00E+00	0.00E+00
3.05E+00			
37.0	4.81E+03	0.00E+00	0.00E+00
3.14E+00			
38.0	4.81E+03	0.00E+00	0.00E+00
3.22E+00			
39.0	4.81E+03	0.00E+00	0.00E+00
3.31E+00			
40.0	4.81E+03	0.00E+00	0.00E+00
3.39E+00			
41.0	4.81E+03	0.00E+00	0.00E+00
3.47E+00			
42.0	4.81E+03	0.00E+00	0.00E+00
3.56E+00			
43.0	4.81E+03	0.00E+00	0.00E+00
3.64E+00			
44.0	4.81E+03	0.00E+00	0.00E+00
3.73E+00			
45.0	4.81E+03	0.00E+00	0.00E+00
3.81E+00			
46.0	4.81E+03	0.00E+00	0.00E+00
3.90E+00			
47.0	4.81E+03	0.00E+00	0.00E+00
3.98E+00			
48.0	4.81E+03	0.00E+00	0.00E+00
4.07E+00			
49.0	4.81E+03	0.00E+00	0.00E+00
4.15E+00			
50.0	4.81E+03	0.00E+00	0.00E+00
4.24E+00			
51.0	4.81E+03	0.00E+00	0.00E+00
4.32E+00			
52.0	4.81E+03	0.00E+00	0.00E+00
4.41E+00			
53.0	4.81E+03	0.00E+00	0.00E+00
4.49E+00			
54.0	4.81E+03	0.00E+00	0.00E+00
4.58E+00			
55.0	4.81E+03	0.00E+00	0.00E+00
4.66E+00			
56.0	4.81E+03	0.00E+00	0.00E+00
4.75E+00			
57.0	4.81E+03	0.00E+00	0.00E+00
4.83E+00			
58.0	4.81E+03	0.00E+00	0.00E+00
4.91E+00			

59.0	4.81E+03	0.00E+00	0.00E+00
5.00E+00			
60.0	4.81E+03	0.00E+00	0.00E+00
5.08E+00			
61.0	4.81E+03	0.00E+00	0.00E+00
5.17E+00			
62.0	4.81E+03	0.00E+00	0.00E+00
5.25E+00			
63.0	4.81E+03	0.00E+00	0.00E+00
5.34E+00			
64.0	4.81E+03	0.00E+00	0.00E+00
5.42E+00			
65.0	4.80E+03	0.00E+00	0.00E+00
5.51E+00			
66.0	4.80E+03	0.00E+00	0.00E+00
5.59E+00			
67.0	4.80E+03	0.00E+00	0.00E+00
5.68E+00			
68.0	4.80E+03	0.00E+00	0.00E+00
5.76E+00			
69.0	4.80E+03	0.00E+00	0.00E+00
5.85E+00			
70.0	4.80E+03	0.00E+00	0.00E+00
5.93E+00			
71.0	4.80E+03	0.00E+00	0.00E+00
6.02E+00			
72.0	4.80E+03	0.00E+00	0.00E+00
6.10E+00			
73.0	4.80E+03	0.00E+00	0.00E+00
6.19E+00			
74.0	4.80E+03	0.00E+00	0.00E+00
6.27E+00			
75.0	4.80E+03	0.00E+00	0.00E+00
6.35E+00			
76.0	4.80E+03	0.00E+00	0.00E+00
6.44E+00			
77.0	4.80E+03	0.00E+00	0.00E+00
6.52E+00			
78.0	4.80E+03	0.00E+00	0.00E+00
6.61E+00			
79.0	4.80E+03	0.00E+00	0.00E+00
6.69E+00			
80.0	4.80E+03	0.00E+00	0.00E+00
6.78E+00			
81.0	4.80E+03	0.00E+00	0.00E+00
6.86E+00			
82.0	4.80E+03	0.00E+00	0.00E+00
6.95E+00			
83.0	4.80E+03	0.00E+00	0.00E+00
7.03E+00			
84.0	4.80E+03	0.00E+00	0.00E+00
7.12E+00			
85.0	4.80E+03	0.00E+00	0.00E+00
7.20E+00			
86.0	4.80E+03	0.00E+00	0.00E+00
7.29E+00			
87.0	4.80E+03	0.00E+00	0.00E+00
7.37E+00			
88.0	4.80E+03	0.00E+00	0.00E+00
7.46E+00			
89.0	4.80E+03	0.00E+00	0.00E+00
7.54E+00			
90.0	4.80E+03	0.00E+00	0.00E+00
7.62E+00			
91.0	4.80E+03	0.00E+00	0.00E+00
7.71E+00			
92.0	4.80E+03	0.00E+00	0.00E+00
7.79E+00			

93.0	4.80E+03	0.00E+00	0.00E+00
7.88E+00			
94.0	4.80E+03	0.00E+00	0.00E+00
7.96E+00			
95.0	4.80E+03	0.00E+00	0.00E+00
8.05E+00			
96.0	4.80E+03	0.00E+00	0.00E+00
8.13E+00			
97.0	4.80E+03	0.00E+00	0.00E+00
8.22E+00			
98.0	4.80E+03	0.00E+00	0.00E+00
8.30E+00			
99.0	4.80E+03	0.00E+00	0.00E+00
8.39E+00			
100.0	4.80E+03	0.00E+00	0.00E+00
8.47E+00			

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TIME = 0.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 1.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 2.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00

2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 3.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 4.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 5.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 10.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00

1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 15.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 20.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 25.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 30.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration
-------	-------------------------------	-----------------------------

(m)	(mg/l)	Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 35.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 40.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 45.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 50.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 55.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 60.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 65.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00

6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 70.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 75.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 80.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 85.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00

3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 90.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 95.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME100.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

LIQUID PHASE CONCENTRATION
Piombo

Time (yr)	Concentration at source (mg/l)	Concentration at water Table (mg/l)
0.0	2.10E-02	0.00E+00
1.0	2.10E-02	0.00E+00
2.0	2.10E-02	0.00E+00
3.0	2.10E-02	0.00E+00
4.0	2.10E-02	0.00E+00
5.0	2.10E-02	0.00E+00
6.0	2.10E-02	0.00E+00
7.0	2.10E-02	0.00E+00
8.0	2.10E-02	0.00E+00
9.0	2.10E-02	0.00E+00
10.0	2.10E-02	0.00E+00
11.0	2.10E-02	0.00E+00
12.0	2.10E-02	0.00E+00
13.0	2.10E-02	0.00E+00
14.0	2.10E-02	0.00E+00
15.0	2.10E-02	0.00E+00
16.0	2.10E-02	0.00E+00
17.0	2.10E-02	0.00E+00
18.0	2.10E-02	0.00E+00
19.0	2.10E-02	0.00E+00
20.0	2.10E-02	0.00E+00
21.0	2.10E-02	0.00E+00
22.0	2.10E-02	0.00E+00
23.0	2.10E-02	0.00E+00
24.0	2.10E-02	0.00E+00
25.0	2.10E-02	0.00E+00
26.0	2.10E-02	0.00E+00
27.0	2.10E-02	0.00E+00
28.0	2.10E-02	0.00E+00
29.0	2.10E-02	0.00E+00
30.0	2.10E-02	0.00E+00
31.0	2.10E-02	0.00E+00
32.0	2.10E-02	0.00E+00
33.0	2.10E-02	0.00E+00
34.0	2.10E-02	0.00E+00
35.0	2.10E-02	0.00E+00
36.0	2.10E-02	0.00E+00
37.0	2.10E-02	0.00E+00
38.0	2.10E-02	0.00E+00
39.0	2.10E-02	0.00E+00
40.0	2.10E-02	0.00E+00
41.0	2.10E-02	0.00E+00
42.0	2.10E-02	0.00E+00
43.0	2.10E-02	0.00E+00
44.0	2.10E-02	0.00E+00
45.0	2.10E-02	0.00E+00
46.0	2.10E-02	0.00E+00
47.0	2.10E-02	0.00E+00
48.0	2.10E-02	0.00E+00
49.0	2.10E-02	0.00E+00
50.0	2.10E-02	0.00E+00
51.0	2.10E-02	0.00E+00
52.0	2.10E-02	0.00E+00
53.0	2.10E-02	0.00E+00
54.0	2.10E-02	0.00E+00
55.0	2.10E-02	0.00E+00
56.0	2.10E-02	0.00E+00
57.0	2.10E-02	0.00E+00
58.0	2.10E-02	0.00E+00
59.0	2.10E-02	0.00E+00
60.0	2.10E-02	0.00E+00

61.0	2.10E-02	0.00E+00
62.0	2.10E-02	0.00E+00
63.0	2.10E-02	0.00E+00
64.0	2.09E-02	0.00E+00
65.0	2.09E-02	0.00E+00
66.0	2.09E-02	0.00E+00
67.0	2.09E-02	0.00E+00
68.0	2.09E-02	0.00E+00
69.0	2.09E-02	0.00E+00
70.0	2.09E-02	0.00E+00
71.0	2.09E-02	0.00E+00
72.0	2.09E-02	0.00E+00
73.0	2.09E-02	0.00E+00
74.0	2.09E-02	0.00E+00
75.0	2.09E-02	0.00E+00
76.0	2.09E-02	0.00E+00
77.0	2.09E-02	0.00E+00
78.0	2.09E-02	0.00E+00
79.0	2.09E-02	0.00E+00
80.0	2.09E-02	0.00E+00
81.0	2.09E-02	0.00E+00
82.0	2.09E-02	0.00E+00
83.0	2.09E-02	0.00E+00
84.0	2.09E-02	0.00E+00
85.0	2.09E-02	0.00E+00
86.0	2.09E-02	0.00E+00
87.0	2.09E-02	0.00E+00
88.0	2.09E-02	0.00E+00
89.0	2.09E-02	0.00E+00
90.0	2.09E-02	0.00E+00
91.0	2.09E-02	0.00E+00
92.0	2.09E-02	0.00E+00
93.0	2.09E-02	0.00E+00
94.0	2.09E-02	0.00E+00
95.0	2.09E-02	0.00E+00
96.0	2.09E-02	0.00E+00
97.0	2.09E-02	0.00E+00
98.0	2.09E-02	0.00E+00
99.0	2.09E-02	0.00E+00
100.0	2.09E-02	0.00E+00

End of VADOSE ZONE MODEL OUTPUT

Start of GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Calculated height of GW source (linked) (m)..... 1.04E+02

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.86
Kd (m3/kg).....	6.7
Retardation coefficient.....	5.67E+04
Seepage velocity (m/d).....	4.30E-03
Retarded seepage velocity (m/d).....	7.58E-08

Dispersion calculations in Saturated Zone

Distance used for dispersion calculations (m).....	82.
Distance = (Dist. to well) + (Source Length)/2	
Calculated longitudinal dispersivity (m).....	9.1
Calculated transverse dispersivity (m).....	3.0
Calculated vertical dispersivity (m).....	3.48E-02

GROUNDWATER CONCENTRATION (annual average)
Piombo

The maximum groundwater concentration (mg/l): 0.00E+00
 Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)

1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00
18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00

52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00
86.0	0.00E+00
87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of GROUNDWATER MODEL OUTPUT

"Rischio per le acque Superficiali derivante da Suolo Superficiale - Scenario 3" - Input

FATE AND TRANSPORT MODEL INPUT SUMMARY FILE

Model Description:

Unsaturated zone model linked with saturated zone model

Title:

New Project

Simulation time (years). 100

Vadose Zone Source Parameters

Thickness of contamination (m)	1.0
Depth to top of contamination (m).	0.0
Length of source (m)	1.63E+02
Width of source (m).	1.24E+02

Unsaturated Zone Properties

Total Porosity in vadose zone (cm3/cm3)	0.25
Residual water content (cm3/cm3)	0.12
Fraction organic carbon (g oc/g soil).	2.40E-02
Soil bulk density (g/cm3).	1.7
Infiltration Rate (cm/yr).	20.
Saturated conductivity (m/d)	0.86
Van Genuchten's N.	1.5
Thickness of vadose zone (m)	8.5

Aquifer Properties

Effective porosity (cm3/cm3)	0.20
Fraction organic carbon (g oc/g soil).	2.40E-02
Hydraulic conductivity (m/d)	0.86
Soil bulk density (g/cm3).	1.7
Hydraulic gradient (m/m)	1.00E-03
***Longitudinal dispersivity (m). code calculated	
***Transverse dispersivity (m). code calculated	
***Vertical dispersivity (m). code calculated	

Receptor Well Location

Distance downgradient (m).	40.
Distance cross-gradient (m).	0.0
Depth to top of well screen (m).	0.0
Depth to bottom of well screen(m).	1.0
Number of points used to calc. conc.	2

TPH Data for Unsaturated Zone Source

Concentration of TPH in soil (mg/kg)	0.0
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Molecular weight of TPH (g/mol). 0.0

Surface Water Mixing Model Data

Distance from GW source to SW (m).	40.
Conductivity of SW bed (m)	10.
Depth of GW aquifer next to SW (m)	1.0
Gradient between GW and SW (m/m)	5.00E-02
SW flow rate (m ³ /d)	1.80E+02
Cross-sectional area of river (m ²).	2.0
Fraction of x-section for mixing (-).	1.0
Fraction org. carbon in sediments (g/g).	1.00E-02

CHEMICAL DATA FOR: Cobalto

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	8.75E+04
Vapor pressure (mmHg)	0.0
Kd (partition coefficient) (L/kg)	2.04E+03
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	59.
Degradation rate, saturated zone (1/d).	0.0
Degradation rate, vadose zone (1/d).	0.0
Degradation rate in surface water (1/d).	0.0

Source Concentrations:

Source conc. for unsaturated zone model (mg/kg). 20.

CHEMICAL DATA FOR: Piombo

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	9.58E+03
Vapor pressure (mmHg)	7.28E-11
Kd (partition coefficient) (L/kg)	6.68E+03
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	2.07E+02
Degradation rate, saturated zone (1/d).	0.0
Degradation rate, vadose zone (1/d).	0.0
Degradation rate in surface water (1/d).	0.0

Source Concentrations:

Source conc. for unsaturated zone model (mg/kg). 1.40E+02

CHEMICAL DATA FOR: Aromatici C11 - C22

Diffusion coefficient in air (cm ² /s)	6.00E-02
Diffusion coefficient in water (cm ² /s)	1.00E-05
Solubility (mg/l)	5.8
Vapor pressure (mmHg)	2.43E-02
KOC (L/kg).	5.00E+03
Henry's Law coefficient (-).	3.00E-02
Molecular weight (g/mol).	1.50E+02
Degradation rate, saturated zone (1/d).	0.0

Degradation rate, vadose zone (1/d).	0.0
Degradation rate in surface water (1/d).	0.0

Source Concentrations:

Source conc. for unsaturated zone model (mg/kg).	1.60E+02
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CHEMICAL DATA FOR: Alifatici C12-C16

Diffusion coefficient in air (cm ² /s)	4.06E-02
Diffusion coefficient in water (cm ² /s)	4.61E-06
Solubility (mg/l)	3.50E-04
Vapor pressure (mmHg)	2.96E-02
KOC (L/kg).	5.01E+06
Henry's Law coefficient (-).	1.60E+02
Molecular weight (g/mol).	2.10E+02
Degradation rate, saturated zone (1/d).	0.0
Degradation rate, vadose zone (1/d).	0.0
Degradation rate in surface water (1/d).	0.0

Source Concentrations:

Source conc. for unsaturated zone model (mg/kg).	1.60E+02
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"Rischio per le acque Superficiali derivante da Suolo Superficiale - Scenario 3" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Alifatici C12-C16

Start of VADOSE ZONE MODEL OUTPUT

Effective Diffusion Coefficient for Vadose zone

Total thickness of subunit [cm].....	26.
Air-filled porosity [-].....	8.08E-02
Water-filled porosity [-].....	0.17
Total porosity [-].....	0.25
Effective diff. coeff. for subunit....[cm ² /s]	1.48E-04

Data Summary and Initial Calculations

Unsaturated Zone

Distance from ground surface to source...	1.00E-02	m
Thickness of source.....	1.0	m
Thickness of vadose zone.....	8.5	m
Infiltration rate (vDarcy).....	5.48E-04	m/d
Porosity in vadose zone.....	0.25	[-]
Moisture content in vadose zone.....	0.17	[-]
Soil bulk density.....	1.7	g/cm ³
Fraction organic carbon in soil.....	2.40E-02	g/g
Calculated pore water velocity.....	3.24E-03	m/d

Chemical-Specific Parameters

Solubility.....	3.50E-04	mg/l
Henry's Law Coefficient.....	1.60E+02	[-]
Koc, organic carbon partition coeff.....	5.01E+06	ml/g

Calculating Dissolved Phase Source Concentration

Chemical solubility (from database).....	3.50E-04	mg/l
Dissolved phase concentration calculated using equilibrium partitioning (3-phase).....	1.33E-03	mg/l

***The lesser value of the (effective) solubility and the dissolved phase

***concentration calculated using equilibrium partitioning (see above)

will

***be used as the maximum concentration in the unsaturated zone

***model source.

Results from above calculation (limiting concentration):

Initial dissolved phase concentration.....	3.50E-04	mg/l
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Residual concentration level calculated using the full solubility.....	42.	mg/kg
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***The source concentration is ABOVE the residual concentration

Source Decay Terms

Source total decay term--Beta.....	5.18E-07
Source loss term--liquids only [1/day].....	7.05E-10
Source loss term--vapor only [1/day].....	5.17E-07
Initial source vapor concentration [kg/m ³]	5.60E-05
Diffusion path length [m].....	0.51
Average vertical thickness of the source[m]	1.0

CUMULATIVE LOSSES (from the Unsaturated Zone)
Alifatici C12-C16

Liq. Mass Lost Time From Source (yr) (kg)	Total Mass in Source (kg)	Mass Loading to Groundwater (kg)	Volatilization Losses (kg)
-----	-----	-----	-----
0.0	5.50E+03	0.00E+00	0.00E+00
0.00E+00			
1.0	5.50E+03	0.00E+00	1.04E+00
1.41E-03			
2.0	5.50E+03	0.00E+00	2.07E+00
2.83E-03			
3.0	5.49E+03	0.00E+00	3.11E+00
4.24E-03			
4.0	5.49E+03	0.00E+00	4.15E+00
5.66E-03			
5.0	5.49E+03	0.00E+00	5.18E+00
7.07E-03			
6.0	5.49E+03	0.00E+00	6.22E+00
8.48E-03			
7.0	5.49E+03	0.00E+00	7.26E+00
9.90E-03			
8.0	5.49E+03	0.00E+00	8.29E+00
1.13E-02			
9.0	5.49E+03	0.00E+00	9.33E+00
1.27E-02			
10.0	5.49E+03	0.00E+00	1.04E+01
1.41E-02			
11.0	5.49E+03	0.00E+00	1.14E+01
1.55E-02			
12.0	5.49E+03	0.00E+00	1.24E+01
1.70E-02			
13.0	5.48E+03	0.00E+00	1.35E+01
1.84E-02			
14.0	5.48E+03	0.00E+00	1.45E+01
1.98E-02			
15.0	5.48E+03	0.00E+00	1.55E+01
2.12E-02			
16.0	5.48E+03	0.00E+00	1.66E+01
2.26E-02			
17.0	5.48E+03	0.00E+00	1.76E+01
2.40E-02			
18.0	5.48E+03	0.00E+00	1.86E+01
2.54E-02			
19.0	5.48E+03	0.00E+00	1.97E+01
2.68E-02			
20.0	5.48E+03	0.00E+00	2.07E+01
2.82E-02			
21.0	5.48E+03	0.00E+00	2.17E+01
2.97E-02			
22.0	5.47E+03	0.00E+00	2.28E+01
3.11E-02			
23.0	5.47E+03	0.00E+00	2.38E+01
3.25E-02			
24.0	5.47E+03	0.00E+00	2.48E+01
3.39E-02			
25.0	5.47E+03	0.00E+00	2.59E+01
3.53E-02			
26.0	5.47E+03	0.00E+00	2.69E+01

3.67E-02			
27.0	5.47E+03	0.00E+00	2.79E+01
3.81E-02			
28.0	5.47E+03	0.00E+00	2.90E+01
3.95E-02			
29.0	5.47E+03	0.00E+00	3.00E+01
4.09E-02			
30.0	5.47E+03	0.00E+00	3.10E+01
4.23E-02			
31.0	5.47E+03	0.00E+00	3.21E+01
4.37E-02			
32.0	5.46E+03	0.00E+00	3.31E+01
4.51E-02			
33.0	5.46E+03	0.00E+00	3.41E+01
4.65E-02			
34.0	5.46E+03	0.00E+00	3.52E+01
4.80E-02			
35.0	5.46E+03	0.00E+00	3.62E+01
4.94E-02			
36.0	5.46E+03	0.00E+00	3.72E+01
5.08E-02			
37.0	5.46E+03	0.00E+00	3.82E+01
5.22E-02			
38.0	5.46E+03	0.00E+00	3.93E+01
5.36E-02			
39.0	5.46E+03	0.00E+00	4.03E+01
5.50E-02			
40.0	5.46E+03	0.00E+00	4.13E+01
5.64E-02			
41.0	5.46E+03	0.00E+00	4.24E+01
5.78E-02			
42.0	5.45E+03	0.00E+00	4.34E+01
5.92E-02			
43.0	5.45E+03	0.00E+00	4.44E+01
6.06E-02			
44.0	5.45E+03	0.00E+00	4.55E+01
6.20E-02			
45.0	5.45E+03	0.00E+00	4.65E+01
6.34E-02			
46.0	5.45E+03	0.00E+00	4.75E+01
6.48E-02			
47.0	5.45E+03	0.00E+00	4.85E+01
6.62E-02			
48.0	5.45E+03	0.00E+00	4.96E+01
6.76E-02			
49.0	5.45E+03	0.00E+00	5.06E+01
6.90E-02			
50.0	5.45E+03	0.00E+00	5.16E+01
7.04E-02			
51.0	5.44E+03	0.00E+00	5.27E+01
7.18E-02			
52.0	5.44E+03	0.00E+00	5.37E+01
7.32E-02			
53.0	5.44E+03	0.00E+00	5.47E+01
7.46E-02			
54.0	5.44E+03	0.00E+00	5.57E+01
7.60E-02			
55.0	5.44E+03	0.00E+00	5.68E+01
7.74E-02			
56.0	5.44E+03	0.00E+00	5.78E+01
7.88E-02			
57.0	5.44E+03	0.00E+00	5.88E+01
8.02E-02			
58.0	5.44E+03	0.00E+00	5.98E+01
8.16E-02			
59.0	5.44E+03	0.00E+00	6.09E+01
8.30E-02			
60.0	5.44E+03	0.00E+00	6.19E+01

8.44E-02			
61.0	5.43E+03	0.00E+00	6.29E+01
8.58E-02			
62.0	5.43E+03	0.00E+00	6.39E+01
8.72E-02			
63.0	5.43E+03	0.00E+00	6.50E+01
8.86E-02			
64.0	5.43E+03	0.00E+00	6.60E+01
9.00E-02			
65.0	5.43E+03	0.00E+00	6.70E+01
9.14E-02			
66.0	5.43E+03	0.00E+00	6.80E+01
9.28E-02			
67.0	5.43E+03	0.00E+00	6.91E+01
9.42E-02			
68.0	5.43E+03	0.00E+00	7.01E+01
9.56E-02			
69.0	5.43E+03	0.00E+00	7.11E+01
9.70E-02			
70.0	5.43E+03	0.00E+00	7.21E+01
9.84E-02			
71.0	5.42E+03	0.00E+00	7.32E+01
9.98E-02			
72.0	5.42E+03	0.00E+00	7.42E+01
1.01E-01			
73.0	5.42E+03	0.00E+00	7.52E+01
1.03E-01			
74.0	5.42E+03	0.00E+00	7.62E+01
1.04E-01			
75.0	5.42E+03	0.00E+00	7.73E+01
1.05E-01			
76.0	5.42E+03	0.00E+00	7.83E+01
1.07E-01			
77.0	5.42E+03	0.00E+00	7.93E+01
1.08E-01			
78.0	5.42E+03	0.00E+00	8.03E+01
1.10E-01			
79.0	5.42E+03	0.00E+00	8.13E+01
1.11E-01			
80.0	5.42E+03	0.00E+00	8.24E+01
1.12E-01			
81.0	5.41E+03	0.00E+00	8.34E+01
1.14E-01			
82.0	5.41E+03	0.00E+00	8.44E+01
1.15E-01			
83.0	5.41E+03	0.00E+00	8.54E+01
1.17E-01			
84.0	5.41E+03	0.00E+00	8.65E+01
1.18E-01			
85.0	5.41E+03	0.00E+00	8.75E+01
1.19E-01			
86.0	5.41E+03	0.00E+00	8.85E+01
1.21E-01			
87.0	5.41E+03	0.00E+00	8.95E+01
1.22E-01			
88.0	5.41E+03	0.00E+00	9.05E+01
1.23E-01			
89.0	5.41E+03	0.00E+00	9.16E+01
1.25E-01			
90.0	5.40E+03	0.00E+00	9.26E+01
1.26E-01			
91.0	5.40E+03	0.00E+00	9.36E+01
1.28E-01			
92.0	5.40E+03	0.00E+00	9.46E+01
1.29E-01			
93.0	5.40E+03	0.00E+00	9.56E+01
1.30E-01			
94.0	5.40E+03	0.00E+00	9.67E+01

1.32E-01			
95.0	5.40E+03	0.00E+00	9.77E+01
1.33E-01			
96.0	5.40E+03	0.00E+00	9.87E+01
1.35E-01			
97.0	5.40E+03	0.00E+00	9.97E+01
1.36E-01			
98.0	5.40E+03	0.00E+00	1.01E+02
1.37E-01			
99.0	5.40E+03	0.00E+00	1.02E+02
1.39E-01			
100.0	5.39E+03	0.00E+00	1.03E+02
1.40E-01			

VADOSE ZONE CONCENTRATION WITH DEPTH
Alifatici C12-C16

TIME = 0.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	3.50E-04	4.21E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 1.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	3.50E-04	4.21E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 2.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	3.50E-04	4.21E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00

5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 3.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	3.50E-04	4.21E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 4.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	3.50E-04	4.21E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 5.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	3.50E-04	4.20E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 10.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	3.49E-04	4.20E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00

4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 15.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.49E-04	4.20E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 20.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.49E-04	4.19E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 25.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.48E-04	4.19E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 30.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.48E-04	4.19E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

1.0	3.48E-04	4.18E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 35.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	3.48E-04	4.18E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 40.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	3.47E-04	4.18E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 45.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	3.47E-04	4.17E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 50.0 years

Liquid Phase

Total Soil

Depth	Concentration	Concentration Below Source
(m)	(mg/l)	(mg/kg)
1.0	3.47E-04	4.17E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 55.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
1.0	3.46E-04	4.17E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 60.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
1.0	3.46E-04	4.16E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 65.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
1.0	3.46E-04	4.16E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 70.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.45E-04	4.15E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 75.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.45E-04	4.15E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 80.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.45E-04	4.15E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 85.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.44E-04	4.14E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00

6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 90.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.44E-04	4.14E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 95.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.44E-04	4.13E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME100.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	3.43E-04	4.13E+01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

LIQUID PHASE CONCENTRATION
Alifatici C12-C16

Time (yr)	Concentration at source (mg/l)	Concentration at water Table (mg/l)
0.0	3.50E-04	0.00E+00
1.0	3.50E-04	0.00E+00
2.0	3.50E-04	0.00E+00
3.0	3.50E-04	0.00E+00
4.0	3.50E-04	0.00E+00
5.0	3.50E-04	0.00E+00
6.0	3.50E-04	0.00E+00
7.0	3.50E-04	0.00E+00
8.0	3.50E-04	0.00E+00
9.0	3.49E-04	0.00E+00
10.0	3.49E-04	0.00E+00
11.0	3.49E-04	0.00E+00
12.0	3.49E-04	0.00E+00
13.0	3.49E-04	0.00E+00
14.0	3.49E-04	0.00E+00
15.0	3.49E-04	0.00E+00
16.0	3.49E-04	0.00E+00
17.0	3.49E-04	0.00E+00
18.0	3.49E-04	0.00E+00
19.0	3.49E-04	0.00E+00
20.0	3.49E-04	0.00E+00
21.0	3.49E-04	0.00E+00
22.0	3.49E-04	0.00E+00
23.0	3.49E-04	0.00E+00
24.0	3.48E-04	0.00E+00
25.0	3.48E-04	0.00E+00
26.0	3.48E-04	0.00E+00
27.0	3.48E-04	0.00E+00
28.0	3.48E-04	0.00E+00
29.0	3.48E-04	0.00E+00
30.0	3.48E-04	0.00E+00
31.0	3.48E-04	0.00E+00
32.0	3.48E-04	0.00E+00
33.0	3.48E-04	0.00E+00
34.0	3.48E-04	0.00E+00
35.0	3.48E-04	0.00E+00
36.0	3.48E-04	0.00E+00
37.0	3.48E-04	0.00E+00
38.0	3.48E-04	0.00E+00
39.0	3.47E-04	0.00E+00
40.0	3.47E-04	0.00E+00
41.0	3.47E-04	0.00E+00
42.0	3.47E-04	0.00E+00
43.0	3.47E-04	0.00E+00
44.0	3.47E-04	0.00E+00
45.0	3.47E-04	0.00E+00
46.0	3.47E-04	0.00E+00
47.0	3.47E-04	0.00E+00
48.0	3.47E-04	0.00E+00
49.0	3.47E-04	0.00E+00
50.0	3.47E-04	0.00E+00
51.0	3.47E-04	0.00E+00
52.0	3.47E-04	0.00E+00
53.0	3.47E-04	0.00E+00
54.0	3.46E-04	0.00E+00
55.0	3.46E-04	0.00E+00
56.0	3.46E-04	0.00E+00
57.0	3.46E-04	0.00E+00
58.0	3.46E-04	0.00E+00
59.0	3.46E-04	0.00E+00
60.0	3.46E-04	0.00E+00
61.0	3.46E-04	0.00E+00
62.0	3.46E-04	0.00E+00
63.0	3.46E-04	0.00E+00

64.0	3.46E-04	0.00E+00
65.0	3.46E-04	0.00E+00
66.0	3.46E-04	0.00E+00
67.0	3.46E-04	0.00E+00
68.0	3.46E-04	0.00E+00
69.0	3.45E-04	0.00E+00
70.0	3.45E-04	0.00E+00
71.0	3.45E-04	0.00E+00
72.0	3.45E-04	0.00E+00
73.0	3.45E-04	0.00E+00
74.0	3.45E-04	0.00E+00
75.0	3.45E-04	0.00E+00
76.0	3.45E-04	0.00E+00
77.0	3.45E-04	0.00E+00
78.0	3.45E-04	0.00E+00
79.0	3.45E-04	0.00E+00
80.0	3.45E-04	0.00E+00
81.0	3.45E-04	0.00E+00
82.0	3.45E-04	0.00E+00
83.0	3.45E-04	0.00E+00
84.0	3.45E-04	0.00E+00
85.0	3.44E-04	0.00E+00
86.0	3.44E-04	0.00E+00
87.0	3.44E-04	0.00E+00
88.0	3.44E-04	0.00E+00
89.0	3.44E-04	0.00E+00
90.0	3.44E-04	0.00E+00
91.0	3.44E-04	0.00E+00
92.0	3.44E-04	0.00E+00
93.0	3.44E-04	0.00E+00
94.0	3.44E-04	0.00E+00
95.0	3.44E-04	0.00E+00
96.0	3.44E-04	0.00E+00
97.0	3.44E-04	0.00E+00
98.0	3.44E-04	0.00E+00
99.0	3.44E-04	0.00E+00
100.0	3.43E-04	0.00E+00

End of VADOSE ZONE MODEL OUTPUT

Start of GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Calculated height of GW source (linked) (m)..... 1.04E+02

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.86
Koc (m3/kg).....	5.01E+03
Foc (g/g).....	2.40E-02
Retardation coefficient.....	1.02E+06
Seepage velocity (m/d).....	4.30E-03
Retarded seepage velocity (m/d).....	4.21E-09

Dispersion Calculations in Saturated Zone

***All dispersivity values entered by user.

Longitudinal dispersivity entered (m).....	13.
Transverse dispersivity entered (m).....	4.4
Vertical dispersivity entered (m).....	5.02E-02

GROUNDWATER CONCENTRATION (annual average)
Alifatici C12-C16

The maximum groundwater concentration (mg/l): 0.00E+00
occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00
18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00
52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00

55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00
86.0	0.00E+00
87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of GROUNDWATER MODEL OUTPUT

SURFACE WATER MIXING ZONE MODEL

Inputs for Calculation of Length of Surface Water Reach
(Using Domenico for a steady-state estimate)

Distance to SW is	40.
Long. dispersivity	13.
Trans. dispersivity	4.4
Vert. dispersivity	5.02E-02
Width of source	1.24E+02
Height of source	1.04E+02
Deg. rate (1/s)	0.0
Effective porosity	0.20
Aquifer gradient	1.00E-03
Hydraulic conductivity	0.86

Seepage velocity 4.30E-03

From Domenico's Equation for a Steady-State
Solution along the Centerline of the Plume:
(x=distance to SW, y=0, z=0)

Term1 1.0
Term2 1.0
Term3 1.0

Concentration profile at x(m) = 40.00

Point	y(m)	C/Cmax
1	63.	0.0

Reached 10% of Cmax

The distance off the centerline of the plume is 63.
The length of the reach is (=2*y) 1.26E+02

Distance from GW source to SW (m).. 40.
Conductivity of SW bed [m/d]..... 10.
FOC in sediment [g/g]..... 1.00E-02
Depth of SW bed [m]..... 1.0
Length of reach [m]..... 1.26E+02
Gradient between GW and SW [m/m]..... 5.00E-02

Calculated GW Inflow to SW [m3/d].. 63.
Cross-sectional area of river [m2]. 2.0
Calculated SW volume [m3]..... 2.51E+02
Fraction of SW for mixing [-]..... 1.0
Adjusted SW volume [m3]..... 2.51E+02
SW flow rate [m3/d]..... 1.80E+02
Adjusted SW flow rate [m3/d]. 1.80E+02
Calculated total flow [m3]..... 2.43E+02
(sum of GW inflow and SW inflow)
Decay rate in SW [1/d]..... 0.0

SURFACE WATER CONCENTRATION
Alifatici C12-C16

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration Surface water (mg/l)	Concentration in Sediment (mg/kg)	Mass Flux from GW to SW (mg/d)
-----	-----	-----	-----
1.0	0.00E+00	0.00E+00	0.00E+00
2.0	0.00E+00	0.00E+00	0.00E+00
3.0	0.00E+00	0.00E+00	0.00E+00
4.0	0.00E+00	0.00E+00	0.00E+00
5.0	0.00E+00	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00	0.00E+00
7.0	0.00E+00	0.00E+00	0.00E+00
8.0	0.00E+00	0.00E+00	0.00E+00
9.0	0.00E+00	0.00E+00	0.00E+00
10.0	0.00E+00	0.00E+00	0.00E+00
11.0	0.00E+00	0.00E+00	0.00E+00
12.0	0.00E+00	0.00E+00	0.00E+00
13.0	0.00E+00	0.00E+00	0.00E+00
14.0	0.00E+00	0.00E+00	0.00E+00
15.0	0.00E+00	0.00E+00	0.00E+00
16.0	0.00E+00	0.00E+00	0.00E+00
17.0	0.00E+00	0.00E+00	0.00E+00
18.0	0.00E+00	0.00E+00	0.00E+00
19.0	0.00E+00	0.00E+00	0.00E+00

17

88.0	0.00E+00	0.00E+00	0.00E+00
89.0	0.00E+00	0.00E+00	0.00E+00
90.0	0.00E+00	0.00E+00	0.00E+00
91.0	0.00E+00	0.00E+00	0.00E+00
92.0	0.00E+00	0.00E+00	0.00E+00
93.0	0.00E+00	0.00E+00	0.00E+00
94.0	0.00E+00	0.00E+00	0.00E+00
95.0	0.00E+00	0.00E+00	0.00E+00
96.0	0.00E+00	0.00E+00	0.00E+00
97.0	0.00E+00	0.00E+00	0.00E+00
98.0	0.00E+00	0.00E+00	0.00E+00
99.0	0.00E+00	0.00E+00	0.00E+00
100.0	0.00E+00	0.00E+00	0.00E+00

"Rischio per le acque Superficiali derivante da Suolo Superficiale - Scenario 3" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Aromatici C11 - C22

Start of VADOSE ZONE MODEL OUTPUT

Effective Diffusion Coefficient for Vadose zone

Total thickness of subunit [cm].....	26.
Air-filled porosity [-].....	8.08E-02
Water-filled porosity [-].....	0.17
Total porosity [-].....	0.25
Effective diff. coeff. for subunit....[cm ² /s]	2.33E-04

Data Summary and Initial Calculations

Unsaturated Zone

Distance from ground surface to source...	1.00E-02	m
Thickness of source.....	1.0	m
Thickness of vadose zone.....	8.5	m
Infiltration rate (vDarcy).....	5.48E-04	m/d
Porosity in vadose zone.....	0.25	[-]
Moisture content in vadose zone.....	0.17	[-]
Soil bulk density.....	1.7	g/cm ³
Fraction organic carbon in soil.....	2.40E-02	g/g
Calculated pore water velocity.....	3.24E-03	m/d

Chemical-Specific Parameters

Solubility.....	5.8	mg/l
Henrys Law Coefficient.....	3.00E-02	[-]
Koc, organic carbon partition coeff.....	5.00E+03	ml/g

Calculating Dissolved Phase Source Concentration

Chemical solubility (from database).....	5.8	mg/l
Dissolved phase concentration calculated using equilibrium partitioning (3-phase).....	1.3	mg/l

***The lesser value of the (effective) solubility and the dissolved phase

***concentration calculated using equilibrium partitioning (see above)

will

***be used as the maximum concentration in the unsaturated zone

***model source.

Results from above calculation (limiting concentration):

Initial dissolved phase concentration.....	1.3	mg/l
Residual concentration level calculated using the full solubility.....	6.97E+02	mg/kg
***The source concentration is BELOW the residual concentration		

Source Decay Terms

Source total decay term--Beta.....	3.26E-06
Source loss term--liquids only [1/day].....	2.68E-06
Source loss term--vapor only [1/day].....	5.81E-07
Initial source vapor concentration [kg/m ³]	4.00E-05
Diffusion path length [m].....	0.51
Average vertical thickness of the source[m]	1.0

***Dispersion limited to dispmax:

6.66E-04

CUMULATIVE LOSSES (from the Unsaturated Zone)
Aromatici C11 - C22

Liq. Mass Lost Time From Source (yr) (kg) -----	Total Mass in Source (kg) -----	Mass Loading to Groundwater (kg) -----	Volatilization Losses (kg) -----
0.0	5.50E+03	0.00E+00	0.00E+00
0.00E+00			
1.0	5.49E+03	0.00E+00	1.16E+00
5.38E+00			
2.0	5.48E+03	0.00E+00	2.33E+00
1.08E+01			
3.0	5.48E+03	0.00E+00	3.49E+00
1.61E+01			
4.0	5.47E+03	0.00E+00	4.65E+00
2.15E+01			
5.0	5.47E+03	0.00E+00	5.81E+00
2.68E+01			
6.0	5.46E+03	0.00E+00	6.97E+00
3.22E+01			
7.0	5.45E+03	0.00E+00	8.12E+00
3.75E+01			
8.0	5.45E+03	0.00E+00	9.28E+00
4.29E+01			
9.0	5.44E+03	0.00E+00	1.04E+01
4.82E+01			
10.0	5.43E+03	0.00E+00	1.16E+01
5.35E+01			
11.0	5.43E+03	0.00E+00	1.27E+01
5.89E+01			
12.0	5.42E+03	0.00E+00	1.39E+01
6.42E+01			
13.0	5.41E+03	0.00E+00	1.50E+01
6.95E+01			
14.0	5.41E+03	0.00E+00	1.62E+01
7.48E+01			
15.0	5.40E+03	0.00E+00	1.73E+01
8.01E+01			
16.0	5.39E+03	0.00E+00	1.85E+01
8.53E+01			
17.0	5.39E+03	0.00E+00	1.96E+01
9.06E+01			
18.0	5.38E+03	0.00E+00	2.08E+01
9.59E+01			
19.0	5.37E+03	0.00E+00	2.19E+01
1.01E+02			
20.0	5.37E+03	0.00E+00	2.30E+01
1.06E+02			
21.0	5.36E+03	0.00E+00	2.42E+01
1.12E+02			
22.0	5.36E+03	0.00E+00	2.53E+01
1.17E+02			
23.0	5.35E+03	0.00E+00	2.64E+01
1.22E+02			
24.0	5.34E+03	0.00E+00	2.76E+01
1.27E+02			

25.0	5.34E+03	0.00E+00	2.87E+01
1.33E+02			
26.0	5.33E+03	0.00E+00	2.98E+01
1.38E+02			
27.0	5.32E+03	0.00E+00	3.10E+01
1.43E+02			
28.0	5.32E+03	0.00E+00	3.21E+01
1.48E+02			
29.0	5.31E+03	0.00E+00	3.32E+01
1.54E+02			
30.0	5.30E+03	0.00E+00	3.43E+01
1.59E+02			
31.0	5.30E+03	0.00E+00	3.55E+01
1.64E+02			
32.0	5.29E+03	0.00E+00	3.66E+01
1.69E+02			
33.0	5.29E+03	0.00E+00	3.77E+01
1.74E+02			
34.0	5.28E+03	0.00E+00	3.88E+01
1.79E+02			
35.0	5.27E+03	0.00E+00	4.00E+01
1.85E+02			
36.0	5.27E+03	0.00E+00	4.11E+01
1.90E+02			
37.0	5.26E+03	0.00E+00	4.22E+01
1.95E+02			
38.0	5.25E+03	0.00E+00	4.33E+01
2.00E+02			
39.0	5.25E+03	0.00E+00	4.44E+01
2.05E+02			
40.0	5.24E+03	0.00E+00	4.55E+01
2.10E+02			
41.0	5.24E+03	0.00E+00	4.66E+01
2.15E+02			
42.0	5.23E+03	0.00E+00	4.77E+01
2.21E+02			
43.0	5.22E+03	0.00E+00	4.89E+01
2.26E+02			
44.0	5.22E+03	0.00E+00	5.00E+01
2.31E+02			
45.0	5.21E+03	0.00E+00	5.11E+01
2.36E+02			
46.0	5.20E+03	0.00E+00	5.22E+01
2.41E+02			
47.0	5.20E+03	0.00E+00	5.33E+01
2.46E+02			
48.0	5.19E+03	0.00E+00	5.44E+01
2.51E+02			
49.0	5.19E+03	0.00E+00	5.55E+01
2.56E+02			
50.0	5.18E+03	0.00E+00	5.66E+01
2.61E+02			
51.0	5.17E+03	0.00E+00	5.77E+01
2.66E+02			
52.0	5.17E+03	0.00E+00	5.88E+01
2.72E+02			
53.0	5.16E+03	0.00E+00	5.99E+01
2.77E+02			
54.0	5.16E+03	0.00E+00	6.10E+01
2.82E+02			
55.0	5.15E+03	0.00E+00	6.20E+01
2.87E+02			
56.0	5.14E+03	0.00E+00	6.31E+01
2.92E+02			
57.0	5.14E+03	0.00E+00	6.42E+01
2.97E+02			
58.0	5.13E+03	0.00E+00	6.53E+01
3.02E+02			

59.0	5.12E+03	0.00E+00	6.64E+01
3.07E+02			
60.0	5.12E+03	0.00E+00	6.75E+01
3.12E+02			
61.0	5.11E+03	0.00E+00	6.86E+01
3.17E+02			
62.0	5.11E+03	0.00E+00	6.97E+01
3.22E+02			
63.0	5.10E+03	0.00E+00	7.07E+01
3.27E+02			
64.0	5.09E+03	0.00E+00	7.18E+01
3.32E+02			
65.0	5.09E+03	0.00E+00	7.29E+01
3.37E+02			
66.0	5.08E+03	0.00E+00	7.40E+01
3.42E+02			
67.0	5.08E+03	0.00E+00	7.51E+01
3.47E+02			
68.0	5.07E+03	0.00E+00	7.61E+01
3.52E+02			
69.0	5.06E+03	0.00E+00	7.72E+01
3.57E+02			
70.0	5.06E+03	0.00E+00	7.83E+01
3.62E+02			
71.0	5.05E+03	0.00E+00	7.93E+01
3.67E+02			
72.0	5.05E+03	0.00E+00	8.04E+01
3.72E+02			
73.0	5.04E+03	0.00E+00	8.15E+01
3.77E+02			
74.0	5.03E+03	0.00E+00	8.26E+01
3.81E+02			
75.0	5.03E+03	0.00E+00	8.36E+01
3.86E+02			
76.0	5.02E+03	0.00E+00	8.47E+01
3.91E+02			
77.0	5.02E+03	0.00E+00	8.57E+01
3.96E+02			
78.0	5.01E+03	0.00E+00	8.68E+01
4.01E+02			
79.0	5.00E+03	0.00E+00	8.79E+01
4.06E+02			
80.0	5.00E+03	0.00E+00	8.89E+01
4.11E+02			
81.0	4.99E+03	0.00E+00	9.00E+01
4.16E+02			
82.0	4.99E+03	0.00E+00	9.10E+01
4.21E+02			
83.0	4.98E+03	0.00E+00	9.21E+01
4.26E+02			
84.0	4.97E+03	0.00E+00	9.32E+01
4.30E+02			
85.0	4.97E+03	0.00E+00	9.42E+01
4.35E+02			
86.0	4.96E+03	0.00E+00	9.53E+01
4.40E+02			
87.0	4.96E+03	0.00E+00	9.63E+01
4.45E+02			
88.0	4.95E+03	0.00E+00	9.74E+01
4.50E+02			
89.0	4.94E+03	0.00E+00	9.84E+01
4.55E+02			
90.0	4.94E+03	0.00E+00	9.95E+01
4.60E+02			
91.0	4.93E+03	0.00E+00	1.01E+02
4.64E+02			
92.0	4.93E+03	0.00E+00	1.02E+02
4.69E+02			

93.0	4.92E+03	0.00E+00	1.03E+02
4.74E+02			
94.0	4.92E+03	0.00E+00	1.04E+02
4.79E+02			
95.0	4.91E+03	0.00E+00	1.05E+02
4.84E+02			
96.0	4.90E+03	0.00E+00	1.06E+02
4.89E+02			
97.0	4.90E+03	0.00E+00	1.07E+02
4.93E+02			
98.0	4.89E+03	0.00E+00	1.08E+02
4.98E+02			
99.0	4.89E+03	0.00E+00	1.09E+02
5.03E+02			
100.0	4.88E+03	0.00E+00	1.10E+02
5.08E+02			

VADOSE ZONE CONCENTRATION WITH DEPTH
Aromatici C11 - C22

TIME = 0.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.33E+00	1.60E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 1.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.33E+00	1.60E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 2.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.33E+00	1.60E+02
1.8	0.00E+00	0.00E+00

2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 3.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.33E+00	1.59E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 4.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.33E+00	1.59E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 5.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.32E+00	1.59E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 10.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	1.32E+00	1.58E+02

1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 15.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	1.31E+00	1.57E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 20.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	1.30E+00	1.56E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 25.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	1.29E+00	1.55E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 30.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration
-------	-------------------------------	-----------------------------

(m)	(mg/l)	Below Source (mg/kg)
1.0	1.29E+00	1.54E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 35.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.28E+00	1.53E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 40.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.27E+00	1.53E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 45.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.26E+00	1.52E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 50.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.26E+00	1.51E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 55.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.25E+00	1.50E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 60.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.24E+00	1.49E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 65.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.23E+00	1.48E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00

6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 70.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.23E+00	1.47E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 75.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.22E+00	1.46E+02
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 80.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.21E+00	1.45E+02
1.8	0.00E+00	0.00E+00
2.7	3.25E-71	3.90E-69
3.5	1.04E-74	1.24E-72
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 85.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.20E+00	1.45E+02
1.8	0.00E+00	0.00E+00
2.7	9.98E-67	1.20E-64

3.5	3.83E-70	4.61E-68
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 90.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.20E+00	1.44E+02
1.8	0.00E+00	0.00E+00
2.7	9.71E-63	1.17E-60
3.5	4.41E-66	5.30E-64
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 95.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.19E+00	1.43E+02
1.8	0.00E+00	0.00E+00
2.7	3.59E-59	4.32E-57
3.5	1.90E-62	2.28E-60
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME100.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	1.18E+00	1.42E+02
1.8	0.00E+00	0.00E+00
2.7	5.84E-56	7.01E-54
3.5	3.53E-59	4.24E-57
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

LIQUID PHASE CONCENTRATION
Aromatici C11 - C22

Time (yr)	Concentration at source (mg/l)	Concentration at water Table (mg/l)
0.0	1.33E+00	0.00E+00
1.0	1.33E+00	0.00E+00
2.0	1.33E+00	0.00E+00
3.0	1.33E+00	0.00E+00
4.0	1.33E+00	0.00E+00
5.0	1.33E+00	0.00E+00
6.0	1.32E+00	0.00E+00
7.0	1.32E+00	0.00E+00
8.0	1.32E+00	0.00E+00
9.0	1.32E+00	0.00E+00
10.0	1.32E+00	0.00E+00
11.0	1.32E+00	0.00E+00
12.0	1.31E+00	0.00E+00
13.0	1.31E+00	0.00E+00
14.0	1.31E+00	0.00E+00
15.0	1.31E+00	0.00E+00
16.0	1.31E+00	0.00E+00
17.0	1.31E+00	0.00E+00
18.0	1.30E+00	0.00E+00
19.0	1.30E+00	0.00E+00
20.0	1.30E+00	0.00E+00
21.0	1.30E+00	0.00E+00
22.0	1.30E+00	0.00E+00
23.0	1.30E+00	0.00E+00
24.0	1.30E+00	0.00E+00
25.0	1.29E+00	0.00E+00
26.0	1.29E+00	0.00E+00
27.0	1.29E+00	0.00E+00
28.0	1.29E+00	0.00E+00
29.0	1.29E+00	0.00E+00
30.0	1.29E+00	0.00E+00
31.0	1.28E+00	0.00E+00
32.0	1.28E+00	0.00E+00
33.0	1.28E+00	0.00E+00
34.0	1.28E+00	0.00E+00
35.0	1.28E+00	0.00E+00
36.0	1.28E+00	0.00E+00
37.0	1.28E+00	0.00E+00
38.0	1.27E+00	0.00E+00
39.0	1.27E+00	0.00E+00
40.0	1.27E+00	0.00E+00
41.0	1.27E+00	0.00E+00
42.0	1.27E+00	0.00E+00
43.0	1.27E+00	0.00E+00
44.0	1.26E+00	0.00E+00
45.0	1.26E+00	0.00E+00
46.0	1.26E+00	0.00E+00
47.0	1.26E+00	0.00E+00
48.0	1.26E+00	0.00E+00
49.0	1.26E+00	0.00E+00
50.0	1.26E+00	0.00E+00
51.0	1.25E+00	0.00E+00
52.0	1.25E+00	0.00E+00
53.0	1.25E+00	0.00E+00
54.0	1.25E+00	0.00E+00
55.0	1.25E+00	0.00E+00
56.0	1.25E+00	0.00E+00
57.0	1.25E+00	0.00E+00
58.0	1.24E+00	0.00E+00
59.0	1.24E+00	0.00E+00
60.0	1.24E+00	0.00E+00

61.0	1.24E+00	0.00E+00
62.0	1.24E+00	0.00E+00
63.0	1.24E+00	0.00E+00
64.0	1.24E+00	0.00E+00
65.0	1.23E+00	0.00E+00
66.0	1.23E+00	0.00E+00
67.0	1.23E+00	0.00E+00
68.0	1.23E+00	0.00E+00
69.0	1.23E+00	0.00E+00
70.0	1.23E+00	0.00E+00
71.0	1.22E+00	0.00E+00
72.0	1.22E+00	0.00E+00
73.0	1.22E+00	0.00E+00
74.0	1.22E+00	0.00E+00
75.0	1.22E+00	0.00E+00
76.0	1.22E+00	0.00E+00
77.0	1.22E+00	0.00E+00
78.0	1.21E+00	0.00E+00
79.0	1.21E+00	0.00E+00
80.0	1.21E+00	0.00E+00
81.0	1.21E+00	0.00E+00
82.0	1.21E+00	0.00E+00
83.0	1.21E+00	0.00E+00
84.0	1.21E+00	0.00E+00
85.0	1.20E+00	0.00E+00
86.0	1.20E+00	0.00E+00
87.0	1.20E+00	0.00E+00
88.0	1.20E+00	0.00E+00
89.0	1.20E+00	0.00E+00
90.0	1.20E+00	0.00E+00
91.0	1.20E+00	0.00E+00
92.0	1.19E+00	0.00E+00
93.0	1.19E+00	0.00E+00
94.0	1.19E+00	0.00E+00
95.0	1.19E+00	0.00E+00
96.0	1.19E+00	0.00E+00
97.0	1.19E+00	0.00E+00
98.0	1.19E+00	0.00E+00
99.0	1.18E+00	0.00E+00
100.0	1.18E+00	0.00E+00

End of VADOSE ZONE MODEL OUTPUT

Start of GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Calculated height of GW source (linked) (m)..... 1.04E+02

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.86
Koc (m3/kg).....	5.0
Foc (g/g).....	2.40E-02
Retardation coefficient.....	1.02E+03
Seepage velocity (m/d).....	4.30E-03
Retarded seepage velocity (m/d).....	4.21E-06

Dispersion Calculations in Saturated Zone

***All dispersivity values entered by user.

Longitudinal dispersivity entered (m)..... 13.
 Transverse dispersivity entered (m)..... 4.4
 Vertical dispersivity entered (m)..... 5.02E-02

GROUNDWATER CONCENTRATION (annual average)
 Aromatici C11 - C22

The maximum groundwater concentration (mg/l): 0.00E+00
 Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00
18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00

52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00
86.0	0.00E+00
87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of GROUNDWATER MODEL OUTPUT

SURFACE WATER MIXING ZONE MODEL

Inputs for Calculation of Length of Surface Water Reach
(Using Domenico for a steady-state estimate)

Distance to SW is	40.
Long. dispersivity	13.
Trans. dispersivity	4.4
Vert. dispersivity	5.02E-02
Width of source	1.24E+02
Height of source	1.04E+02
Deg. rate (1/s)	0.0

Effective porosity	0.20
Aquifer gradient	1.00E-03
Hydraulic conductivity	0.86
Seepage velocity	4.30E-03

From Domenico's Equation for a Steady-State
Solution along the Centerline of the Plume:
(x=distance to SW, y=0, z=0)

Term1	1.0
Term2	1.0
Term3	1.0

Concentration profile at x(m) = 40.00

Point	y(m)	C/Cmax
1	63.	0.0

Reached 10% of Cmax

The distance off the centerline of the plume is 63.
The length of the reach is (=2*y) 1.26E+02

Distance from GW source to SW (m).. 40.
 Conductivity of SW bed [m/d]..... 10.
 FOC in sediment [g/g]..... 1.00E-02
 Depth of SW bed [m]..... 1.0
 Length of reach [m]..... 1.26E+02
 Gradient between GW and SW [m/m]..... 5.00E-02

Calculated GW Inflow to SW [m3/d].. 63.
 Cross-sectional area of river [m2]. 2.0
 Calculated SW volume [m3]..... 2.51E+02
 Fraction of SW for mixing [-]..... 1.0
 Adjusted SW volume [m3]..... 2.51E+02
 SW flow rate [m3/d]..... 1.80E+02
 Adjusted SW flow rate [m3/d]. 1.80E+02
 Calculated total flow [m3]..... 2.43E+02
 (sum of GW inflow and SW inflow)
 Decay rate in SW [1/d]..... 0.0

SURFACE WATER CONCENTRATION Aromatici C11 - C22

The maximum groundwater concentration (mg/l): 0.00E+00
 Occurred at year: 0.0

Time (yr)	Concentration Surface water (mg/l)	Concentration in Sediment (mg/kg)	Mass Flux from GW to SW (mg/d)
1.0	0.00E+00	0.00E+00	0.00E+00
2.0	0.00E+00	0.00E+00	0.00E+00
3.0	0.00E+00	0.00E+00	0.00E+00
4.0	0.00E+00	0.00E+00	0.00E+00
5.0	0.00E+00	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00	0.00E+00
7.0	0.00E+00	0.00E+00	0.00E+00
8.0	0.00E+00	0.00E+00	0.00E+00
9.0	0.00E+00	0.00E+00	0.00E+00
10.0	0.00E+00	0.00E+00	0.00E+00
11.0	0.00E+00	0.00E+00	0.00E+00
12.0	0.00E+00	0.00E+00	0.00E+00
13.0	0.00E+00	0.00E+00	0.00E+00
14.0	0.00E+00	0.00E+00	0.00E+00
15.0	0.00E+00	0.00E+00	0.00E+00
16.0	0.00E+00	0.00E+00	0.00E+00

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85.0	0.00E+00	0.00E+00	0.00E+00
86.0	0.00E+00	0.00E+00	0.00E+00
87.0	0.00E+00	0.00E+00	0.00E+00
88.0	0.00E+00	0.00E+00	0.00E+00
89.0	0.00E+00	0.00E+00	0.00E+00
90.0	0.00E+00	0.00E+00	0.00E+00
91.0	0.00E+00	0.00E+00	0.00E+00
92.0	0.00E+00	0.00E+00	0.00E+00
93.0	0.00E+00	0.00E+00	0.00E+00
94.0	0.00E+00	0.00E+00	0.00E+00
95.0	0.00E+00	0.00E+00	0.00E+00
96.0	0.00E+00	0.00E+00	0.00E+00
97.0	0.00E+00	0.00E+00	0.00E+00
98.0	0.00E+00	0.00E+00	0.00E+00
99.0	0.00E+00	0.00E+00	0.00E+00
100.0	0.00E+00	0.00E+00	0.00E+00

"Rischio per le acque Superficiali derivante da Suolo Superficiale - Scenario 3" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Cobalto

Start of VADOSE ZONE MODEL OUTPUT

Effective Diffusion Coefficient for Vadose zone

Total thickness of subunit [cm].....	1.0
Air-filled porosity [-].....	8.08E-02
Water-filled porosity [-].....	0.17
Total porosity [-].....	0.25
Effective diff. coeff. for subunit....[cm ² /s]	1.00E-20
***Diffusion coeff. in air and water = 0.	
Effective diffusion coefficient set to 1E-20	

Data Summary and Initial Calculations

Unsaturated Zone

Distance from ground surface to source...	1.00E-02	m
Thickness of source.....	1.0	m
Thickness of vadose zone.....	8.5	m
Infiltration rate (vDarcy).....	5.48E-04	m/d
Porosity in vadose zone.....	0.25	[-]
Moisture content in vadose zone.....	0.17	[-]
Soil bulk density.....	1.7	g/cm ³
Fraction organic carbon in soil.....	1.0	g/g
Calculated pore water velocity.....	3.24E-03	m/d

Chemical-Specific Parameters

Solubility.....	8.75E+04	mg/l
Henrys Law Coefficient.....	0.0	[-]
Koc, organic carbon partition coeff.....	2.04E+03	ml/g

Calculating Dissolved Phase Source Concentration

Chemical solubility (from database).....	8.75E+04	mg/l
Dissolved phase concentration calculated using equilibrium partitioning (3-phase).....	9.80E-03	mg/l

***The lesser value of the (effective) solubility and the dissolved phase

***concentration calculated using equilibrium partitioning (see above)

will

***be used as the maximum concentration in the unsaturated zone

***model source.

Results from above calculation (limiting concentration):

Initial dissolved phase concentration.....	9.80E-03	mg/l
Residual concentration level calculated using the full solubility.....	1.79E+08	mg/kg
***The source concentration is BELOW the residual concentration		

Source Decay Terms

Source total decay term--Beta.....	1.58E-07
Source loss term--liquids only [1/day].....	1.58E-07
Source loss term--vapor only [1/day].....	0.0
Initial source vapor concentration [kg/m ³]	0.0

Diffusion path length [m].....	0.51
Average vertical thickness of the source[m]	1.0

CUMULATIVE LOSSES (from the Unsaturated Zone)
Cobalto

Liq. Mass Lost Time From Source (yr) (kg)	Total Mass in Source (kg)	Mass Loading to Groundwater (kg)	Volatilization Losses (kg)
-----	-----	-----	-----
0.0	6.87E+02	0.00E+00	0.00E+00
0.00E+00			
1.0	6.87E+02	0.00E+00	0.00E+00
3.96E-02			
2.0	6.87E+02	0.00E+00	0.00E+00
7.93E-02			
3.0	6.87E+02	0.00E+00	0.00E+00
1.19E-01			
4.0	6.87E+02	0.00E+00	0.00E+00
1.58E-01			
5.0	6.87E+02	0.00E+00	0.00E+00
1.98E-01			
6.0	6.87E+02	0.00E+00	0.00E+00
2.38E-01			
7.0	6.87E+02	0.00E+00	0.00E+00
2.77E-01			
8.0	6.87E+02	0.00E+00	0.00E+00
3.17E-01			
9.0	6.87E+02	0.00E+00	0.00E+00
3.57E-01			
10.0	6.87E+02	0.00E+00	0.00E+00
3.96E-01			
11.0	6.87E+02	0.00E+00	0.00E+00
4.36E-01			
12.0	6.87E+02	0.00E+00	0.00E+00
4.75E-01			
13.0	6.87E+02	0.00E+00	0.00E+00
5.15E-01			
14.0	6.87E+02	0.00E+00	0.00E+00
5.55E-01			
15.0	6.87E+02	0.00E+00	0.00E+00
5.94E-01			
16.0	6.87E+02	0.00E+00	0.00E+00
6.34E-01			
17.0	6.87E+02	0.00E+00	0.00E+00
6.73E-01			
18.0	6.86E+02	0.00E+00	0.00E+00
7.13E-01			
19.0	6.86E+02	0.00E+00	0.00E+00
7.53E-01			
20.0	6.86E+02	0.00E+00	0.00E+00
7.92E-01			
21.0	6.86E+02	0.00E+00	0.00E+00
8.32E-01			
22.0	6.86E+02	0.00E+00	0.00E+00
8.71E-01			
23.0	6.86E+02	0.00E+00	0.00E+00
9.11E-01			
24.0	6.86E+02	0.00E+00	0.00E+00
9.50E-01			

25.0	6.86E+02	0.00E+00	0.00E+00
9.90E-01			
26.0	6.86E+02	0.00E+00	0.00E+00
1.03E+00			
27.0	6.86E+02	0.00E+00	0.00E+00
1.07E+00			
28.0	6.86E+02	0.00E+00	0.00E+00
1.11E+00			
29.0	6.86E+02	0.00E+00	0.00E+00
1.15E+00			
30.0	6.86E+02	0.00E+00	0.00E+00
1.19E+00			
31.0	6.86E+02	0.00E+00	0.00E+00
1.23E+00			
32.0	6.86E+02	0.00E+00	0.00E+00
1.27E+00			
33.0	6.86E+02	0.00E+00	0.00E+00
1.31E+00			
34.0	6.86E+02	0.00E+00	0.00E+00
1.35E+00			
35.0	6.86E+02	0.00E+00	0.00E+00
1.39E+00			
36.0	6.86E+02	0.00E+00	0.00E+00
1.43E+00			
37.0	6.86E+02	0.00E+00	0.00E+00
1.46E+00			
38.0	6.86E+02	0.00E+00	0.00E+00
1.50E+00			
39.0	6.86E+02	0.00E+00	0.00E+00
1.54E+00			
40.0	6.86E+02	0.00E+00	0.00E+00
1.58E+00			
41.0	6.86E+02	0.00E+00	0.00E+00
1.62E+00			
42.0	6.86E+02	0.00E+00	0.00E+00
1.66E+00			
43.0	6.86E+02	0.00E+00	0.00E+00
1.70E+00			
44.0	6.85E+02	0.00E+00	0.00E+00
1.74E+00			
45.0	6.85E+02	0.00E+00	0.00E+00
1.78E+00			
46.0	6.85E+02	0.00E+00	0.00E+00
1.82E+00			
47.0	6.85E+02	0.00E+00	0.00E+00
1.86E+00			
48.0	6.85E+02	0.00E+00	0.00E+00
1.90E+00			
49.0	6.85E+02	0.00E+00	0.00E+00
1.94E+00			
50.0	6.85E+02	0.00E+00	0.00E+00
1.98E+00			
51.0	6.85E+02	0.00E+00	0.00E+00
2.02E+00			
52.0	6.85E+02	0.00E+00	0.00E+00
2.06E+00			
53.0	6.85E+02	0.00E+00	0.00E+00
2.10E+00			
54.0	6.85E+02	0.00E+00	0.00E+00
2.14E+00			
55.0	6.85E+02	0.00E+00	0.00E+00
2.18E+00			
56.0	6.85E+02	0.00E+00	0.00E+00
2.22E+00			
57.0	6.85E+02	0.00E+00	0.00E+00
2.26E+00			
58.0	6.85E+02	0.00E+00	0.00E+00
2.29E+00			

59.0	6.85E+02	0.00E+00	0.00E+00
2.33E+00			
60.0	6.85E+02	0.00E+00	0.00E+00
2.37E+00			
61.0	6.85E+02	0.00E+00	0.00E+00
2.41E+00			
62.0	6.85E+02	0.00E+00	0.00E+00
2.45E+00			
63.0	6.85E+02	0.00E+00	0.00E+00
2.49E+00			
64.0	6.85E+02	0.00E+00	0.00E+00
2.53E+00			
65.0	6.85E+02	0.00E+00	0.00E+00
2.57E+00			
66.0	6.85E+02	0.00E+00	0.00E+00
2.61E+00			
67.0	6.85E+02	0.00E+00	0.00E+00
2.65E+00			
68.0	6.85E+02	0.00E+00	0.00E+00
2.69E+00			
69.0	6.84E+02	0.00E+00	0.00E+00
2.73E+00			
70.0	6.84E+02	0.00E+00	0.00E+00
2.77E+00			
71.0	6.84E+02	0.00E+00	0.00E+00
2.81E+00			
72.0	6.84E+02	0.00E+00	0.00E+00
2.85E+00			
73.0	6.84E+02	0.00E+00	0.00E+00
2.89E+00			
74.0	6.84E+02	0.00E+00	0.00E+00
2.93E+00			
75.0	6.84E+02	0.00E+00	0.00E+00
2.97E+00			
76.0	6.84E+02	0.00E+00	0.00E+00
3.01E+00			
77.0	6.84E+02	0.00E+00	0.00E+00
3.04E+00			
78.0	6.84E+02	0.00E+00	0.00E+00
3.08E+00			
79.0	6.84E+02	0.00E+00	0.00E+00
3.12E+00			
80.0	6.84E+02	0.00E+00	0.00E+00
3.16E+00			
81.0	6.84E+02	0.00E+00	0.00E+00
3.20E+00			
82.0	6.84E+02	0.00E+00	0.00E+00
3.24E+00			
83.0	6.84E+02	0.00E+00	0.00E+00
3.28E+00			
84.0	6.84E+02	0.00E+00	0.00E+00
3.32E+00			
85.0	6.84E+02	0.00E+00	0.00E+00
3.36E+00			
86.0	6.84E+02	0.00E+00	0.00E+00
3.40E+00			
87.0	6.84E+02	0.00E+00	0.00E+00
3.44E+00			
88.0	6.84E+02	0.00E+00	0.00E+00
3.48E+00			
89.0	6.84E+02	0.00E+00	0.00E+00
3.52E+00			
90.0	6.84E+02	0.00E+00	0.00E+00
3.56E+00			
91.0	6.84E+02	0.00E+00	0.00E+00
3.60E+00			
92.0	6.84E+02	0.00E+00	0.00E+00
3.64E+00			

93.0	6.84E+02	0.00E+00	0.00E+00
3.68E+00			
94.0	6.83E+02	0.00E+00	0.00E+00
3.72E+00			
95.0	6.83E+02	0.00E+00	0.00E+00
3.75E+00			
96.0	6.83E+02	0.00E+00	0.00E+00
3.79E+00			
97.0	6.83E+02	0.00E+00	0.00E+00
3.83E+00			
98.0	6.83E+02	0.00E+00	0.00E+00
3.87E+00			
99.0	6.83E+02	0.00E+00	0.00E+00
3.91E+00			
100.0	6.83E+02	0.00E+00	0.00E+00
3.95E+00			

VADOSE ZONE CONCENTRATION WITH DEPTH
Cobalto

TIME = 0.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 1.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 2.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01
1.8	0.00E+00	0.00E+00

2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 3.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 4.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 5.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 10.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	9.80E-03	4.81E-01

1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 15.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.79E-03	4.81E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 20.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.79E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 25.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.79E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 30.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration
-------	-------------------------------	-----------------------------

(m)	(mg/l)	Below Source (mg/kg)
1.0	9.79E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 35.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.78E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 40.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.78E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 45.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.78E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 50.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.78E-03	4.80E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 55.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.77E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 60.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.77E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 65.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.77E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00

6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 70.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.76E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 75.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.76E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 80.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.76E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 85.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	9.76E-03	4.79E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00

3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 90.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.75E-03	4.78E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 95.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.75E-03	4.78E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME100.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	9.75E-03	4.78E-01
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

LIQUID PHASE CONCENTRATION
Cobalto

Time (yr)	Concentration at source (mg/l)	Concentration at water Table (mg/l)
0.0	9.80E-03	0.00E+00
1.0	9.80E-03	0.00E+00
2.0	9.80E-03	0.00E+00
3.0	9.80E-03	0.00E+00
4.0	9.80E-03	0.00E+00
5.0	9.80E-03	0.00E+00
6.0	9.80E-03	0.00E+00
7.0	9.80E-03	0.00E+00
8.0	9.80E-03	0.00E+00
9.0	9.80E-03	0.00E+00
10.0	9.80E-03	0.00E+00
11.0	9.80E-03	0.00E+00
12.0	9.80E-03	0.00E+00
13.0	9.80E-03	0.00E+00
14.0	9.80E-03	0.00E+00
15.0	9.80E-03	0.00E+00
16.0	9.79E-03	0.00E+00
17.0	9.79E-03	0.00E+00
18.0	9.79E-03	0.00E+00
19.0	9.79E-03	0.00E+00
20.0	9.79E-03	0.00E+00
21.0	9.79E-03	0.00E+00
22.0	9.79E-03	0.00E+00
23.0	9.79E-03	0.00E+00
24.0	9.79E-03	0.00E+00
25.0	9.79E-03	0.00E+00
26.0	9.79E-03	0.00E+00
27.0	9.79E-03	0.00E+00
28.0	9.79E-03	0.00E+00
29.0	9.79E-03	0.00E+00
30.0	9.79E-03	0.00E+00
31.0	9.79E-03	0.00E+00
32.0	9.79E-03	0.00E+00
33.0	9.79E-03	0.00E+00
34.0	9.78E-03	0.00E+00
35.0	9.78E-03	0.00E+00
36.0	9.78E-03	0.00E+00
37.0	9.78E-03	0.00E+00
38.0	9.78E-03	0.00E+00
39.0	9.78E-03	0.00E+00
40.0	9.78E-03	0.00E+00
41.0	9.78E-03	0.00E+00
42.0	9.78E-03	0.00E+00
43.0	9.78E-03	0.00E+00
44.0	9.78E-03	0.00E+00
45.0	9.78E-03	0.00E+00
46.0	9.78E-03	0.00E+00
47.0	9.78E-03	0.00E+00
48.0	9.78E-03	0.00E+00
49.0	9.78E-03	0.00E+00
50.0	9.78E-03	0.00E+00
51.0	9.77E-03	0.00E+00
52.0	9.77E-03	0.00E+00
53.0	9.77E-03	0.00E+00
54.0	9.77E-03	0.00E+00
55.0	9.77E-03	0.00E+00
56.0	9.77E-03	0.00E+00
57.0	9.77E-03	0.00E+00
58.0	9.77E-03	0.00E+00
59.0	9.77E-03	0.00E+00
60.0	9.77E-03	0.00E+00

61.0	9.77E-03	0.00E+00
62.0	9.77E-03	0.00E+00
63.0	9.77E-03	0.00E+00
64.0	9.77E-03	0.00E+00
65.0	9.77E-03	0.00E+00
66.0	9.77E-03	0.00E+00
67.0	9.77E-03	0.00E+00
68.0	9.77E-03	0.00E+00
69.0	9.76E-03	0.00E+00
70.0	9.76E-03	0.00E+00
71.0	9.76E-03	0.00E+00
72.0	9.76E-03	0.00E+00
73.0	9.76E-03	0.00E+00
74.0	9.76E-03	0.00E+00
75.0	9.76E-03	0.00E+00
76.0	9.76E-03	0.00E+00
77.0	9.76E-03	0.00E+00
78.0	9.76E-03	0.00E+00
79.0	9.76E-03	0.00E+00
80.0	9.76E-03	0.00E+00
81.0	9.76E-03	0.00E+00
82.0	9.76E-03	0.00E+00
83.0	9.76E-03	0.00E+00
84.0	9.76E-03	0.00E+00
85.0	9.76E-03	0.00E+00
86.0	9.76E-03	0.00E+00
87.0	9.75E-03	0.00E+00
88.0	9.75E-03	0.00E+00
89.0	9.75E-03	0.00E+00
90.0	9.75E-03	0.00E+00
91.0	9.75E-03	0.00E+00
92.0	9.75E-03	0.00E+00
93.0	9.75E-03	0.00E+00
94.0	9.75E-03	0.00E+00
95.0	9.75E-03	0.00E+00
96.0	9.75E-03	0.00E+00
97.0	9.75E-03	0.00E+00
98.0	9.75E-03	0.00E+00
99.0	9.75E-03	0.00E+00
100.0	9.75E-03	0.00E+00

End of VADOSE ZONE MODEL OUTPUT

Start of GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Calculated height of GW source (linked) (m)..... 1.04E+02

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.86
Kd (m3/kg).....	2.0
Retardation coefficient.....	1.73E+04
Seepage velocity (m/d).....	4.30E-03
Retarded seepage velocity (m/d).....	2.48E-07

Dispersion calculations in Saturated Zone

Distance used for dispersion calculations (m).....	1.22E+02
Distance = (Dist. to well) + (Source Length)/2	
Calculated longitudinal dispersivity (m).....	13.
Calculated transverse dispersivity (m).....	4.4
Calculated vertical dispersivity (m).....	5.02E-02

GROUNDWATER CONCENTRATION (annual average)
Cobalto

The maximum groundwater concentration (mg/l): 0.00E+00
 Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00
18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00

52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00
86.0	0.00E+00
87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of GROUNDWATER MODEL OUTPUT

SURFACE WATER MIXING ZONE MODEL

Inputs for Calculation of Length of Surface Water Reach
(Using Domenico for a steady-state estimate)

Distance to SW is	40.
Long. dispersivity	13.
Trans. dispersivity	4.4
Vert. dispersivity	5.02E-02
width of source	1.24E+02
Height of source	1.04E+02
Deg. rate (1/s)	0.0

Effective porosity	0.20
Aquifer gradient	1.00E-03
Hydraulic conductivity	0.86
Seepage velocity	4.30E-03

From Domenico's Equation for a Steady-State
Solution along the Centerline of the Plume:
(x=distance to SW, y=0, z=0)

Term1	1.0
Term2	1.0
Term3	1.0

Concentration profile at x(m) = 40.00

Point	y(m)	C/Cmax
1	63.	0.0

Reached 10% of Cmax

The distance off the centerline of the plume is	63.
The length of the reach is (=2*y)	1.26E+02

Distance from GW source to SW (m) ..	40.
Conductivity of SW bed [m/d]	10.
Kd in sediment [L/kg]	2.04E+03
Depth of SW bed [m]	1.0
Length of reach [m]	1.26E+02
Gradient between GW and SW [m/m]	5.00E-02

Calculated GW Inflow to SW [m3/d] ..	63.
Cross-sectional area of river [m2] ..	2.0
Calculated SW volume [m3]	2.51E+02
Fraction of SW for mixing [-]	1.0
Adjusted SW volume [m3]	2.51E+02
SW flow rate [m3/d]	1.80E+02
Adjusted SW flow rate [m3/d]	1.80E+02
Calculated total flow [m3]	2.43E+02
(sum of GW inflow and SW inflow)	
Decay rate in SW [1/d]	0.0

SURFACE WATER CONCENTRATION
Cobalto

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration Surface water (mg/l)	Concentration in Sediment (mg/kg)	Mass Flux from GW to SW (mg/d)
1.0	0.00E+00	0.00E+00	0.00E+00
2.0	0.00E+00	0.00E+00	0.00E+00
3.0	0.00E+00	0.00E+00	0.00E+00
4.0	0.00E+00	0.00E+00	0.00E+00
5.0	0.00E+00	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00	0.00E+00
7.0	0.00E+00	0.00E+00	0.00E+00
8.0	0.00E+00	0.00E+00	0.00E+00
9.0	0.00E+00	0.00E+00	0.00E+00
10.0	0.00E+00	0.00E+00	0.00E+00
11.0	0.00E+00	0.00E+00	0.00E+00
12.0	0.00E+00	0.00E+00	0.00E+00
13.0	0.00E+00	0.00E+00	0.00E+00
14.0	0.00E+00	0.00E+00	0.00E+00
15.0	0.00E+00	0.00E+00	0.00E+00
16.0	0.00E+00	0.00E+00	0.00E+00

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85.0	0.00E+00	0.00E+00	0.00E+00
86.0	0.00E+00	0.00E+00	0.00E+00
87.0	0.00E+00	0.00E+00	0.00E+00
88.0	0.00E+00	0.00E+00	0.00E+00
89.0	0.00E+00	0.00E+00	0.00E+00
90.0	0.00E+00	0.00E+00	0.00E+00
91.0	0.00E+00	0.00E+00	0.00E+00
92.0	0.00E+00	0.00E+00	0.00E+00
93.0	0.00E+00	0.00E+00	0.00E+00
94.0	0.00E+00	0.00E+00	0.00E+00
95.0	0.00E+00	0.00E+00	0.00E+00
96.0	0.00E+00	0.00E+00	0.00E+00
97.0	0.00E+00	0.00E+00	0.00E+00
98.0	0.00E+00	0.00E+00	0.00E+00
99.0	0.00E+00	0.00E+00	0.00E+00
100.0	0.00E+00	0.00E+00	0.00E+00

"Rischio per le acque Superficiali derivante da Suolo Superficiale - Scenario 3" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Piombo

Start of VADOSE ZONE MODEL OUTPUT

Effective Diffusion Coefficient for Vadose zone

Total thickness of subunit [cm].....	26.
Air-filled porosity [-].....	8.08E-02
Water-filled porosity [-].....	0.17
Total porosity [-].....	0.25
Effective diff. coeff. for subunit....[cm ² /s]	1.00E-20
***Diffusion coeff. in air and water = 0.	
Effective diffusion coefficient set to 1E-20	

Data Summary and Initial Calculations

Unsaturated Zone

Distance from ground surface to source...	1.00E-02	m
Thickness of source.....	1.0	m
Thickness of vadose zone.....	8.5	m
Infiltration rate (vDarcy).....	5.48E-04	m/d
Porosity in vadose zone.....	0.25	[-]
Moisture content in vadose zone.....	0.17	[-]
Soil bulk density.....	1.7	g/cm ³
Fraction organic carbon in soil.....	1.0	g/g
Calculated pore water velocity.....	3.24E-03	m/d

Chemical-Specific Parameters

Solubility.....	9.58E+03	mg/l
Henrys Law Coefficient.....	0.0	[-]
Koc, organic carbon partition coeff.....	6.68E+03	ml/g

Calculating Dissolved Phase Source Concentration

Chemical solubility (from database).....	9.58E+03	mg/l
Dissolved phase concentration calculated using equilibrium partitioning (3-phase).....	2.10E-02	mg/l

***The lesser value of the (effective) solubility and the dissolved phase

***concentration calculated using equilibrium partitioning (see above)

will

***be used as the maximum concentration in the unsaturated zone

***model source.

Results from above calculation (limiting concentration):

Initial dissolved phase concentration.....	2.10E-02	mg/l
Residual concentration level calculated using the full solubility.....	6.39E+07	mg/kg
***The source concentration is BELOW the residual concentration		

Source Decay Terms

Source total decay term--Beta.....	4.83E-08
Source loss term--liquids only [1/day].....	4.83E-08
Source loss term--vapor only [1/day].....	0.0
Initial source vapor concentration [kg/m ³]	0.0

Diffusion path length [m].....	0.51
Average vertical thickness of the source[m]	1.0

CUMULATIVE LOSSES (from the Unsaturated Zone)
Piombo

Liq. Mass Lost Time From Source (yr) (kg) -----	Total Mass in Source (kg) -----	Mass Loading to Groundwater (kg) -----	Volatilization Losses (kg) -----
0.0	4.81E+03	0.00E+00	0.00E+00
0.00E+00			
1.0	4.81E+03	0.00E+00	0.00E+00
8.48E-02			
2.0	4.81E+03	0.00E+00	0.00E+00
1.70E-01			
3.0	4.81E+03	0.00E+00	0.00E+00
2.54E-01			
4.0	4.81E+03	0.00E+00	0.00E+00
3.39E-01			
5.0	4.81E+03	0.00E+00	0.00E+00
4.24E-01			
6.0	4.81E+03	0.00E+00	0.00E+00
5.09E-01			
7.0	4.81E+03	0.00E+00	0.00E+00
5.93E-01			
8.0	4.81E+03	0.00E+00	0.00E+00
6.78E-01			
9.0	4.81E+03	0.00E+00	0.00E+00
7.63E-01			
10.0	4.81E+03	0.00E+00	0.00E+00
8.48E-01			
11.0	4.81E+03	0.00E+00	0.00E+00
9.33E-01			
12.0	4.81E+03	0.00E+00	0.00E+00
1.02E+00			
13.0	4.81E+03	0.00E+00	0.00E+00
1.10E+00			
14.0	4.81E+03	0.00E+00	0.00E+00
1.19E+00			
15.0	4.81E+03	0.00E+00	0.00E+00
1.27E+00			
16.0	4.81E+03	0.00E+00	0.00E+00
1.36E+00			
17.0	4.81E+03	0.00E+00	0.00E+00
1.44E+00			
18.0	4.81E+03	0.00E+00	0.00E+00
1.53E+00			
19.0	4.81E+03	0.00E+00	0.00E+00
1.61E+00			
20.0	4.81E+03	0.00E+00	0.00E+00
1.70E+00			
21.0	4.81E+03	0.00E+00	0.00E+00
1.78E+00			
22.0	4.81E+03	0.00E+00	0.00E+00
1.86E+00			
23.0	4.81E+03	0.00E+00	0.00E+00
1.95E+00			
24.0	4.81E+03	0.00E+00	0.00E+00
2.03E+00			

25.0	4.81E+03	0.00E+00	0.00E+00
2.12E+00			
26.0	4.81E+03	0.00E+00	0.00E+00
2.20E+00			
27.0	4.81E+03	0.00E+00	0.00E+00
2.29E+00			
28.0	4.81E+03	0.00E+00	0.00E+00
2.37E+00			
29.0	4.81E+03	0.00E+00	0.00E+00
2.46E+00			
30.0	4.81E+03	0.00E+00	0.00E+00
2.54E+00			
31.0	4.81E+03	0.00E+00	0.00E+00
2.63E+00			
32.0	4.81E+03	0.00E+00	0.00E+00
2.71E+00			
33.0	4.81E+03	0.00E+00	0.00E+00
2.80E+00			
34.0	4.81E+03	0.00E+00	0.00E+00
2.88E+00			
35.0	4.81E+03	0.00E+00	0.00E+00
2.97E+00			
36.0	4.81E+03	0.00E+00	0.00E+00
3.05E+00			
37.0	4.81E+03	0.00E+00	0.00E+00
3.14E+00			
38.0	4.81E+03	0.00E+00	0.00E+00
3.22E+00			
39.0	4.81E+03	0.00E+00	0.00E+00
3.31E+00			
40.0	4.81E+03	0.00E+00	0.00E+00
3.39E+00			
41.0	4.81E+03	0.00E+00	0.00E+00
3.47E+00			
42.0	4.81E+03	0.00E+00	0.00E+00
3.56E+00			
43.0	4.81E+03	0.00E+00	0.00E+00
3.64E+00			
44.0	4.81E+03	0.00E+00	0.00E+00
3.73E+00			
45.0	4.81E+03	0.00E+00	0.00E+00
3.81E+00			
46.0	4.81E+03	0.00E+00	0.00E+00
3.90E+00			
47.0	4.81E+03	0.00E+00	0.00E+00
3.98E+00			
48.0	4.81E+03	0.00E+00	0.00E+00
4.07E+00			
49.0	4.81E+03	0.00E+00	0.00E+00
4.15E+00			
50.0	4.81E+03	0.00E+00	0.00E+00
4.24E+00			
51.0	4.81E+03	0.00E+00	0.00E+00
4.32E+00			
52.0	4.81E+03	0.00E+00	0.00E+00
4.41E+00			
53.0	4.81E+03	0.00E+00	0.00E+00
4.49E+00			
54.0	4.81E+03	0.00E+00	0.00E+00
4.58E+00			
55.0	4.81E+03	0.00E+00	0.00E+00
4.66E+00			
56.0	4.81E+03	0.00E+00	0.00E+00
4.75E+00			
57.0	4.81E+03	0.00E+00	0.00E+00
4.83E+00			
58.0	4.81E+03	0.00E+00	0.00E+00
4.91E+00			

59.0	4.81E+03	0.00E+00	0.00E+00
5.00E+00			
60.0	4.81E+03	0.00E+00	0.00E+00
5.08E+00			
61.0	4.81E+03	0.00E+00	0.00E+00
5.17E+00			
62.0	4.81E+03	0.00E+00	0.00E+00
5.25E+00			
63.0	4.81E+03	0.00E+00	0.00E+00
5.34E+00			
64.0	4.81E+03	0.00E+00	0.00E+00
5.42E+00			
65.0	4.80E+03	0.00E+00	0.00E+00
5.51E+00			
66.0	4.80E+03	0.00E+00	0.00E+00
5.59E+00			
67.0	4.80E+03	0.00E+00	0.00E+00
5.68E+00			
68.0	4.80E+03	0.00E+00	0.00E+00
5.76E+00			
69.0	4.80E+03	0.00E+00	0.00E+00
5.85E+00			
70.0	4.80E+03	0.00E+00	0.00E+00
5.93E+00			
71.0	4.80E+03	0.00E+00	0.00E+00
6.02E+00			
72.0	4.80E+03	0.00E+00	0.00E+00
6.10E+00			
73.0	4.80E+03	0.00E+00	0.00E+00
6.19E+00			
74.0	4.80E+03	0.00E+00	0.00E+00
6.27E+00			
75.0	4.80E+03	0.00E+00	0.00E+00
6.35E+00			
76.0	4.80E+03	0.00E+00	0.00E+00
6.44E+00			
77.0	4.80E+03	0.00E+00	0.00E+00
6.52E+00			
78.0	4.80E+03	0.00E+00	0.00E+00
6.61E+00			
79.0	4.80E+03	0.00E+00	0.00E+00
6.69E+00			
80.0	4.80E+03	0.00E+00	0.00E+00
6.78E+00			
81.0	4.80E+03	0.00E+00	0.00E+00
6.86E+00			
82.0	4.80E+03	0.00E+00	0.00E+00
6.95E+00			
83.0	4.80E+03	0.00E+00	0.00E+00
7.03E+00			
84.0	4.80E+03	0.00E+00	0.00E+00
7.12E+00			
85.0	4.80E+03	0.00E+00	0.00E+00
7.20E+00			
86.0	4.80E+03	0.00E+00	0.00E+00
7.29E+00			
87.0	4.80E+03	0.00E+00	0.00E+00
7.37E+00			
88.0	4.80E+03	0.00E+00	0.00E+00
7.46E+00			
89.0	4.80E+03	0.00E+00	0.00E+00
7.54E+00			
90.0	4.80E+03	0.00E+00	0.00E+00
7.62E+00			
91.0	4.80E+03	0.00E+00	0.00E+00
7.71E+00			
92.0	4.80E+03	0.00E+00	0.00E+00
7.79E+00			

93.0	4.80E+03	0.00E+00	0.00E+00
7.88E+00			
94.0	4.80E+03	0.00E+00	0.00E+00
7.96E+00			
95.0	4.80E+03	0.00E+00	0.00E+00
8.05E+00			
96.0	4.80E+03	0.00E+00	0.00E+00
8.13E+00			
97.0	4.80E+03	0.00E+00	0.00E+00
8.22E+00			
98.0	4.80E+03	0.00E+00	0.00E+00
8.30E+00			
99.0	4.80E+03	0.00E+00	0.00E+00
8.39E+00			
100.0	4.80E+03	0.00E+00	0.00E+00
8.47E+00			

VADOSE ZONE CONCENTRATION WITH DEPTH
Piombo

TIME = 0.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 1.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 2.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00

2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 3.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 4.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME = 5.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 10.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00

1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 15.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 20.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 25.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 30.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration
-------	-------------------------------	-----------------------------

(m)	(mg/l)	Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 35.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 40.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 45.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 50.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 55.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 60.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.10E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 65.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00

6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 70.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 75.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 80.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 85.0 years

Depth	Liquid Phase Concentration	Total Soil Concentration Below Source
(m)	(mg/l)	(mg/kg)
-----	-----	-----
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00

3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 90.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME 95.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

TIME100.0 years

Depth (m)	Liquid Phase Concentration (mg/l)	Total Soil Concentration Below Source (mg/kg)
1.0	2.09E-02	3.36E+00
1.8	0.00E+00	0.00E+00
2.7	0.00E+00	0.00E+00
3.5	0.00E+00	0.00E+00
4.3	0.00E+00	0.00E+00
5.2	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00
6.8	0.00E+00	0.00E+00
7.7	0.00E+00	0.00E+00
8.5	0.00E+00	0.00E+00

LIQUID PHASE CONCENTRATION
Piombo

Time (yr)	Concentration at source (mg/l)	Concentration at water Table (mg/l)
0.0	2.10E-02	0.00E+00
1.0	2.10E-02	0.00E+00
2.0	2.10E-02	0.00E+00
3.0	2.10E-02	0.00E+00
4.0	2.10E-02	0.00E+00
5.0	2.10E-02	0.00E+00
6.0	2.10E-02	0.00E+00
7.0	2.10E-02	0.00E+00
8.0	2.10E-02	0.00E+00
9.0	2.10E-02	0.00E+00
10.0	2.10E-02	0.00E+00
11.0	2.10E-02	0.00E+00
12.0	2.10E-02	0.00E+00
13.0	2.10E-02	0.00E+00
14.0	2.10E-02	0.00E+00
15.0	2.10E-02	0.00E+00
16.0	2.10E-02	0.00E+00
17.0	2.10E-02	0.00E+00
18.0	2.10E-02	0.00E+00
19.0	2.10E-02	0.00E+00
20.0	2.10E-02	0.00E+00
21.0	2.10E-02	0.00E+00
22.0	2.10E-02	0.00E+00
23.0	2.10E-02	0.00E+00
24.0	2.10E-02	0.00E+00
25.0	2.10E-02	0.00E+00
26.0	2.10E-02	0.00E+00
27.0	2.10E-02	0.00E+00
28.0	2.10E-02	0.00E+00
29.0	2.10E-02	0.00E+00
30.0	2.10E-02	0.00E+00
31.0	2.10E-02	0.00E+00
32.0	2.10E-02	0.00E+00
33.0	2.10E-02	0.00E+00
34.0	2.10E-02	0.00E+00
35.0	2.10E-02	0.00E+00
36.0	2.10E-02	0.00E+00
37.0	2.10E-02	0.00E+00
38.0	2.10E-02	0.00E+00
39.0	2.10E-02	0.00E+00
40.0	2.10E-02	0.00E+00
41.0	2.10E-02	0.00E+00
42.0	2.10E-02	0.00E+00
43.0	2.10E-02	0.00E+00
44.0	2.10E-02	0.00E+00
45.0	2.10E-02	0.00E+00
46.0	2.10E-02	0.00E+00
47.0	2.10E-02	0.00E+00
48.0	2.10E-02	0.00E+00
49.0	2.10E-02	0.00E+00
50.0	2.10E-02	0.00E+00
51.0	2.10E-02	0.00E+00
52.0	2.10E-02	0.00E+00
53.0	2.10E-02	0.00E+00
54.0	2.10E-02	0.00E+00
55.0	2.10E-02	0.00E+00
56.0	2.10E-02	0.00E+00
57.0	2.10E-02	0.00E+00
58.0	2.10E-02	0.00E+00
59.0	2.10E-02	0.00E+00
60.0	2.10E-02	0.00E+00

61.0	2.10E-02	0.00E+00
62.0	2.10E-02	0.00E+00
63.0	2.10E-02	0.00E+00
64.0	2.09E-02	0.00E+00
65.0	2.09E-02	0.00E+00
66.0	2.09E-02	0.00E+00
67.0	2.09E-02	0.00E+00
68.0	2.09E-02	0.00E+00
69.0	2.09E-02	0.00E+00
70.0	2.09E-02	0.00E+00
71.0	2.09E-02	0.00E+00
72.0	2.09E-02	0.00E+00
73.0	2.09E-02	0.00E+00
74.0	2.09E-02	0.00E+00
75.0	2.09E-02	0.00E+00
76.0	2.09E-02	0.00E+00
77.0	2.09E-02	0.00E+00
78.0	2.09E-02	0.00E+00
79.0	2.09E-02	0.00E+00
80.0	2.09E-02	0.00E+00
81.0	2.09E-02	0.00E+00
82.0	2.09E-02	0.00E+00
83.0	2.09E-02	0.00E+00
84.0	2.09E-02	0.00E+00
85.0	2.09E-02	0.00E+00
86.0	2.09E-02	0.00E+00
87.0	2.09E-02	0.00E+00
88.0	2.09E-02	0.00E+00
89.0	2.09E-02	0.00E+00
90.0	2.09E-02	0.00E+00
91.0	2.09E-02	0.00E+00
92.0	2.09E-02	0.00E+00
93.0	2.09E-02	0.00E+00
94.0	2.09E-02	0.00E+00
95.0	2.09E-02	0.00E+00
96.0	2.09E-02	0.00E+00
97.0	2.09E-02	0.00E+00
98.0	2.09E-02	0.00E+00
99.0	2.09E-02	0.00E+00
100.0	2.09E-02	0.00E+00

End of VADOSE ZONE MODEL OUTPUT

Start of GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Calculated height of GW source (linked) (m)..... 1.04E+02

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.86
Kd (m3/kg).....	6.7
Retardation coefficient.....	5.67E+04
Seepage velocity (m/d).....	4.30E-03
Retarded seepage velocity (m/d).....	7.58E-08

Dispersion calculations in Saturated Zone

***All dispersivity values entered by user.

Longitudinal dispersivity entered (m)..... 13.
 Transverse dispersivity entered (m)..... 4.4
 Vertical dispersivity entered (m)..... 5.02E-02

GROUNDWATER CONCENTRATION (annual average)
 Piombo

The maximum groundwater concentration (mg/l): 0.00E+00
 Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00
18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00
52.0	0.00E+00

53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00
86.0	0.00E+00
87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of GROUNDWATER MODEL OUTPUT

SURFACE WATER MIXING ZONE MODEL

Inputs for Calculation of Length of Surface Water Reach
(Using Domenico for a steady-state estimate)

Distance to SW is	40.
Long. dispersivity	13.
Trans. dispersivity	4.4
Vert. dispersivity	5.02E-02
Width of source	1.24E+02
Height of source	1.04E+02
Deg. rate (1/s)	0.0
Effective porosity	0.20

Aquifer gradient	1.00E-03
Hydraulic conductivity	0.86
Seepage velocity	4.30E-03

From Domenico's Equation for a Steady-State
Solution along the Centerline of the Plume:
(x=distance to SW, y=0, z=0)

Term1	1.0
Term2	1.0
Term3	1.0

Concentration profile at x(m) = 40.00

Point	y(m)	C/Cmax
1	63.	0.0

Reached 10% of Cmax

The distance off the centerline of the plume is 63.
The length of the reach is (=2*y) 1.26E+02

Distance from GW source to SW (m).. 40.
Conductivity of SW bed [m/d]..... 10.
Kd in sediment [L/kg]..... 6.68E+03
Depth of SW bed [m]..... 1.0
Length of reach [m]..... 1.26E+02
Gradient between GW and SW [m/m]..... 5.00E-02

Calculated GW Inflow to SW [m3/d].. 63.
Cross-sectional area of river [m2]. 2.0
Calculated SW volume [m3]..... 2.51E+02
Fraction of SW for mixing [-]..... 1.0
Adjusted SW volume [m3]..... 2.51E+02
SW flow rate [m3/d]..... 1.80E+02
Adjusted SW flow rate [m3/d]. 1.80E+02
Calculated total flow [m3]..... 2.43E+02
(sum of GW inflow and SW inflow)
Decay rate in SW [1/d]..... 0.0

SURFACE WATER CONCENTRATION
Piombo

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration Surface Water (mg/l)	Concentration in Sediment (mg/kg)	Mass Flux from GW to SW (mg/d)
1.0	0.00E+00	0.00E+00	0.00E+00
2.0	0.00E+00	0.00E+00	0.00E+00
3.0	0.00E+00	0.00E+00	0.00E+00
4.0	0.00E+00	0.00E+00	0.00E+00
5.0	0.00E+00	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00	0.00E+00
7.0	0.00E+00	0.00E+00	0.00E+00
8.0	0.00E+00	0.00E+00	0.00E+00
9.0	0.00E+00	0.00E+00	0.00E+00
10.0	0.00E+00	0.00E+00	0.00E+00
11.0	0.00E+00	0.00E+00	0.00E+00
12.0	0.00E+00	0.00E+00	0.00E+00
13.0	0.00E+00	0.00E+00	0.00E+00
14.0	0.00E+00	0.00E+00	0.00E+00
15.0	0.00E+00	0.00E+00	0.00E+00
16.0	0.00E+00	0.00E+00	0.00E+00
17.0	0.00E+00	0.00E+00	0.00E+00

17

86.0	0.00E+00	0.00E+00	0.00E+00
87.0	0.00E+00	0.00E+00	0.00E+00
88.0	0.00E+00	0.00E+00	0.00E+00
89.0	0.00E+00	0.00E+00	0.00E+00
90.0	0.00E+00	0.00E+00	0.00E+00
91.0	0.00E+00	0.00E+00	0.00E+00
92.0	0.00E+00	0.00E+00	0.00E+00
93.0	0.00E+00	0.00E+00	0.00E+00
94.0	0.00E+00	0.00E+00	0.00E+00
95.0	0.00E+00	0.00E+00	0.00E+00
96.0	0.00E+00	0.00E+00	0.00E+00
97.0	0.00E+00	0.00E+00	0.00E+00
98.0	0.00E+00	0.00E+00	0.00E+00
99.0	0.00E+00	0.00E+00	0.00E+00
100.0	0.00E+00	0.00E+00	0.00E+00

"Rischio per adulto/bambino derivante da Falda - Scenario 4" - Input

Title:
New Project
11/08/13 10:25

Scenarios:
Child Resident - RME
Adult Resident - RME

Routes:
INHALATION OF OUTDOOR AIR

Chemicals:
Cromo totale
Ferro
Manganese
Nichel
Nitriti
Solfati

SUMMARY OF INPUT PARAMETERS	SCENARIO:	
	1	2

LIFETIME AND BODY WEIGHT		
Body Weight (kg)	15.0	70.0
Lifetime (years)	70.0	70.0
INHALATION OF OUTDOOR AIR		
Inhalation rate (m ³ /hr)	0.830	0.830
Time outdoors (hours/day)	24.0	2.50
Lung Retention Factor (-)	1.00	1.00
Exp. Freq. Outdoor Air (events/yr)	350.	350.
Exp. Duration Outdoor Air (yr)	6.00	30.0
Absorption Adjustment Factor for Inhalation (-)		
Cromo totale	1.0	1.0
Ferro	1.0	1.0
Manganese	1.0	1.0
Nichel	1.0	1.0
Nitriti	1.0	1.0
Solfati	1.0	1.0
MEDIA CONCENTRATIONS		

Concentration in Outdoor Air (mg/m ³)		
Obtained from Fate and Transport output		
AVERAGE Concentration (over exposure duration)		
(used to calculate carcinogenic risk)		
Exposure Duration (years)	6.0	30.
Cromo totale	0.0	0.0
Ferro	0.0	0.0
Manganese	0.0	0.0
Nichel	0.0	0.0
Nitriti	0.0	0.0
Solfati	3.68E-09	3.68E-09
Concentration used to calculate hazard index		
(Averaged over 7 years or exposure duration, if less than 7 years)		
Exposure Duration (years)	6.0	7.0
Cromo totale	0.0	0.0
Ferro	0.0	0.0
Manganese	0.0	0.0
Nichel	0.0	0.0
Nitriti	0.0	0.0
Solfati	3.68E-09	3.68E-09

SLOPE FACTORS AND REFERENCE DOSES

Inhalation Slope Factor [1/(mg/kg-day)]		
Cromo totale	ND	ND
Ferro	ND	ND
Manganese	ND	ND
Nichel	0.84	0.84
Nitriti	ND	ND
Solfati	ND	ND
Inhalation Reference Dose (mg/kg-day)		
Cromo totale	1.5	1.5
Ferro	ND	ND
Manganese	1.43E-05	1.43E-05
Nichel	2.00E-02	2.00E-02
Nitriti	0.10	0.10
Solfati	ND	ND

SCENARIO:

SUMMARY OF RESULTS	1	2

INHALATION OF OUTDOOR AIR

Daily Doses and Risk for : Cromo totale		
CADD (mg/kg-day)	0.00E+00	0.00E+00
LADD (mg/kg-day)	0.00E+00	0.00E+00
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00
Daily Doses and Risk for : Ferro		
CADD (mg/kg-day)	0.00E+00	0.00E+00
LADD (mg/kg-day)	0.00E+00	0.00E+00
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00
Daily Doses and Risk for : Manganese		
CADD (mg/kg-day)	0.00E+00	0.00E+00
LADD (mg/kg-day)	0.00E+00	0.00E+00
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00
Daily Doses and Risk for : Nichel		
CADD (mg/kg-day)	0.00E+00	0.00E+00
LADD (mg/kg-day)	0.00E+00	0.00E+00
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00
Daily Doses and Risk for : Nitriti		
CADD (mg/kg-day)	0.00E+00	0.00E+00
LADD (mg/kg-day)	0.00E+00	0.00E+00
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00
Daily Doses and Risk for : Solfati		
CADD (mg/kg-day)	4.68E-09	1.05E-10
LADD (mg/kg-day)	4.01E-10	4.48E-11
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00

"Rischio per adulto/bambino derivante da Falda - Scenario 4" - Output

Title:
New Project
11/08/13 10:25

Scenarios:
Child Resident - RME
Adult Resident - RME

Routes:
INHALATION OF OUTDOOR AIR

Chemicals:
Cromo totale
Ferro
Manganese
Nichel
Nitriti
Sol fati

SUMMARY OF INPUT PARAMETERS	SCENARIO:	
	1	2

LIFETIME AND BODY WEIGHT		
Body Weight (kg)	15.0	70.0
Lifetime (years)	70.0	70.0
INHALATION OF OUTDOOR AIR		
Inhalation rate (m ³ /hr)	0.830	0.830
Time outdoors (hours/day)	24.0	2.50
Lung Retention Factor (-)	1.00	1.00
Exp. Freq. Outdoor Air (events/yr)	350.	350.
Exp. Duration Outdoor Air (yr)	6.00	30.0
Absorption Adjustment Factor for Inhalation (-)		
Cromo totale	1.0	1.0
Ferro	1.0	1.0
Manganese	1.0	1.0
Nichel	1.0	1.0
Nitriti	1.0	1.0
Sol fati	1.0	1.0
MEDIA CONCENTRATIONS		

Concentration in Outdoor Air (mg/m ³)		
Obtained from Fate and Transport output		
AVERAGE Concentration (over exposure duration)		
(used to calculate carcinogenic risk)		
Exposure Duration (years)	6.0	30.
Cromo totale	0.0	0.0
Ferro	0.0	0.0
Manganese	0.0	0.0
Nichel	0.0	0.0
Nitriti	0.0	0.0
Sol fati	3.68E-09	3.68E-09
Concentration used to calculate hazard index		
(Averaged over 7 years or exposure duration, if less than 7 years)		
Exposure Duration (years)	6.0	7.0
Cromo totale	0.0	0.0
Ferro	0.0	0.0
Manganese	0.0	0.0
Nichel	0.0	0.0
Nitriti	0.0	0.0
Sol fati	3.68E-09	3.68E-09

SLOPE FACTORS AND REFERENCE DOSES

Inhalation Slope Factor [1/(mg/kg-day)]		
Cromo totale	ND	ND
Ferro	ND	ND
Manganese	ND	ND
Nichel	0.84	0.84
Nitriti	ND	ND
Solfati	ND	ND
Inhalation Reference Dose (mg/kg-day)		
Cromo totale	1.5	1.5
Ferro	ND	ND
Manganese	1.43E-05	1.43E-05
Nichel	2.00E-02	2.00E-02
Nitriti	0.10	0.10
Solfati	ND	ND

SCENARIO:

SUMMARY OF RESULTS	1	2

INHALATION OF OUTDOOR AIR

Daily Doses and Risk for : Cromo totale		
CADD (mg/kg-day)	0.00E+00	0.00E+00
LADD (mg/kg-day)	0.00E+00	0.00E+00
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00
Daily Doses and Risk for : Ferro		
CADD (mg/kg-day)	0.00E+00	0.00E+00
LADD (mg/kg-day)	0.00E+00	0.00E+00
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00
Daily Doses and Risk for : Manganese		
CADD (mg/kg-day)	0.00E+00	0.00E+00
LADD (mg/kg-day)	0.00E+00	0.00E+00
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00
Daily Doses and Risk for : Nichel		
CADD (mg/kg-day)	0.00E+00	0.00E+00
LADD (mg/kg-day)	0.00E+00	0.00E+00
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00
Daily Doses and Risk for : Nitriti		
CADD (mg/kg-day)	0.00E+00	0.00E+00
LADD (mg/kg-day)	0.00E+00	0.00E+00
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00
Daily Doses and Risk for : Solfati		
CADD (mg/kg-day)	4.68E-09	1.05E-10
LADD (mg/kg-day)	4.01E-10	4.48E-11
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	0.000E+00	0.000E+00

"Rischio per la Risorsa Idrica Sotterranea derivante da Falda - Scenario 5" - Input

FATE AND TRANSPORT MODEL INPUT SUMMARY FILE

Model Description:

Saturated zone model (dissolved phase source)

Title:

New Project

Simulation time (years). 100

Saturated Zone Model Source

***Pulse Source:

Length of pulse (yr).	1.00E+02
Total thickness of source (m)	40.
Length of source (m).	1.28E+02
Width of source (m)	1.45E+02

Aquifer Properties

Effective porosity (cm ³ /cm ³)	0.25
Fraction organic carbon (g oc/g soil).	7.00E-03
Hydraulic conductivity (m/d)	0.62
Soil bulk density (g/cm ³).	1.7
Hydraulic gradient (m/m)	1.00E-03
***Longitudinal dispersivity (m). code calculated	
***Transverse dispersivity (m). code calculated	
***Vertical dispersivity (m). code calculated	

Receptor Well Location

Distance downgradient (m).	15.
Distance cross-gradient (m).	0.0
Depth to top of well screen (m).	0.0
Depth to bottom of well screen(m).	1.0
Number of points used to calc. conc.	2

CHEMICAL DATA FOR: Cromo totale

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	1.20E+04
Vapor pressure (mmHg)	0.0
Kd (partition coefficient) (L/kg)	91.
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	52.
Degradation rate, saturated zone (1/d).	0.0

Source Concentrations:

Source conc. for GW model (mg/l)	9.60E-02
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CHEMICAL DATA FOR: Ferro

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	6.24E+05
Vapor pressure (mmHg)	4.24E-09
Kd (partition coefficient) (L/kg)	1.65E+02
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	56.
Degradation rate, saturated zone (1/d).	0.0

Source Concentrations:

Source conc. for GW model (mg/l)	2.1
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CHEMICAL DATA FOR: Manganese

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	9.30E+02
Vapor pressure (mmHg)	0.0
Kd (partition coefficient) (L/kg)	50.
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	55.
Degradation rate, saturated zone (1/d).	0.0

Source Concentrations:

Source conc. for GW model (mg/l)	3.9
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CHEMICAL DATA FOR: Nichel

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	4.22E+05
Vapor pressure (mmHg)	4.24E-09
Kd (partition coefficient) (L/kg)	5.50E+03
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	59.
Degradation rate, saturated zone (1/d).	0.0

Source Concentrations:

Source conc. for GW model (mg/l)	2.80E-02
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CHEMICAL DATA FOR: Nitriti

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	0.0
Solubility (mg/l)	1.20E+05
Vapor pressure (mmHg)	8.55E-14
Kd (partition coefficient) (L/kg)	23.
Henry's Law coefficient (-).	8.38E-06
Molecular weight (g/mol).	46.
Degradation rate, saturated zone (1/d).	0.0

Source Concentrations:

Source conc. for GW model (mg/l)

3.4

CHEMICAL DATA FOR: Solfati

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	1.00E+06
Vapor pressure (mmHg)	5.93E-05
KOC (L/kg).	0.0
Henry's Law coefficient (-).	1.04E-09
Molecular weight (g/mol).	96.
Degradation rate, saturated zone (1/d).	0.0

Source Concentrations:

Source conc. for GW model (mg/l)

0.46

"Rischio per la Risorsa Idrica Sotterranea derivante da Falda - Scenario 5" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Cromo totale

Start of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Initial mass input to bring source area up to the required concentration in GW (mg/d)...	1.10E+10
Mass input rate for pulse source in GW (mg/d)...	3.45E+02
Mass input rate = (Darcy flux) * (Source conc)	
= K * gradient * (Source conc)	

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.62
Kd (m3/kg).....	9.10E-02
Retardation coefficient.....	6.20E+02
Seepage velocity (m/d).....	2.48E-03
Retarded seepage velocity (m/d).....	4.00E-06

Dispersion Calculations in Saturated Zone

Distance used for dispersion calculations (m).....	79.
Distance = (Dist. to well) + (Source Length)/2	
Calculated longitudinal dispersivity (m).....	8.8
Calculated transverse dispersivity (m).....	2.9
Calculated vertical dispersivity (m).....	3.38E-02

GROUNDWATER CONCENTRATION (annual average)

Cromo totale

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00

18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00
52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00

86.0	0.00E+00
87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

"Rischio per la Risorsa Idrica Sotterranea derivante da Falda - Scenario 5" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Ferro

Start of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Initial mass input to bring source area up to the required concentration in GW (mg/d)...	4.46E+11
Mass input rate for pulse source in GW (mg/d)...	7.69E+03
Mass input rate = (Darcy flux) * (Source conc)	
= K * gradient * (Source conc)	

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.62
Kd (m3/kg).....	0.17
Retardation coefficient.....	1.12E+03
Seepage velocity (m/d).....	2.48E-03
Retarded seepage velocity (m/d).....	2.21E-06

Dispersion Calculations in Saturated Zone

Distance used for dispersion calculations (m).....	79.
Distance = (Dist. to well) + (Source Length)/2	
Calculated longitudinal dispersivity (m).....	8.8
Calculated transverse dispersivity (m).....	2.9
Calculated vertical dispersivity (m).....	3.38E-02

GROUNDWATER CONCENTRATION (annual average)

Ferro

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00

18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00
52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00

86.0	0.00E+00
87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

"Rischio per la Risorsa Idrica Sotterranea derivante da Falda - Scenario 5" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Manganese

Start of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Initial mass input to bring source area up to the required concentration in GW (mg/d)...	2.49E+11
Mass input rate for pulse source in GW (mg/d)...	1.41E+04
Mass input rate = (Darcy flux) * (Source conc)	
= K * gradient * (Source conc)	

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.62
Kd (m3/kg).....	5.00E-02
Retardation coefficient.....	3.41E+02
Seepage velocity (m/d).....	2.48E-03
Retarded seepage velocity (m/d).....	7.27E-06

Dispersion Calculations in Saturated Zone

Distance used for dispersion calculations (m).....	79.
Distance = (Dist. to well) + (Source Length)/2	
Calculated longitudinal dispersivity (m).....	8.8
Calculated transverse dispersivity (m).....	2.9
Calculated vertical dispersivity (m).....	3.38E-02

GROUNDWATER CONCENTRATION (annual average) Manganese

The maximum groundwater concentration (mg/l): 1.31E-15
Occurred at year: 100.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00

18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00
52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00

86.0	0.00E+00
87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	2.20E-19
94.0	4.07E-17
95.0	1.26E-16
96.0	2.38E-16
97.0	3.85E-16
98.0	5.76E-16
99.0	8.23E-16
100.0	1.14E-15

End of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

"Rischio per la Risorsa Idrica Sotterranea derivante da Falda - Scenario 5" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Nichel

Start of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Initial mass input to bring source area up to the required concentration in GW (mg/d)...	1.94E+11
Mass input rate for pulse source in GW (mg/d)...	1.01E+02
Mass input rate = (Darcy flux) * (Source conc)	
= K * gradient * (Source conc)	

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.62
Kd (m3/kg).....	5.5
Retardation coefficient.....	3.74E+04
Seepage velocity (m/d).....	2.48E-03
Retarded seepage velocity (m/d).....	6.63E-08

Dispersion Calculations in Saturated Zone

Distance used for dispersion calculations (m).....	79.
Distance = (Dist. to well) + (Source Length)/2	
Calculated longitudinal dispersivity (m).....	8.8
Calculated transverse dispersivity (m).....	2.9
Calculated vertical dispersivity (m).....	3.38E-02

GROUNDWATER CONCENTRATION (annual average) Nichel

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00

18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00
52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00

86.0	0.00E+00
87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

"Rischio per la Risorsa Idrica Sotterranea derivante da Falda - Scenario 5" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Nitriti

Start of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Initial mass input to bring source area up to the required concentration in GW (mg/d)...	9.93E+10
Mass input rate for pulse source in GW (mg/d)...	1.22E+04
Mass input rate = (Darcy flux) * (Source conc)	
= K * gradient * (Source conc)	

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.62
Kd (m3/kg).....	2.30E-02
Retardation coefficient.....	1.57E+02
Seepage velocity (m/d).....	2.48E-03
Retarded seepage velocity (m/d).....	1.58E-05

Dispersion Calculations in Saturated Zone

Distance used for dispersion calculations (m).....	79.
Distance = (Dist. to well) + (Source Length)/2	
Calculated longitudinal dispersivity (m).....	8.8
Calculated transverse dispersivity (m).....	2.9
Calculated vertical dispersivity (m).....	3.38E-02

GROUNDWATER CONCENTRATION (annual average) Nitriti

The maximum groundwater concentration (mg/l): 3.38E-09
Occurred at year: 100.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00

18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	1.03E-18
44.0	9.55E-17
45.0	3.34E-16
46.0	7.54E-16
47.0	1.48E-15
48.0	2.69E-15
49.0	4.70E-15
50.0	7.94E-15
51.0	1.31E-14
52.0	2.11E-14
53.0	3.33E-14
54.0	5.17E-14
55.0	7.90E-14
56.0	1.19E-13
57.0	1.77E-13
58.0	2.59E-13
59.0	3.75E-13
60.0	5.37E-13
61.0	7.60E-13
62.0	1.06E-12
63.0	1.47E-12
64.0	2.02E-12
65.0	2.75E-12
66.0	3.70E-12
67.0	4.95E-12
68.0	6.56E-12
69.0	8.63E-12
70.0	1.13E-11
71.0	1.46E-11
72.0	1.88E-11
73.0	2.41E-11
74.0	3.06E-11
75.0	3.87E-11
76.0	4.86E-11
77.0	6.07E-11
78.0	7.54E-11
79.0	9.32E-11
80.0	1.15E-10
81.0	1.40E-10
82.0	1.71E-10
83.0	2.07E-10
84.0	2.51E-10
85.0	3.02E-10

86.0	3.61E-10
87.0	4.31E-10
88.0	5.13E-10
89.0	6.07E-10
90.0	7.17E-10
91.0	8.44E-10
92.0	9.89E-10
93.0	1.16E-09
94.0	1.35E-09
95.0	1.57E-09
96.0	1.81E-09
97.0	2.10E-09
98.0	2.42E-09
99.0	2.78E-09
100.0	3.18E-09

End of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

"Rischio per la Risorsa Idrica Sotterranea derivante da Falda - Scenario 5" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Solfati

Start of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Initial mass input to bring source area up to the required concentration in GW (mg/d)...	8.54E+07
Mass input rate for pulse source in GW (mg/d)...	1.65E+03
Mass input rate = (Darcy flux) * (Source conc)	
= K * gradient * (Source conc)	

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.62
Koc (m3/kg).....	0.0
Foc (g/g).....	7.00E-03
Retardation coefficient.....	1.0
Seepage velocity (m/d).....	2.48E-03
Retarded seepage velocity (m/d).....	2.48E-03

Dispersion calculations in Saturated Zone

Distance used for dispersion calculations (m).....	79.
Distance = (Dist. to well) + (Source Length)/2	
Calculated longitudinal dispersivity (m).....	8.8
Calculated transverse dispersivity (m).....	2.9
Calculated vertical dispersivity (m).....	3.38E-02

GROUNDWATER CONCENTRATION (annual average) Solfati

The maximum groundwater concentration (mg/l): 2.39E-01
 Occurred at year: 100.0

Time (yr)	Concentration at well (mg/l)

1.0	1.10E-08
2.0	3.73E-06
3.0	4.41E-05
4.0	1.76E-04
5.0	4.35E-04
6.0	8.35E-04
7.0	1.38E-03
8.0	2.05E-03
9.0	2.86E-03
10.0	3.79E-03
11.0	4.83E-03
12.0	5.98E-03
13.0	7.23E-03
14.0	8.57E-03
15.0	1.00E-02
16.0	1.15E-02

17.0	1.31E-02
18.0	1.48E-02
19.0	1.65E-02
20.0	1.83E-02
21.0	2.01E-02
22.0	2.20E-02
23.0	2.40E-02
24.0	2.60E-02
25.0	2.81E-02
26.0	3.02E-02
27.0	3.24E-02
28.0	3.46E-02
29.0	3.68E-02
30.0	3.91E-02
31.0	4.14E-02
32.0	4.37E-02
33.0	4.61E-02
34.0	4.85E-02
35.0	5.10E-02
36.0	5.34E-02
37.0	5.59E-02
38.0	5.85E-02
39.0	6.10E-02
40.0	6.36E-02
41.0	6.62E-02
42.0	6.88E-02
43.0	7.15E-02
44.0	7.41E-02
45.0	7.68E-02
46.0	7.95E-02
47.0	8.23E-02
48.0	8.50E-02
49.0	8.78E-02
50.0	9.05E-02
51.0	9.33E-02
52.0	9.61E-02
53.0	9.90E-02
54.0	1.02E-01
55.0	1.05E-01
56.0	1.07E-01
57.0	1.10E-01
58.0	1.13E-01
59.0	1.16E-01
60.0	1.19E-01
61.0	1.22E-01
62.0	1.25E-01
63.0	1.28E-01
64.0	1.31E-01
65.0	1.34E-01
66.0	1.37E-01
67.0	1.40E-01
68.0	1.43E-01
69.0	1.46E-01
70.0	1.49E-01
71.0	1.52E-01
72.0	1.55E-01
73.0	1.58E-01
74.0	1.61E-01
75.0	1.64E-01
76.0	1.67E-01
77.0	1.70E-01
78.0	1.73E-01
79.0	1.75E-01
80.0	1.78E-01
81.0	1.81E-01
82.0	1.84E-01
83.0	1.87E-01
84.0	1.90E-01

85.0	1.93E-01
86.0	1.96E-01
87.0	1.99E-01
88.0	2.02E-01
89.0	2.05E-01
90.0	2.08E-01
91.0	2.11E-01
92.0	2.14E-01
93.0	2.17E-01
94.0	2.20E-01
95.0	2.23E-01
96.0	2.26E-01
97.0	2.29E-01
98.0	2.32E-01
99.0	2.35E-01
100.0	2.37E-01

End of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

"Rischio per la Risorsa Idrica Superficiale derivante da Falda - Scenario 6" - Input

FATE AND TRANSPORT MODEL INPUT SUMMARY FILE

Model Description:

Saturated zone model (dissolved phase source)

Title:

New Project

Simulation time (years).

100

Saturated Zone Model Source

***Pulse Source:

Length of pulse (yr). 1.00E+02

Total thickness of source (m) 40.

Length of source (m). 1.45E+02

Width of source (m) 1.28E+02

Aquifer Properties

Effective porosity (cm³/cm³)

0.25

Fraction organic carbon (g oc/g soil).

2.40E-02

Hydraulic conductivity (m/d)

0.62

Soil bulk density (g/cm³).

1.7

Hydraulic gradient (m/m)

1.00E-03

***Longitudinal dispersivity (m). code calculated

***Transverse dispersivity (m). code calculated

***Vertical dispersivity (m). code calculated

Receptor Well Location

Distance downgradient (m).

75.

Distance cross-gradient (m).

0.0

Depth to top of well screen (m).

0.0

Depth to bottom of well screen(m).

1.0

Number of points used to calc. conc.

2

Surface Water Mixing Model Data

Distance from GW source to SW (m).

75.

Conductivity of SW bed (m)

10.

Depth of GW aquifer next to SW (m)

1.0

Gradient between GW and SW (m/m)

5.00E-02

SW flow rate (m³/d)

1.80E+02

Cross-sectional area of river (m²).

2.0

Fraction of x-section for mixing (-).

1.0

Fraction org. carbon in sediments (g/g).

1.00E-02

CHEMICAL DATA FOR: Cromo totale

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	1.20E+04
Vapor pressure (mmHg)	0.0
Kd (partition coefficient) (L/kg)	91.
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	52.
Degradation rate, saturated zone (1/d).	0.0
Degradation rate in surface water (1/d).	0.0

Source Concentrations:

Source conc. for GW model (mg/l)	9.60E-02
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CHEMICAL DATA FOR: Ferro

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	6.24E+05
Vapor pressure (mmHg)	4.24E-09
Kd (partition coefficient) (L/kg)	1.65E+02
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	56.
Degradation rate, saturated zone (1/d).	0.0
Degradation rate in surface water (1/d).	0.0

Source Concentrations:

Source conc. for GW model (mg/l)	2.1
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CHEMICAL DATA FOR: Manganese

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	9.30E+02
Vapor pressure (mmHg)	0.0
Kd (partition coefficient) (L/kg)	50.
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	55.
Degradation rate, saturated zone (1/d).	0.0
Degradation rate in surface water (1/d).	0.0

Source Concentrations:

Source conc. for GW model (mg/l)	3.9
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CHEMICAL DATA FOR: Nickel

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	4.22E+05
Vapor pressure (mmHg)	4.24E-09
Kd (partition coefficient) (L/kg)	5.50E+03
Henry's Law coefficient (-).	0.0
Molecular weight (g/mol).	59.
Degradation rate, saturated zone (1/d).	0.0
Degradation rate in surface water (1/d).	0.0

Source Concentrations:

Source conc. for GW model (mg/l) 2.80E-02

CHEMICAL DATA FOR: Nitriti

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	0.0
Solubility (mg/l)	1.20E+05
Vapor pressure (mmHg)	8.55E-14
Kd (partition coefficient) (L/kg)	23.
Henry's Law coefficient (-).	8.38E-06
Molecular weight (g/mol).	46.
Degradation rate, saturated zone (1/d).	0.0
Degradation rate in surface water (1/d).	0.0

Source Concentrations:

Source conc. for GW model (mg/l) 3.4

CHEMICAL DATA FOR: Sol fati

Diffusion coefficient in air (cm ² /s)	0.0
Diffusion coefficient in water (cm ² /s)	1.00E-06
Solubility (mg/l)	1.00E+06
Vapor pressure (mmHg)	5.93E-05
KOC (L/kg).	0.0
Henry's Law coefficient (-).	1.04E-09
Molecular weight (g/mol).	96.
Degradation rate, saturated zone (1/d).	0.0
Degradation rate in surface water (1/d).	0.0

Source Concentrations:

Source conc. for GW model (mg/l) 0.46

"Rischio per la Risorsa Idrica Superficiale derivante da Falda - Scenario 6" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Cromo totale

Start of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Initial mass input to bring source area up to the required concentration in GW (mg/d)...	1.10E+10
Mass input rate for pulse source in GW (mg/d)...	3.05E+02
Mass input rate = (Darcy flux) * (Source conc)	
= K * gradient * (Source conc)	

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.62
Kd (m3/kg).....	9.10E-02
Retardation coefficient.....	6.20E+02
Seepage velocity (m/d).....	2.48E-03
Retarded seepage velocity (m/d).....	4.00E-06

Dispersion Calculations in Saturated Zone

Distance used for dispersion calculations (m).....	1.48E+02
Distance = (Dist. to well) + (Source Length)/2	
Calculated longitudinal dispersivity (m).....	15.
Calculated transverse dispersivity (m).....	5.2
Calculated vertical dispersivity (m).....	5.93E-02

GROUNDWATER CONCENTRATION (annual average)

Cromo totale

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00

18.0	0.00E+00
19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00
52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00

86.0	0.00E+00
87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

SURFACE WATER MIXING ZONE MODEL

Inputs for Calculation of Length of Surface Water Reach
(Using Domenico for a steady-state estimate)

Distance to SW is	75.
Long. dispersivity	15.
Trans. dispersivity	5.2
Vert. dispersivity	5.93E-02
Width of source	1.28E+02
Height of source	40.
Deg. rate (1/s)	0.0
Effective porosity	0.25
Aquifer gradient	1.00E-03
Hydraulic conductivity	0.62
Seepage velocity	2.48E-03

From Domenico's Equation for a Steady-State
Solution along the Centerline of the Plume:
(x=distance to SW, y=0, z=0)

Term1	1.0
Term2	0.98
Term3	1.0

Concentration profile at x(m) = 75.00

Point	y(m)	C/Cmax
1	66.	0.49
2	67.	0.47
3	68.	0.45
4	70.	0.42
5	72.	0.40
6	73.	0.38
7	74.	0.36
8	76.	0.34
9	78.	0.32
10	79.	0.30
11	80.	0.28
12	82.	0.26
13	84.	0.25
14	85.	0.23
15	86.	0.21
16	88.	0.20

17	90.	0.18
18	91.	0.17
19	92.	0.16
20	94.	0.14
21	96.	0.13
22	97.	0.12
23	98.	0.11
24	1.00E+02	0.10
25	1.02E+02	9.08E-02

Reached 10% of Cmax

The distance off the centerline of the plume is	1.02E+02
The length of the reach is (=2*y)	2.03E+02

Distance from GW source to SW (m) ..	75.
Conductivity of SW bed [m/d]	10.
Kd in sediment [L/kg]	91.
Depth of SW bed [m]	1.0
Length of reach [m]	2.03E+02
Gradient between GW and SW [m/m]	5.00E-02

Calculated GW Inflow to SW [m3/d] ..	1.02E+02
Cross-sectional area of river [m2] ..	2.0
Calculated SW volume [m3]	4.06E+02
Fraction of SW for mixing [-]	1.0
Adjusted SW volume [m3]	4.06E+02
SW flow rate [m3/d]	1.80E+02
Adjusted SW flow rate [m3/d]	1.80E+02
Calculated total flow [m3]	2.82E+02
(sum of GW inflow and SW inflow)	
Decay rate in SW [1/d]	0.0

SURFACE WATER CONCENTRATION
Cromo totale

The maximum groundwater concentration (mg/l):	0.00E+00
Occurred at year:	0.0

Time (yr)	Concentration Surface Water (mg/l)	Concentration in Sediment (mg/kg)	Mass Flux from GW to SW (mg/d)
-----	-----	-----	-----
1.0	0.00E+00	0.00E+00	0.00E+00
2.0	0.00E+00	0.00E+00	0.00E+00
3.0	0.00E+00	0.00E+00	0.00E+00
4.0	0.00E+00	0.00E+00	0.00E+00
5.0	0.00E+00	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00	0.00E+00
7.0	0.00E+00	0.00E+00	0.00E+00
8.0	0.00E+00	0.00E+00	0.00E+00
9.0	0.00E+00	0.00E+00	0.00E+00
10.0	0.00E+00	0.00E+00	0.00E+00
11.0	0.00E+00	0.00E+00	0.00E+00
12.0	0.00E+00	0.00E+00	0.00E+00
13.0	0.00E+00	0.00E+00	0.00E+00
14.0	0.00E+00	0.00E+00	0.00E+00
15.0	0.00E+00	0.00E+00	0.00E+00
16.0	0.00E+00	0.00E+00	0.00E+00
17.0	0.00E+00	0.00E+00	0.00E+00
18.0	0.00E+00	0.00E+00	0.00E+00
19.0	0.00E+00	0.00E+00	0.00E+00
20.0	0.00E+00	0.00E+00	0.00E+00
21.0	0.00E+00	0.00E+00	0.00E+00
22.0	0.00E+00	0.00E+00	0.00E+00
23.0	0.00E+00	0.00E+00	0.00E+00
24.0	0.00E+00	0.00E+00	0.00E+00
25.0	0.00E+00	0.00E+00	0.00E+00
26.0	0.00E+00	0.00E+00	0.00E+00

5

95.0	0.00E+00	0.00E+00	0.00E+00
96.0	0.00E+00	0.00E+00	0.00E+00
97.0	0.00E+00	0.00E+00	0.00E+00
98.0	0.00E+00	0.00E+00	0.00E+00
99.0	0.00E+00	0.00E+00	0.00E+00
100.0	0.00E+00	0.00E+00	0.00E+00

"Rischio per la Risorsa Idrica Superficiale derivante da Falda - Scenario 6" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Ferro

Start of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Initial mass input to bring source area up to the required concentration in GW (mg/d)...	4.46E+11
Mass input rate for pulse source in GW (mg/d)...	6.79E+03
Mass input rate = (Darcy flux) * (Source conc)	
= K * gradient * (Source conc)	

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.62
Kd (m3/kg).....	0.17
Retardation coefficient.....	1.12E+03
Seepage velocity (m/d).....	2.48E-03
Retarded seepage velocity (m/d).....	2.21E-06

Dispersion Calculations in Saturated Zone

***All dispersivity values entered by user.

Longitudinal dispersivity entered (m).....	15.
Transverse dispersivity entered (m).....	5.2
Vertical dispersivity entered (m).....	5.93E-02

GROUNDWATER CONCENTRATION (annual average) Ferro

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)
-----	-----
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00
18.0	0.00E+00

19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00
52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00
86.0	0.00E+00

87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

SURFACE WATER MIXING ZONE MODEL

Inputs for Calculation of Length of Surface Water Reach
(Using Domenico for a steady-state estimate)

Distance to SW is	75.
Long. dispersivity	15.
Trans. dispersivity	5.2
Vert. dispersivity	5.93E-02
Width of source	1.28E+02
Height of source	40.
Deg. rate (1/s)	0.0
Effective porosity	0.25
Aquifer gradient	1.00E-03
Hydraulic conductivity	0.62
Seepage velocity	2.48E-03

From Domenico's Equation for a Steady-State
Solution along the Centerline of the Plume:
(x=distance to SW, y=0, z=0)

Term1	1.0
Term2	0.98
Term3	1.0

Concentration profile at x(m) = 75.00

Point	y(m)	C/Cmax
1	66.	0.49
2	67.	0.47
3	68.	0.45
4	70.	0.42
5	72.	0.40
6	73.	0.38
7	74.	0.36
8	76.	0.34
9	78.	0.32
10	79.	0.30
11	80.	0.28
12	82.	0.26
13	84.	0.25
14	85.	0.23
15	86.	0.21
16	88.	0.20
17	90.	0.18

18	91.	0.17
19	92.	0.16
20	94.	0.14
21	96.	0.13
22	97.	0.12
23	98.	0.11
24	1.00E+02	0.10
25	1.02E+02	9.08E-02

Reached 10% of Cmax

The distance off the centerline of the plume is 1.02E+02
The length of the reach is (=2*y) 2.03E+02

Distance from GW source to SW (m).. 75.
Conductivity of SW bed [m/d]..... 10.
Kd in sediment [L/kg]..... 1.65E+02
Depth of SW bed [m]..... 1.0
Length of reach [m]..... 2.03E+02
Gradient between GW and SW [m/m]..... 5.00E-02

Calculated GW Inflow to SW [m3/d].. 1.02E+02
Cross-sectional area of river [m2]. 2.0
Calculated SW volume [m3]..... 4.06E+02
Fraction of SW for mixing [-]..... 1.0
Adjusted SW volume [m3]..... 4.06E+02
SW flow rate [m3/d]..... 1.80E+02
Adjusted SW flow rate [m3/d]. 1.80E+02
Calculated total flow [m3]..... 2.82E+02
(sum of GW inflow and SW inflow)
Decay rate in SW [1/d]..... 0.0

SURFACE WATER CONCENTRATION Ferro

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration Surface water (mg/l)	Concentration in Sediment (mg/kg)	Mass Flux from GW to SW (mg/d)
1.0	0.00E+00	0.00E+00	0.00E+00
2.0	0.00E+00	0.00E+00	0.00E+00
3.0	0.00E+00	0.00E+00	0.00E+00
4.0	0.00E+00	0.00E+00	0.00E+00
5.0	0.00E+00	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00	0.00E+00
7.0	0.00E+00	0.00E+00	0.00E+00
8.0	0.00E+00	0.00E+00	0.00E+00
9.0	0.00E+00	0.00E+00	0.00E+00
10.0	0.00E+00	0.00E+00	0.00E+00
11.0	0.00E+00	0.00E+00	0.00E+00
12.0	0.00E+00	0.00E+00	0.00E+00
13.0	0.00E+00	0.00E+00	0.00E+00
14.0	0.00E+00	0.00E+00	0.00E+00
15.0	0.00E+00	0.00E+00	0.00E+00
16.0	0.00E+00	0.00E+00	0.00E+00
17.0	0.00E+00	0.00E+00	0.00E+00
18.0	0.00E+00	0.00E+00	0.00E+00
19.0	0.00E+00	0.00E+00	0.00E+00
20.0	0.00E+00	0.00E+00	0.00E+00
21.0	0.00E+00	0.00E+00	0.00E+00
22.0	0.00E+00	0.00E+00	0.00E+00
23.0	0.00E+00	0.00E+00	0.00E+00
24.0	0.00E+00	0.00E+00	0.00E+00
25.0	0.00E+00	0.00E+00	0.00E+00
26.0	0.00E+00	0.00E+00	0.00E+00
27.0	0.00E+00	0.00E+00	0.00E+00

[illegible]

96.0	0.00E+00	0.00E+00	0.00E+00
97.0	0.00E+00	0.00E+00	0.00E+00
98.0	0.00E+00	0.00E+00	0.00E+00
99.0	0.00E+00	0.00E+00	0.00E+00
100.0	0.00E+00	0.00E+00	0.00E+00

"Rischio per la Risorsa Idrica Superficiale derivante da Falda - Scenario 6" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Manganese

Start of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Initial mass input to bring source area up to the required concentration in GW (mg/d)...	2.49E+11
Mass input rate for pulse source in GW (mg/d)...	1.25E+04
Mass input rate = (Darcy flux) * (Source conc)	
= K * gradient * (Source conc)	

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.62
Kd (m3/kg).....	5.00E-02
Retardation coefficient.....	3.41E+02
Seepage velocity (m/d).....	2.48E-03
Retarded seepage velocity (m/d).....	7.27E-06

Dispersion Calculations in Saturated Zone

***All dispersivity values entered by user.

Longitudinal dispersivity entered (m).....	15.
Transverse dispersivity entered (m).....	5.2
Vertical dispersivity entered (m).....	5.93E-02

GROUNDWATER CONCENTRATION (annual average) Manganese

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)
-----	-----
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00
18.0	0.00E+00

19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00
52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00
86.0	0.00E+00

87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

SURFACE WATER MIXING ZONE MODEL

Inputs for Calculation of Length of Surface Water Reach
(Using Domenico for a steady-state estimate)

Distance to SW is	75.
Long. dispersivity	15.
Trans. dispersivity	5.2
Vert. dispersivity	5.93E-02
Width of source	1.28E+02
Height of source	40.
Deg. rate (1/s)	0.0
Effective porosity	0.25
Aquifer gradient	1.00E-03
Hydraulic conductivity	0.62
Seepage velocity	2.48E-03

From Domenico's Equation for a Steady-State
Solution along the Centerline of the Plume:
(x=distance to SW, y=0, z=0)

Term1	1.0
Term2	0.98
Term3	1.0

Concentration profile at x(m) = 75.00

Point	y(m)	C/Cmax
1	66.	0.49
2	67.	0.47
3	68.	0.45
4	70.	0.42
5	72.	0.40
6	73.	0.38
7	74.	0.36
8	76.	0.34
9	78.	0.32
10	79.	0.30
11	80.	0.28
12	82.	0.26
13	84.	0.25
14	85.	0.23
15	86.	0.21
16	88.	0.20
17	90.	0.18

18	91.	0.17
19	92.	0.16
20	94.	0.14
21	96.	0.13
22	97.	0.12
23	98.	0.11
24	1.00E+02	0.10
25	1.02E+02	9.08E-02

Reached 10% of Cmax

The distance off the centerline of the plume is 1.02E+02
The length of the reach is (=2*y) 2.03E+02

Distance from GW source to SW (m).. 75.
Conductivity of SW bed [m/d]..... 10.
Kd in sediment [L/kg]..... 50.
Depth of SW bed [m]..... 1.0
Length of reach [m]..... 2.03E+02
Gradient between GW and SW [m/m]..... 5.00E-02

Calculated GW Inflow to SW [m3/d].. 1.02E+02
Cross-sectional area of river [m2]. 2.0
Calculated SW volume [m3]..... 4.06E+02
Fraction of SW for mixing [-]..... 1.0
Adjusted SW volume [m3]..... 4.06E+02
SW flow rate [m3/d]..... 1.80E+02
Adjusted SW flow rate [m3/d]. 1.80E+02
Calculated total flow [m3]..... 2.82E+02
(sum of GW inflow and SW inflow)
Decay rate in SW [1/d]..... 0.0

SURFACE WATER CONCENTRATION Manganese

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration Surface water (mg/l)	Concentration in Sediment (mg/kg)	Mass Flux from GW to SW (mg/d)
1.0	0.00E+00	0.00E+00	0.00E+00
2.0	0.00E+00	0.00E+00	0.00E+00
3.0	0.00E+00	0.00E+00	0.00E+00
4.0	0.00E+00	0.00E+00	0.00E+00
5.0	0.00E+00	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00	0.00E+00
7.0	0.00E+00	0.00E+00	0.00E+00
8.0	0.00E+00	0.00E+00	0.00E+00
9.0	0.00E+00	0.00E+00	0.00E+00
10.0	0.00E+00	0.00E+00	0.00E+00
11.0	0.00E+00	0.00E+00	0.00E+00
12.0	0.00E+00	0.00E+00	0.00E+00
13.0	0.00E+00	0.00E+00	0.00E+00
14.0	0.00E+00	0.00E+00	0.00E+00
15.0	0.00E+00	0.00E+00	0.00E+00
16.0	0.00E+00	0.00E+00	0.00E+00
17.0	0.00E+00	0.00E+00	0.00E+00
18.0	0.00E+00	0.00E+00	0.00E+00
19.0	0.00E+00	0.00E+00	0.00E+00
20.0	0.00E+00	0.00E+00	0.00E+00
21.0	0.00E+00	0.00E+00	0.00E+00
22.0	0.00E+00	0.00E+00	0.00E+00
23.0	0.00E+00	0.00E+00	0.00E+00
24.0	0.00E+00	0.00E+00	0.00E+00
25.0	0.00E+00	0.00E+00	0.00E+00
26.0	0.00E+00	0.00E+00	0.00E+00
27.0	0.00E+00	0.00E+00	0.00E+00

[illegible]

96.0	0.00E+00	0.00E+00	0.00E+00
97.0	0.00E+00	0.00E+00	0.00E+00
98.0	0.00E+00	0.00E+00	0.00E+00
99.0	0.00E+00	0.00E+00	0.00E+00
100.0	0.00E+00	0.00E+00	0.00E+00

"Rischio per la Risorsa Idrica Superficiale derivante da Falda - Scenario 6" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Nichel

Start of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Initial mass input to bring source area up to the
required concentration in GW (mg/d)... 1.94E+11
Mass input rate for pulse source in GW (mg/d)... 89.
Mass input rate = (Darcy flux) * (Source conc)
= K * gradient * (Source conc)

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.62
Kd (m3/kg).....	5.5
Retardation coefficient.....	3.74E+04
Seepage velocity (m/d).....	2.48E-03
Retarded seepage velocity (m/d).....	6.63E-08

Dispersion Calculations in Saturated Zone

***All dispersivity values entered by user.

Longitudinal dispersivity entered (m).....	15.
Transverse dispersivity entered (m).....	5.2
Vertical dispersivity entered (m).....	5.93E-02

GROUNDWATER CONCENTRATION (annual average)
Nichel

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)

1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00
18.0	0.00E+00

19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00
52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00
86.0	0.00E+00

87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

SURFACE WATER MIXING ZONE MODEL

Inputs for Calculation of Length of Surface Water Reach
(Using Domenico for a steady-state estimate)

Distance to SW is	75.
Long. dispersivity	15.
Trans. dispersivity	5.2
Vert. dispersivity	5.93E-02
Width of source	1.28E+02
Height of source	40.
Deg. rate (1/s)	0.0
Effective porosity	0.25
Aquifer gradient	1.00E-03
Hydraulic conductivity	0.62
Seepage velocity	2.48E-03

From Domenico's Equation for a Steady-State
Solution along the Centerline of the Plume:
(x=distance to SW, y=0, z=0)

Term1	1.0
Term2	0.98
Term3	1.0

Concentration profile at x(m) = 75.00

Point	y(m)	C/Cmax
1	66.	0.49
2	67.	0.47
3	68.	0.45
4	70.	0.42
5	72.	0.40
6	73.	0.38
7	74.	0.36
8	76.	0.34
9	78.	0.32
10	79.	0.30
11	80.	0.28
12	82.	0.26
13	84.	0.25
14	85.	0.23
15	86.	0.21
16	88.	0.20
17	90.	0.18

18	91.	0.17
19	92.	0.16
20	94.	0.14
21	96.	0.13
22	97.	0.12
23	98.	0.11
24	1.00E+02	0.10
25	1.02E+02	9.08E-02

Reached 10% of Cmax

The distance off the centerline of the plume is 1.02E+02
The length of the reach is (=2*y) 2.03E+02

Distance from GW source to SW (m).. 75.
Conductivity of SW bed [m/d]..... 10.
Kd in sediment [L/kg]..... 5.50E+03
Depth of SW bed [m]..... 1.0
Length of reach [m]..... 2.03E+02
Gradient between GW and SW [m/m]..... 5.00E-02

Calculated GW Inflow to SW [m3/d].. 1.02E+02
Cross-sectional area of river [m2]. 2.0
Calculated SW volume [m3]..... 4.06E+02
Fraction of SW for mixing [-]..... 1.0
Adjusted SW volume [m3]..... 4.06E+02
SW flow rate [m3/d]..... 1.80E+02
Adjusted SW flow rate [m3/d]. 1.80E+02
Calculated total flow [m3]..... 2.82E+02
(sum of GW inflow and SW inflow)
Decay rate in SW [1/d]..... 0.0

SURFACE WATER CONCENTRATION

Niche1

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration Surface water (mg/l)	Concentration in Sediment (mg/kg)	Mass Flux from GW to SW (mg/d)
1.0	0.00E+00	0.00E+00	0.00E+00
2.0	0.00E+00	0.00E+00	0.00E+00
3.0	0.00E+00	0.00E+00	0.00E+00
4.0	0.00E+00	0.00E+00	0.00E+00
5.0	0.00E+00	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00	0.00E+00
7.0	0.00E+00	0.00E+00	0.00E+00
8.0	0.00E+00	0.00E+00	0.00E+00
9.0	0.00E+00	0.00E+00	0.00E+00
10.0	0.00E+00	0.00E+00	0.00E+00
11.0	0.00E+00	0.00E+00	0.00E+00
12.0	0.00E+00	0.00E+00	0.00E+00
13.0	0.00E+00	0.00E+00	0.00E+00
14.0	0.00E+00	0.00E+00	0.00E+00
15.0	0.00E+00	0.00E+00	0.00E+00
16.0	0.00E+00	0.00E+00	0.00E+00
17.0	0.00E+00	0.00E+00	0.00E+00
18.0	0.00E+00	0.00E+00	0.00E+00
19.0	0.00E+00	0.00E+00	0.00E+00
20.0	0.00E+00	0.00E+00	0.00E+00
21.0	0.00E+00	0.00E+00	0.00E+00
22.0	0.00E+00	0.00E+00	0.00E+00
23.0	0.00E+00	0.00E+00	0.00E+00
24.0	0.00E+00	0.00E+00	0.00E+00
25.0	0.00E+00	0.00E+00	0.00E+00
26.0	0.00E+00	0.00E+00	0.00E+00
27.0	0.00E+00	0.00E+00	0.00E+00

[illegible]

96.0	0.00E+00	0.00E+00	0.00E+00
97.0	0.00E+00	0.00E+00	0.00E+00
98.0	0.00E+00	0.00E+00	0.00E+00
99.0	0.00E+00	0.00E+00	0.00E+00
100.0	0.00E+00	0.00E+00	0.00E+00

"Rischio per la Risorsa Idrica Superficiale derivante da Falda - Scenario 6" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Nitriti

Start of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Initial mass input to bring source area up to the required concentration in GW (mg/d)...	9.93E+10
Mass input rate for pulse source in GW (mg/d)...	1.08E+04
Mass input rate = (Darcy flux) * (Source conc)	
= K * gradient * (Source conc)	

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.62
Kd (m3/kg).....	2.30E-02
Retardation coefficient.....	1.57E+02
Seepage velocity (m/d).....	2.48E-03
Retarded seepage velocity (m/d).....	1.58E-05

Dispersion Calculations in Saturated Zone

***All dispersivity values entered by user.

Longitudinal dispersivity entered (m).....	15.
Transverse dispersivity entered (m).....	5.2
Vertical dispersivity entered (m).....	5.93E-02

GROUNDWATER CONCENTRATION (annual average) Nitriti

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration at well (mg/l)

1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	0.00E+00
5.0	0.00E+00
6.0	0.00E+00
7.0	0.00E+00
8.0	0.00E+00
9.0	0.00E+00
10.0	0.00E+00
11.0	0.00E+00
12.0	0.00E+00
13.0	0.00E+00
14.0	0.00E+00
15.0	0.00E+00
16.0	0.00E+00
17.0	0.00E+00
18.0	0.00E+00

19.0	0.00E+00
20.0	0.00E+00
21.0	0.00E+00
22.0	0.00E+00
23.0	0.00E+00
24.0	0.00E+00
25.0	0.00E+00
26.0	0.00E+00
27.0	0.00E+00
28.0	0.00E+00
29.0	0.00E+00
30.0	0.00E+00
31.0	0.00E+00
32.0	0.00E+00
33.0	0.00E+00
34.0	0.00E+00
35.0	0.00E+00
36.0	0.00E+00
37.0	0.00E+00
38.0	0.00E+00
39.0	0.00E+00
40.0	0.00E+00
41.0	0.00E+00
42.0	0.00E+00
43.0	0.00E+00
44.0	0.00E+00
45.0	0.00E+00
46.0	0.00E+00
47.0	0.00E+00
48.0	0.00E+00
49.0	0.00E+00
50.0	0.00E+00
51.0	0.00E+00
52.0	0.00E+00
53.0	0.00E+00
54.0	0.00E+00
55.0	0.00E+00
56.0	0.00E+00
57.0	0.00E+00
58.0	0.00E+00
59.0	0.00E+00
60.0	0.00E+00
61.0	0.00E+00
62.0	0.00E+00
63.0	0.00E+00
64.0	0.00E+00
65.0	0.00E+00
66.0	0.00E+00
67.0	0.00E+00
68.0	0.00E+00
69.0	0.00E+00
70.0	0.00E+00
71.0	0.00E+00
72.0	0.00E+00
73.0	0.00E+00
74.0	0.00E+00
75.0	0.00E+00
76.0	0.00E+00
77.0	0.00E+00
78.0	0.00E+00
79.0	0.00E+00
80.0	0.00E+00
81.0	0.00E+00
82.0	0.00E+00
83.0	0.00E+00
84.0	0.00E+00
85.0	0.00E+00
86.0	0.00E+00

87.0	0.00E+00
88.0	0.00E+00
89.0	0.00E+00
90.0	0.00E+00
91.0	0.00E+00
92.0	0.00E+00
93.0	0.00E+00
94.0	0.00E+00
95.0	0.00E+00
96.0	0.00E+00
97.0	0.00E+00
98.0	0.00E+00
99.0	0.00E+00
100.0	0.00E+00

End of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

SURFACE WATER MIXING ZONE MODEL

Inputs for Calculation of Length of Surface Water Reach
(Using Domenico for a steady-state estimate)

Distance to SW is	75.
Long. dispersivity	15.
Trans. dispersivity	5.2
Vert. dispersivity	5.93E-02
Width of source	1.28E+02
Height of source	40.
Deg. rate (1/s)	0.0
Effective porosity	0.25
Aquifer gradient	1.00E-03
Hydraulic conductivity	0.62
Seepage velocity	2.48E-03

From Domenico's Equation for a Steady-State
Solution along the Centerline of the Plume:
(x=distance to SW, y=0, z=0)

Term1	1.0
Term2	0.98
Term3	1.0

Concentration profile at x(m) = 75.00

Point	y(m)	C/Cmax
1	66.	0.49
2	67.	0.47
3	68.	0.45
4	70.	0.42
5	72.	0.40
6	73.	0.38
7	74.	0.36
8	76.	0.34
9	78.	0.32
10	79.	0.30
11	80.	0.28
12	82.	0.26
13	84.	0.25
14	85.	0.23
15	86.	0.21
16	88.	0.20
17	90.	0.18

18	91.	0.17
19	92.	0.16
20	94.	0.14
21	96.	0.13
22	97.	0.12
23	98.	0.11
24	1.00E+02	0.10
25	1.02E+02	9.08E-02

Reached 10% of Cmax

The distance off the centerline of the plume is 1.02E+02
The length of the reach is (=2*y) 2.03E+02

Distance from GW source to SW (m).. 75.
Conductivity of SW bed [m/d]..... 10.
Kd in sediment [L/kg]..... 23.
Depth of SW bed [m]..... 1.0
Length of reach [m]..... 2.03E+02
Gradient between GW and SW [m/m]..... 5.00E-02

Calculated GW Inflow to SW [m3/d].. 1.02E+02
Cross-sectional area of river [m2]. 2.0
Calculated SW volume [m3]..... 4.06E+02
Fraction of SW for mixing [-]..... 1.0
Adjusted SW volume [m3]..... 4.06E+02
SW flow rate [m3/d]..... 1.80E+02
Adjusted SW flow rate [m3/d]. 1.80E+02
Calculated total flow [m3]..... 2.82E+02
(sum of GW inflow and SW inflow)
Decay rate in SW [1/d]..... 0.0

SURFACE WATER CONCENTRATION Nitriti

The maximum groundwater concentration (mg/l): 0.00E+00
Occurred at year: 0.0

Time (yr)	Concentration Surface water (mg/l)	Concentration in Sediment (mg/kg)	Mass Flux from GW to SW (mg/d)
1.0	0.00E+00	0.00E+00	0.00E+00
2.0	0.00E+00	0.00E+00	0.00E+00
3.0	0.00E+00	0.00E+00	0.00E+00
4.0	0.00E+00	0.00E+00	0.00E+00
5.0	0.00E+00	0.00E+00	0.00E+00
6.0	0.00E+00	0.00E+00	0.00E+00
7.0	0.00E+00	0.00E+00	0.00E+00
8.0	0.00E+00	0.00E+00	0.00E+00
9.0	0.00E+00	0.00E+00	0.00E+00
10.0	0.00E+00	0.00E+00	0.00E+00
11.0	0.00E+00	0.00E+00	0.00E+00
12.0	0.00E+00	0.00E+00	0.00E+00
13.0	0.00E+00	0.00E+00	0.00E+00
14.0	0.00E+00	0.00E+00	0.00E+00
15.0	0.00E+00	0.00E+00	0.00E+00
16.0	0.00E+00	0.00E+00	0.00E+00
17.0	0.00E+00	0.00E+00	0.00E+00
18.0	0.00E+00	0.00E+00	0.00E+00
19.0	0.00E+00	0.00E+00	0.00E+00
20.0	0.00E+00	0.00E+00	0.00E+00
21.0	0.00E+00	0.00E+00	0.00E+00
22.0	0.00E+00	0.00E+00	0.00E+00
23.0	0.00E+00	0.00E+00	0.00E+00
24.0	0.00E+00	0.00E+00	0.00E+00
25.0	0.00E+00	0.00E+00	0.00E+00
26.0	0.00E+00	0.00E+00	0.00E+00
27.0	0.00E+00	0.00E+00	0.00E+00

[illegible]

96.0	0.00E+00	0.00E+00	0.00E+00
97.0	0.00E+00	0.00E+00	0.00E+00
98.0	0.00E+00	0.00E+00	0.00E+00
99.0	0.00E+00	0.00E+00	0.00E+00
100.0	0.00E+00	0.00E+00	0.00E+00

"Rischio per la Risorsa Idrica Superficiale derivante da Falda - Scenario 6" - Output

FATE AND TRANSPORT MODEL OUTPUT FOR: Solfati

Start of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

GROUNDWATER MODEL CALCULATIONS:

Initial mass input to bring source area up to the required concentration in GW (mg/d)...	8.54E+07
Mass input rate for pulse source in GW (mg/d)...	1.46E+03
Mass input rate = (Darcy flux) * (Source conc)	
= K * gradient * (Source conc)	

Contaminant Velocity in Saturated Zone

Aquifer gradient	1.00E-03
Hydraulic conductivity (m/d).....	0.62
Koc (m ³ /kg).....	0.0
Foc (g/g).....	2.40E-02
Retardation coefficient.....	1.0
Seepage velocity (m/d).....	2.48E-03
Retarded seepage velocity (m/d).....	2.48E-03

Dispersion calculations in Saturated Zone

***All dispersivity values entered by user.

Longitudinal dispersivity entered (m).....	15.
Transverse dispersivity entered (m).....	5.2
Vertical dispersivity entered (m).....	5.93E-02

GROUNDWATER CONCENTRATION (annual average) Solfati

The maximum groundwater concentration (mg/l): 6.84E-02
Occurred at year: 100.0

Time (yr)	Concentration at well (mg/l)
1.0	0.00E+00
2.0	0.00E+00
3.0	0.00E+00
4.0	4.98E-16
5.0	2.18E-13
6.0	1.23E-11
7.0	2.35E-10
8.0	2.25E-09
9.0	1.34E-08
10.0	5.71E-08
11.0	1.90E-07
12.0	5.24E-07
13.0	1.25E-06
14.0	2.65E-06
15.0	5.13E-06
16.0	9.22E-06
17.0	1.55E-05

18.0	2.49E-05
19.0	3.80E-05
20.0	5.60E-05
21.0	7.97E-05
22.0	1.10E-04
23.0	1.49E-04
24.0	1.97E-04
25.0	2.55E-04
26.0	3.24E-04
27.0	4.06E-04
28.0	5.02E-04
29.0	6.12E-04
30.0	7.39E-04
31.0	8.82E-04
32.0	1.04E-03
33.0	1.22E-03
34.0	1.42E-03
35.0	1.64E-03
36.0	1.88E-03
37.0	2.14E-03
38.0	2.43E-03
39.0	2.73E-03
40.0	3.07E-03
41.0	3.42E-03
42.0	3.80E-03
43.0	4.20E-03
44.0	4.63E-03
45.0	5.09E-03
46.0	5.57E-03
47.0	6.08E-03
48.0	6.61E-03
49.0	7.17E-03
50.0	7.76E-03
51.0	8.37E-03
52.0	9.01E-03
53.0	9.67E-03
54.0	1.04E-02
55.0	1.11E-02
56.0	1.18E-02
57.0	1.26E-02
58.0	1.34E-02
59.0	1.42E-02
60.0	1.51E-02
61.0	1.60E-02
62.0	1.69E-02
63.0	1.78E-02
64.0	1.87E-02
65.0	1.97E-02
66.0	2.07E-02
67.0	2.17E-02
68.0	2.28E-02
69.0	2.39E-02
70.0	2.50E-02
71.0	2.61E-02
72.0	2.73E-02
73.0	2.84E-02
74.0	2.96E-02
75.0	3.08E-02
76.0	3.21E-02
77.0	3.33E-02
78.0	3.46E-02
79.0	3.59E-02
80.0	3.72E-02
81.0	3.86E-02
82.0	4.00E-02
83.0	4.13E-02
84.0	4.27E-02
85.0	4.42E-02

86.0	4.56E-02
87.0	4.71E-02
88.0	4.86E-02
89.0	5.01E-02
90.0	5.16E-02
91.0	5.31E-02
92.0	5.47E-02
93.0	5.62E-02
94.0	5.78E-02
95.0	5.94E-02
96.0	6.10E-02
97.0	6.26E-02
98.0	6.43E-02
99.0	6.59E-02
100.0	6.76E-02

End of DISSOLVED SOURCE GROUNDWATER MODEL OUTPUT

SURFACE WATER MIXING ZONE MODEL

Inputs for Calculation of Length of Surface Water Reach
(Using Domenico for a steady-state estimate)

Distance to SW is	75.
Long. dispersivity	15.
Trans. dispersivity	5.2
Vert. dispersivity	5.93E-02
Width of source	1.28E+02
Height of source	40.
Deg. rate (1/s)	0.0
Effective porosity	0.25
Aquifer gradient	1.00E-03
Hydraulic conductivity	0.62
Seepage velocity	2.48E-03

From Domenico's Equation for a Steady-State
Solution along the Centerline of the Plume:
(x=distance to SW, y=0, z=0)

Term1	1.0
Term2	0.98
Term3	1.0

Concentration profile at x(m) = 75.00

Point	y(m)	C/Cmax
1	66.	0.49
2	67.	0.47
3	68.	0.45
4	70.	0.42
5	72.	0.40
6	73.	0.38
7	74.	0.36
8	76.	0.34
9	78.	0.32
10	79.	0.30
11	80.	0.28
12	82.	0.26
13	84.	0.25
14	85.	0.23
15	86.	0.21
16	88.	0.20

17	90.	0.18
18	91.	0.17
19	92.	0.16
20	94.	0.14
21	96.	0.13
22	97.	0.12
23	98.	0.11
24	1.00E+02	0.10
25	1.02E+02	9.08E-02

Reached 10% of Cmax

The distance off the centerline of the plume is	1.02E+02
The length of the reach is (=2*y)	2.03E+02

Distance from GW source to SW (m) ..	75.
Conductivity of SW bed [m/d]	10.
FOC in sediment [g/g]	1.00E-02
Depth of SW bed [m]	1.0
Length of reach [m]	2.03E+02
Gradient between GW and SW [m/m]	5.00E-02

Calculated GW Inflow to SW [m3/d] ..	1.02E+02
Cross-sectional area of river [m2] ..	2.0
Calculated SW volume [m3]	4.06E+02
Fraction of SW for mixing [-]	1.0
Adjusted SW volume [m3]	4.06E+02
SW flow rate [m3/d]	1.80E+02
Adjusted SW flow rate [m3/d]	1.80E+02
Calculated total flow [m3]	2.82E+02
(sum of GW inflow and SW inflow)	
Decay rate in SW [1/d]	0.0

SURFACE WATER CONCENTRATION
Solfati

The maximum groundwater concentration (mg/l):	2.46E-02
Occurred at year:	100.0

Time (yr)	Concentration Surface Water (mg/l)	Concentration in Sediment (mg/kg)	Mass Flux from GW to SW (mg/d)
-----	-----	-----	-----
1.0	0.00E+00	0.00E+00	0.00E+00
2.0	0.00E+00	0.00E+00	0.00E+00
3.0	0.00E+00	0.00E+00	0.00E+00
4.0	0.00E+00	0.00E+00	4.45E-11
5.0	0.00E+00	0.00E+00	2.22E-08
6.0	0.00E+00	0.00E+00	1.25E-06
7.0	4.96E-11	0.00E+00	2.38E-05
8.0	8.11E-10	0.00E+00	2.28E-04
9.0	4.84E-09	0.00E+00	1.36E-03
10.0	2.06E-08	0.00E+00	5.80E-03
11.0	6.85E-08	0.00E+00	1.93E-02
12.0	1.89E-07	0.00E+00	5.32E-02
13.0	4.50E-07	0.00E+00	1.27E-01
14.0	9.56E-07	0.00E+00	2.69E-01
15.0	1.85E-06	0.00E+00	5.21E-01
16.0	3.32E-06	0.00E+00	9.36E-01
17.0	5.60E-06	0.00E+00	1.58E+00
18.0	8.96E-06	0.00E+00	2.52E+00
19.0	1.37E-05	0.00E+00	3.86E+00
20.0	2.02E-05	0.00E+00	5.68E+00
21.0	2.87E-05	0.00E+00	8.09E+00
22.0	3.98E-05	0.00E+00	1.12E+01
23.0	5.37E-05	0.00E+00	1.51E+01
24.0	7.09E-05	0.00E+00	2.00E+01
25.0	9.19E-05	0.00E+00	2.59E+01
26.0	1.17E-04	0.00E+00	3.29E+01

27.0	1.46E-04	0.00E+00	4.12E+01
28.0	1.81E-04	0.00E+00	5.10E+01
29.0	2.21E-04	0.00E+00	6.22E+01
30.0	2.66E-04	0.00E+00	7.50E+01
31.0	3.18E-04	0.00E+00	8.95E+01
32.0	3.76E-04	0.00E+00	1.06E+02
33.0	4.41E-04	0.00E+00	1.24E+02
34.0	5.12E-04	0.00E+00	1.44E+02
35.0	5.91E-04	0.00E+00	1.66E+02
36.0	6.78E-04	0.00E+00	1.91E+02
37.0	7.73E-04	0.00E+00	2.17E+02
38.0	8.75E-04	0.00E+00	2.46E+02
39.0	9.86E-04	0.00E+00	2.78E+02
40.0	1.11E-03	0.00E+00	3.11E+02
41.0	1.23E-03	0.00E+00	3.47E+02
42.0	1.37E-03	0.00E+00	3.86E+02
43.0	1.52E-03	0.00E+00	4.27E+02
44.0	1.67E-03	0.00E+00	4.70E+02
45.0	1.84E-03	0.00E+00	5.17E+02
46.0	2.01E-03	0.00E+00	5.65E+02
47.0	2.19E-03	0.00E+00	6.17E+02
48.0	2.38E-03	0.00E+00	6.71E+02
49.0	2.59E-03	0.00E+00	7.28E+02
50.0	2.80E-03	0.00E+00	7.87E+02
51.0	3.02E-03	0.00E+00	8.49E+02
52.0	3.25E-03	0.00E+00	9.14E+02
53.0	3.49E-03	0.00E+00	9.82E+02
54.0	3.74E-03	0.00E+00	1.05E+03
55.0	4.00E-03	0.00E+00	1.13E+03
56.0	4.27E-03	0.00E+00	1.20E+03
57.0	4.54E-03	0.00E+00	1.28E+03
58.0	4.83E-03	0.00E+00	1.36E+03
59.0	5.13E-03	0.00E+00	1.44E+03
60.0	5.44E-03	0.00E+00	1.53E+03
61.0	5.75E-03	0.00E+00	1.62E+03
62.0	6.08E-03	0.00E+00	1.71E+03
63.0	6.41E-03	0.00E+00	1.81E+03
64.0	6.76E-03	0.00E+00	1.90E+03
65.0	7.11E-03	0.00E+00	2.00E+03
66.0	7.47E-03	0.00E+00	2.10E+03
67.0	7.84E-03	0.00E+00	2.21E+03
68.0	8.22E-03	0.00E+00	2.31E+03
69.0	8.61E-03	0.00E+00	2.42E+03
70.0	9.01E-03	0.00E+00	2.54E+03
71.0	9.41E-03	0.00E+00	2.65E+03
72.0	9.83E-03	0.00E+00	2.77E+03
73.0	1.02E-02	0.00E+00	2.88E+03
74.0	1.07E-02	0.00E+00	3.01E+03
75.0	1.11E-02	0.00E+00	3.13E+03
76.0	1.16E-02	0.00E+00	3.26E+03
77.0	1.20E-02	0.00E+00	3.38E+03
78.0	1.25E-02	0.00E+00	3.51E+03
79.0	1.30E-02	0.00E+00	3.65E+03
80.0	1.34E-02	0.00E+00	3.78E+03
81.0	1.39E-02	0.00E+00	3.92E+03
82.0	1.44E-02	0.00E+00	4.06E+03
83.0	1.49E-02	0.00E+00	4.20E+03
84.0	1.54E-02	0.00E+00	4.34E+03
85.0	1.59E-02	0.00E+00	4.48E+03
86.0	1.64E-02	0.00E+00	4.63E+03
87.0	1.70E-02	0.00E+00	4.78E+03
88.0	1.75E-02	0.00E+00	4.93E+03
89.0	1.80E-02	0.00E+00	5.08E+03
90.0	1.86E-02	0.00E+00	5.23E+03
91.0	1.91E-02	0.00E+00	5.39E+03
92.0	1.97E-02	0.00E+00	5.55E+03
93.0	2.03E-02	0.00E+00	5.71E+03
94.0	2.08E-02	0.00E+00	5.87E+03

95.0	2.14E-02	0.00E+00	6.03E+03
96.0	2.20E-02	0.00E+00	6.19E+03
97.0	2.26E-02	0.00E+00	6.36E+03
98.0	2.32E-02	0.00E+00	6.52E+03
99.0	2.38E-02	0.00E+00	6.69E+03
100.0	2.44E-02	0.00E+00	6.86E+03