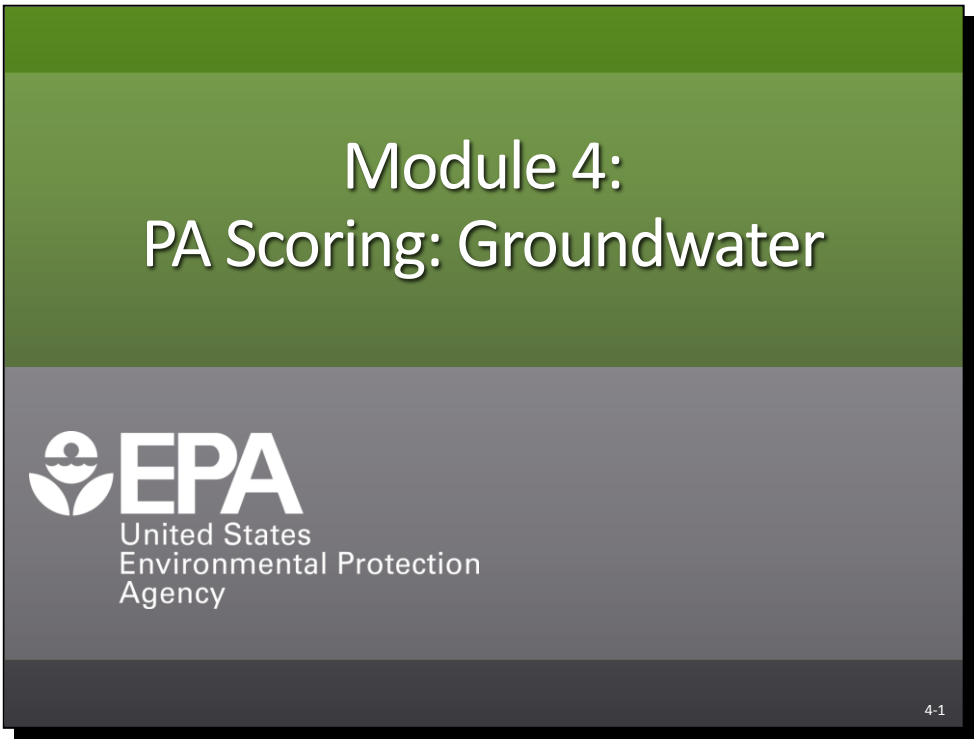
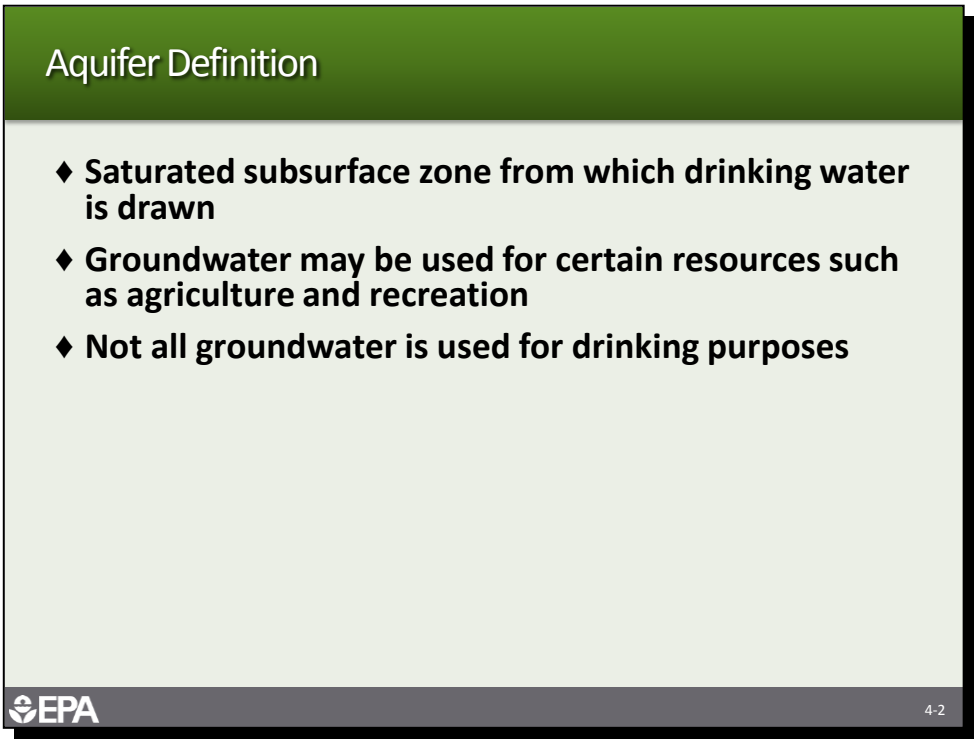
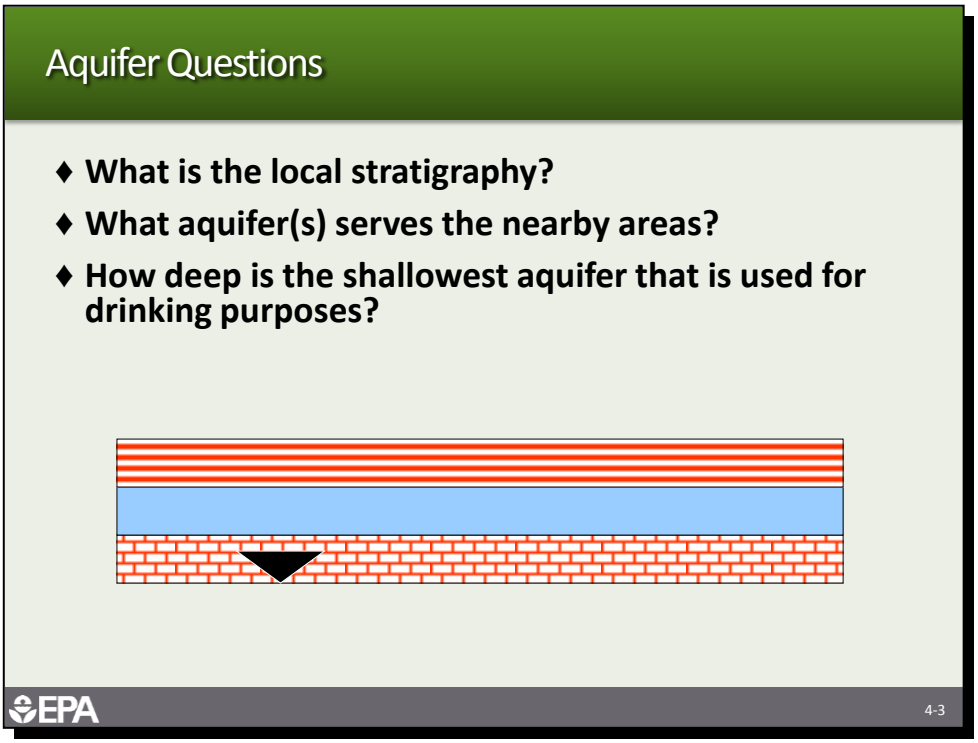

Module 4:
PA Scoring: Groundwater
EPA
United States
Environmental Protection
Agency
4-1



Notes

- **Saturated subsurface zone from which drinking water is drawn:** EPA's PA guidance defines an aquifer as a saturated subsurface zone from which drinking water is drawn. The principal threat under the groundwater pathway is the threat posed to drinking water and to populations relying on groundwater as their source of drinking water.
- **Groundwater may be used for certain resources such as agriculture and recreation:** Groundwater affected by a site may also be used for resources, such as agriculture, commercial food production, livestock, silviculture or recreation. If groundwater is used for certain resources, the groundwater score can be increased.
- **Not all groundwater is used for drinking purposes:** Groundwater may not be used for drinking in some areas. The reasons could be poor yield, poor quality or the availability of a high quality surface water source.

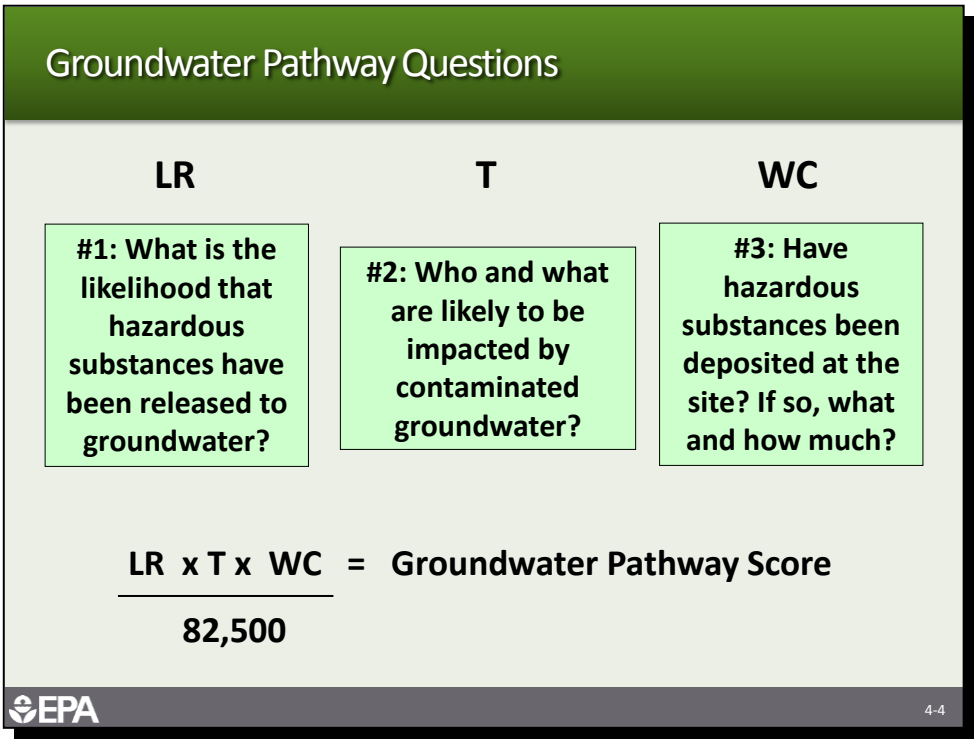


Notes

- **What is the local stratigraphy?:** Proper evaluation of the groundwater pathway requires a general understanding of the local geology and subsurface conditions. Publications of the USGS and State geological surveys are good sources for local and regional geologic information. Other local sources of information may include well drillers, well logs (possibly maintained by local and State government agencies) and university geology departments.

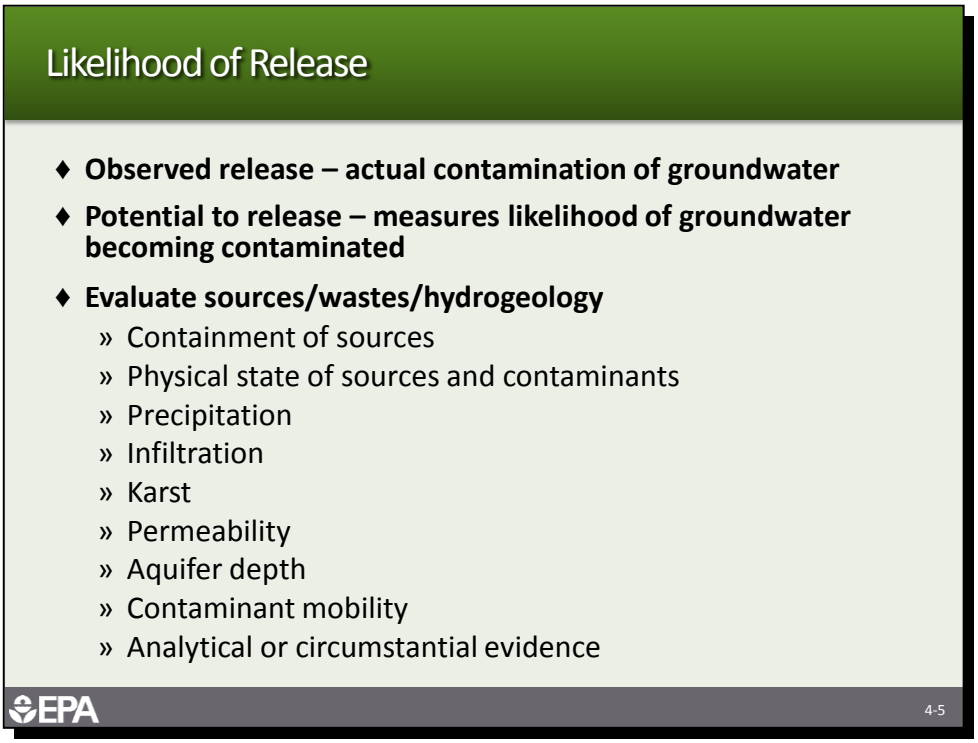
- **What aquifer(s) serves the nearby areas?:** The target distance limit for groundwater is 4 miles. All aquifers within 4 miles of the site should be evaluated to determine if they are used for drinking water. In many cases, a shallow aquifer may be used by private residents with individual wells while a deeper aquifer is used by a community or municipality.

- **How deep is the shallowest aquifer that is used for drinking purposes?:** The PA identifies the shallowest aquifer used for drinking purposes. This information is necessary to evaluate the potential to release if an observed release cannot be established.



Notes

- **Groundwater pathway questions:** The groundwater pathway is scored by determining (1) the likelihood that hazardous substances have been released to the groundwater (the higher the likelihood the higher the score); (2) the number of targets affected or potentially affected by the contaminated groundwater (the greater the number of targets the greater the score); and (3) the toxicity, mobility and quantity of hazardous substances at the site (the more toxic and mobile, and the greater the quantity the greater the score).



Notes

- **Observed release:** This factor evaluates the likelihood that contamination from the site has reached groundwater. At the PA stage, groundwater sampling data may not be available. Therefore, several contaminant and hydrogeologic factors are evaluated to make this determination.

- **Potential to release:** This factor measures the likelihood of groundwater becoming contaminated based on site-specific factors. These factors include source containment, net precipitation, depth to aquifer and contaminant travel time.

- **Evaluate sources/wastes/hydrogeology:** The likelihood of release requires an evaluation of the sources at the site and the level of containment of those sources, the physical state of the contaminants, precipitation levels, infiltration rates, presence of karst geology, permeability, aquifer depth, contaminant mobility and any analytical or circumstantial evidence regarding releases.

Groundwater Targets

- **Actual contamination, Level I and Level II concentrations**
  - » Drinking water wells
  - » Count population drinking from wells
- **Potential contamination**
  - » Drinking water wells within 4-mile radius of source
  - » Calculate distance weighted population drinking from wells

EPA 4-6

Notes

- **Actual Level I and II contamination:** Actual contamination targets include populations associated with drinking water wells that are contaminated. Level I contamination occurs when contaminant levels in drinking water wells are above established standards, such as maximum contaminant levels (MCL). Level II contamination occurs when contaminant levels in drinking water qualifies as an observed release but is at or below established standards.

- **Potential contamination:** Potential contamination evaluates all drinking water wells within 4 miles of the sources. The population served by these wells is counted even if they live farther than 4 miles from the source. Populations associated with drinking water wells are distance weighted. The farther the well is from the source, the greater the reduction in target numbers due to distance weighting.

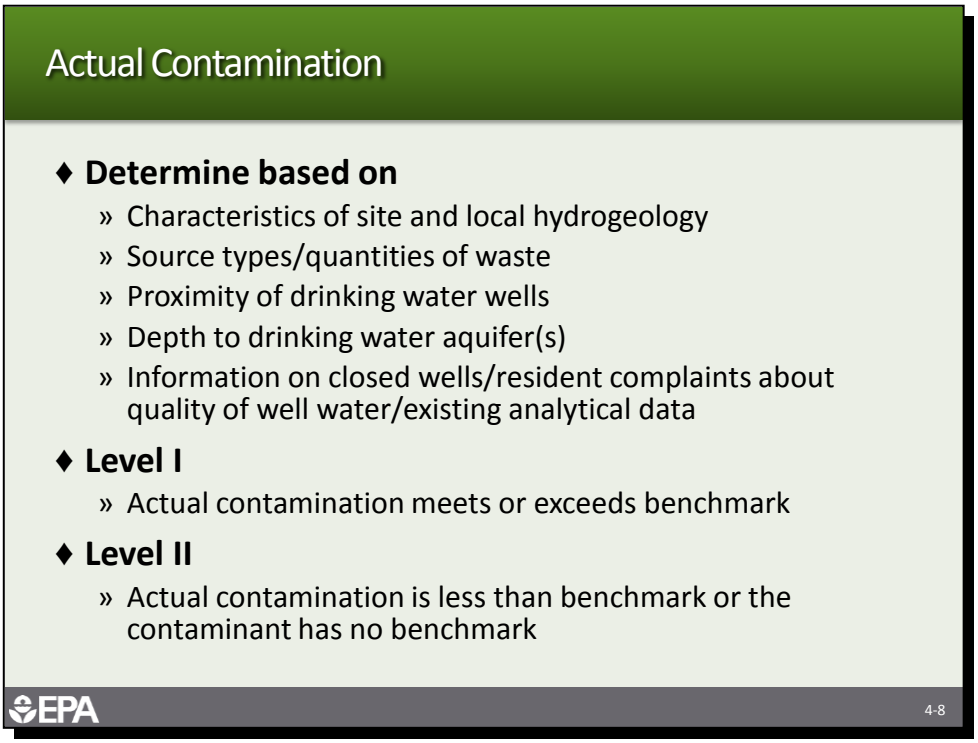
Groundwater Targets

- **Resources – groundwater used for agriculture, silviculture, livestock, food production or recreation within 4 miles of source**
- **Wellhead Protection Area – officially established under SDWA within 4 miles of source**

EPA 4-7

Notes

- **Resources:** This pathway score can be increased if groundwater is used for particular resources within 4 miles of the sources at the site.
- **Wellhead Protection Area:** If there is a formally established Wellhead Protection Area within 4 miles of the sources at the site then additional points can be added to the score. Only final Wellhead Protection Areas established in accordance with the Safe Drinking Water Act count. Proposed areas cannot be counted.

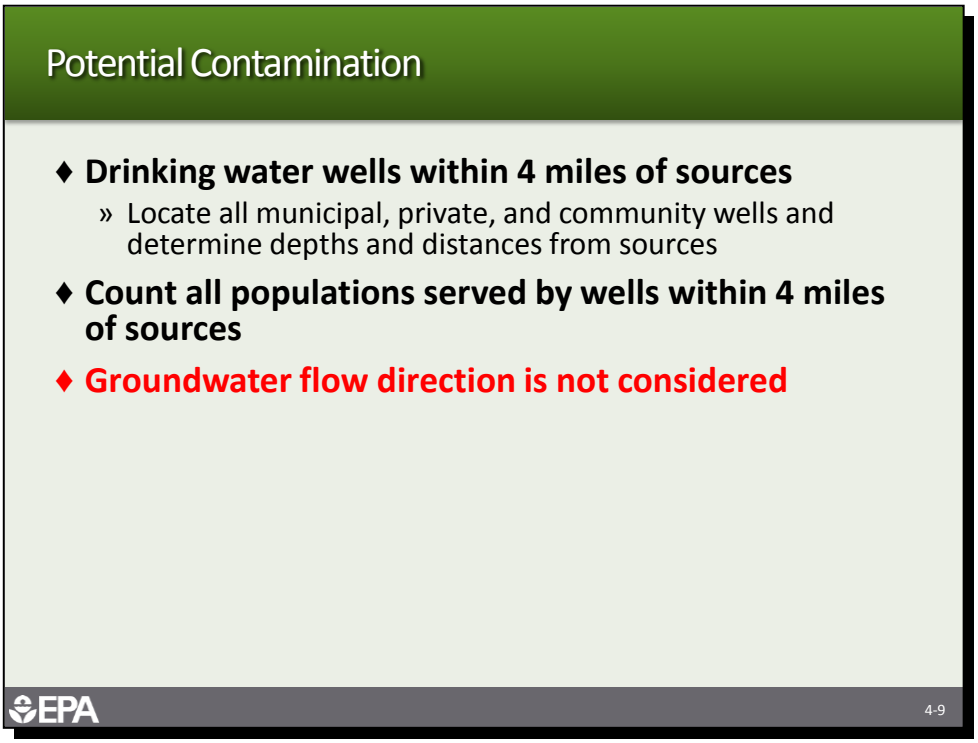


Notes

- **Determine based on:** At the PA stage, there may not be any analytical data to indicate that drinking water wells are subject to actual contamination. Therefore, BPJ must be used to evaluate whether actual contamination should be scored. These judgments should be conservative and err on the side of caution. The BPJ should consider the characteristics of the site and local hydrogeology; source types and quantities of waste; the proximity of drinking water wells; the depth to drinking water aquifers; and any information about closed wells or complaints of residents about the quality of well water. Existing analytical information from past sampling efforts can also be useful.

- **Level I:** Actual contamination can either be Level I or Level II. Level I groundwater contamination means that a drinking water well has contamination at levels that equal or exceed regulatory or health-based standards, such as, MCLs. Level I contamination is scored higher than Level II contamination.

- **Level II:** Level II contamination means that a drinking water well has contamination at levels that qualify as an observed release but are less than regulatory or health-based standards.

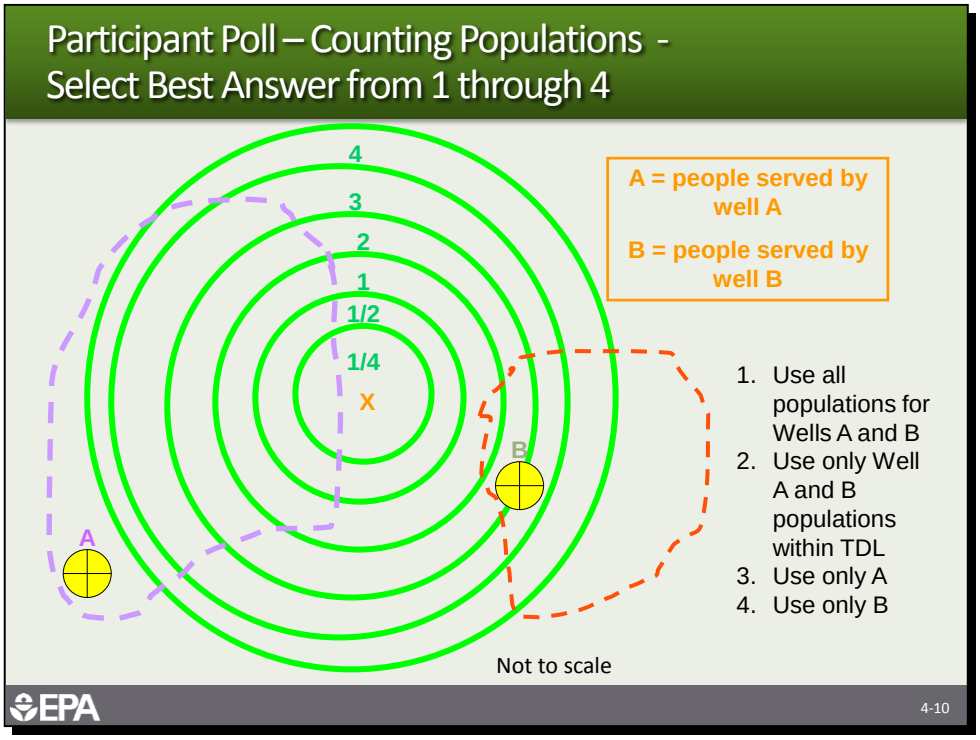


Notes

- **Drinking water wells within 4 miles of sources:** All drinking water wells within 4 miles of the source should be evaluated, including municipal wells, private wells and community supply wells. The depths of these wells and their distances from the sources should be established.

- **Count all populations served by wells within 4 miles of sources:** All populations served by wells located 4 miles from the source should be counted. Well located within 4 miles of the sources may serve populations outside 4 miles. Conversely, wells located outside the 4 mile distance limit may serve populations located within the 4 mile target distance limit.

- **Groundwater flow direction is not considered:** The PA, SI and HRS do not consider groundwater flow direction. The target distance limit is measured from sources in all directions.



Notes

- **Well location example:** This example illustrates how populations are counted. The population from Well A would not be included because the well is located outside the 4 mile target distance limit, even though the population resides within the target distance limit. The population associated with Well B would be counted even though most of the people live outside the target distance limit because the well is within the target distance limit.

Multiple Aquifers

- **Evaluate all groundwater targets within 4 miles of the sources regardless of which aquifer they draw from**
- **If two or more aquifers are interconnected, they can be counted as one aquifer**

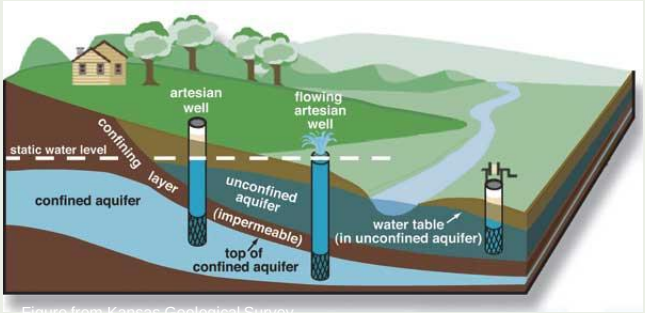


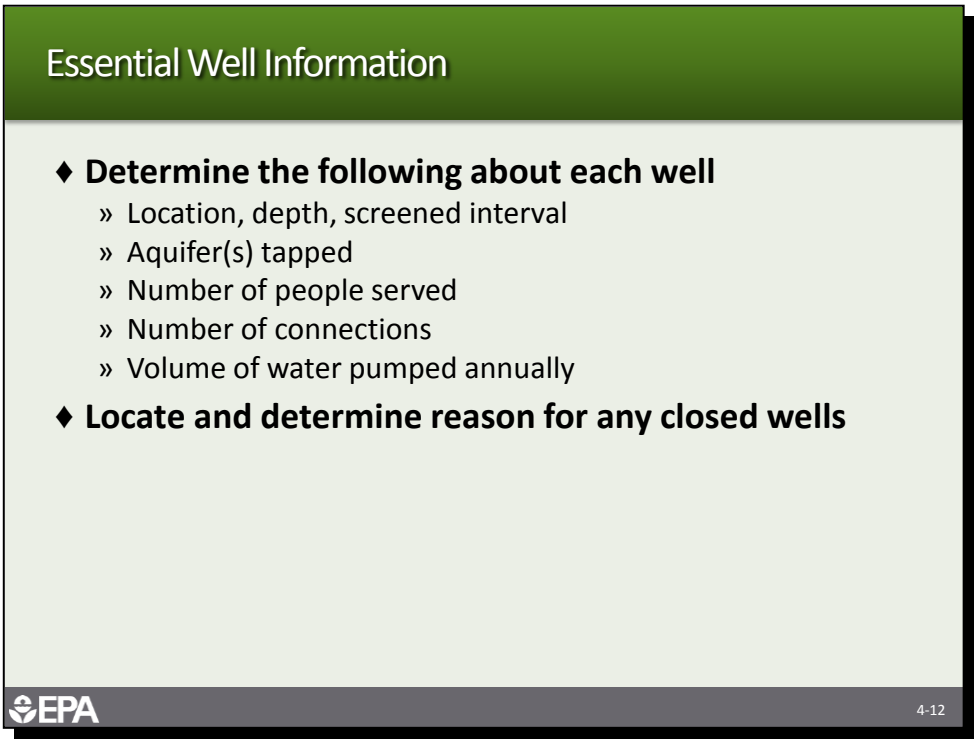
Figure from Kansas Geological Survey

EPA 4-11

Notes

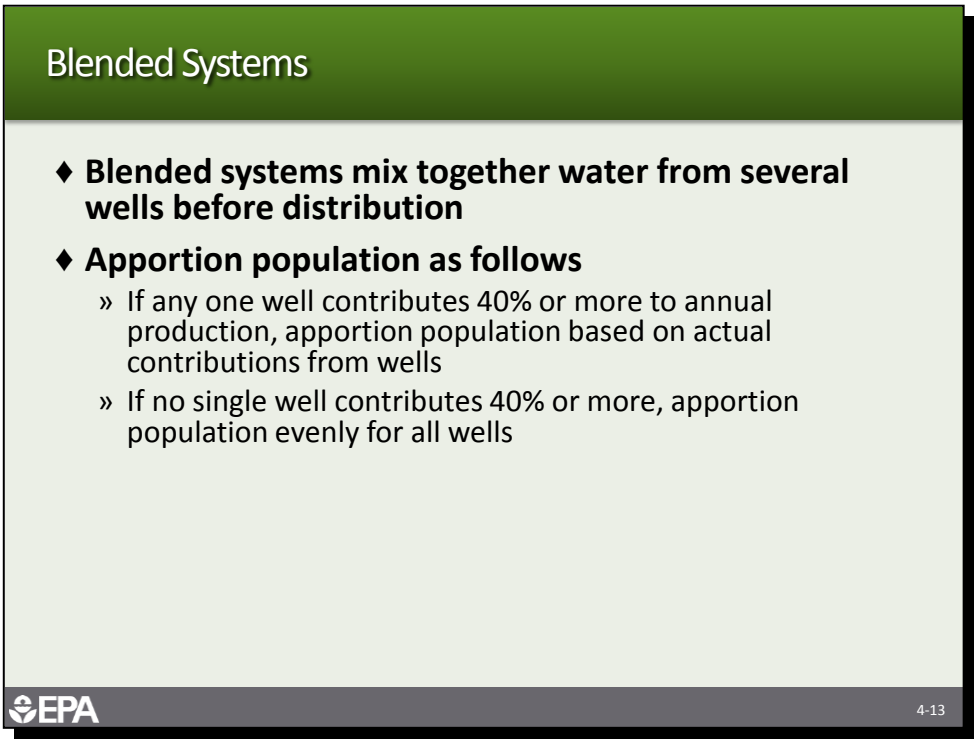
- **Evaluate all groundwater targets within 4 miles of the sources regardless of which aquifer they draw from:** Many sites will have more than one aquifer associated with them. All drinking water wells within the 4 mile target distance limit should be evaluated even if they draw from different aquifers.

- **If two or more aquifers are interconnected, they can be counted as one aquifer:** Interconnected aquifers can be counted as one aquifer. Evidence of interconnected must be established through existing geologic information or information developed during the SI.



Notes

- **Determine the following about each well:** As part of the PA, the following information should be collected for each well:
  - Location, depth and screened interval
  - Aquifer(s) tapped
  - Number of people served
  - Number of connections
  - Volume of water pumped annually
- **Locate and determine reason for any closed wells:** If any wells have been closed, the PA should locate these wells in relation to the site, determine if they are within the target distance limit, and establish the reason for closing the well.

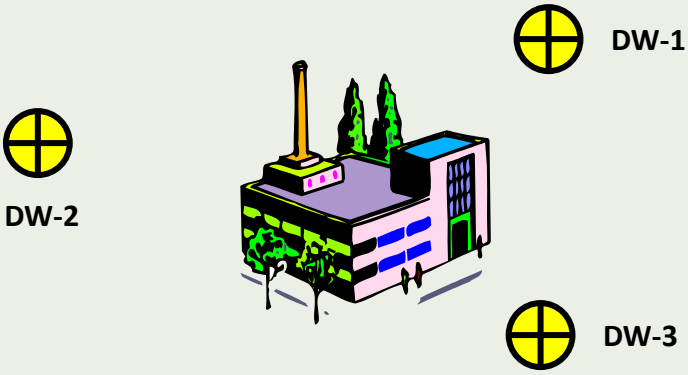


Notes

- **Blended systems mix together water from several wells before distribution:** Municipal systems may blend together water from two or more wells before distribution to users. In addition, the entire system may be interconnected, by way of valves or connecting lines, so that water drawn from any individual well has the potential to reach any user of the system. The population from such blended systems must be apportioned.

- **Apportion population as follows:** Population apportions for blended systems follows the 40% rule. If any one well contributes 40% or more to annual production, apportion the population based on actual contributions from wells. If no single well contributes 40% or more, apportion population evenly for all wells.

40% Rule Example



Water from DW-1, DW-2 and DW-3 is blended together and serves a population of 10,000 people

EPA 4-14

Participant Poll - Less than 40% - Apportion Population of 10,000 to Each Well

WELL #	% CONTRIBUTION	POPULATION SERVED
DW-1	30	?
DW-2	35	?
DW-3	35	?

EPA 4-15

Less Than 40% Solution

WELL #	% CONTRIBUTION	POPULATION SERVED
DW-1	30	3,333
DW-2	35	3,333
DW-3	35	3,333

$$\frac{\text{TOTAL POPULATION}}{\text{NUMBER OF WELLS}} = \text{POPULATION SERVED}$$

EPA 4-16

Participant Poll - More Than 40% - Apportion Population of 10,000 to Each Well

WELL #	% CONTRIBUTION	POPULATION SERVED
DW-1	50	?
DW-2	25	?
DW-3	25	?

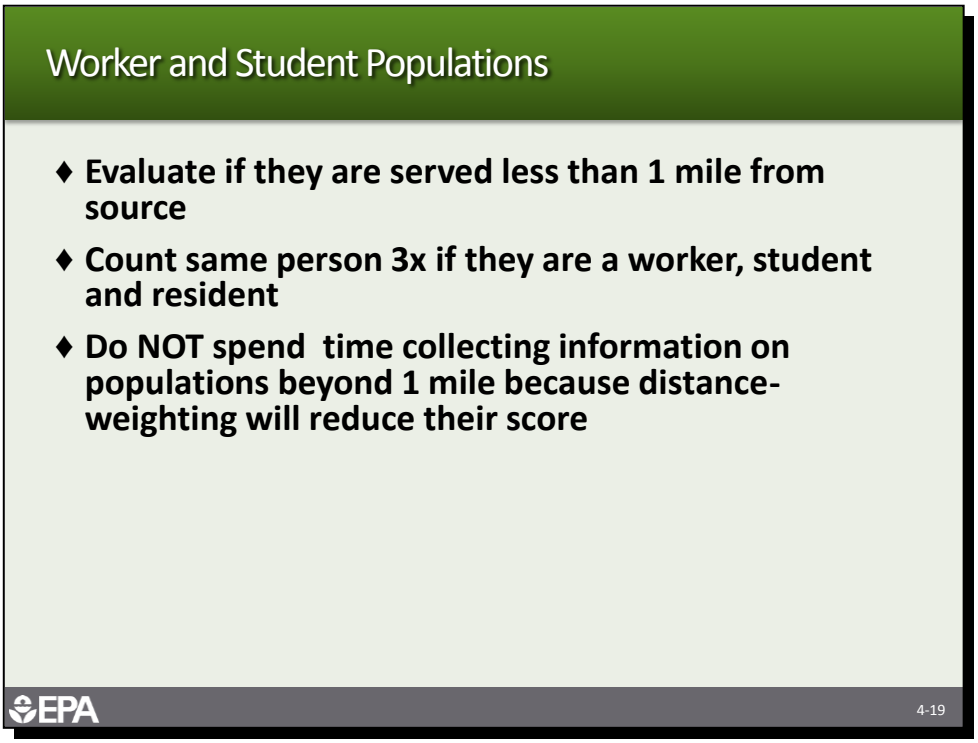
EPA 4-17

More Than 40% Solution

WELL #	% CONTRIBUTION	POPULATION SERVED
DW-1	50	5,000
DW-2	25	2,500
DW-3	25	2,500

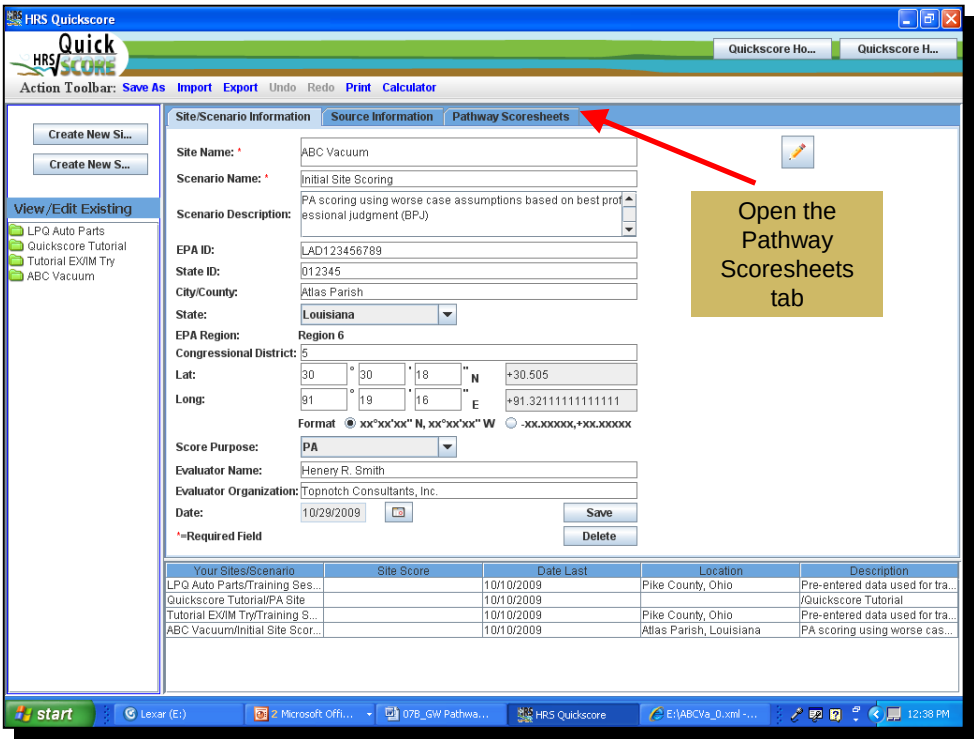
TOTAL POPULATION x % CONTRIBUTION = POPULATION SERVED

EPA 4-18



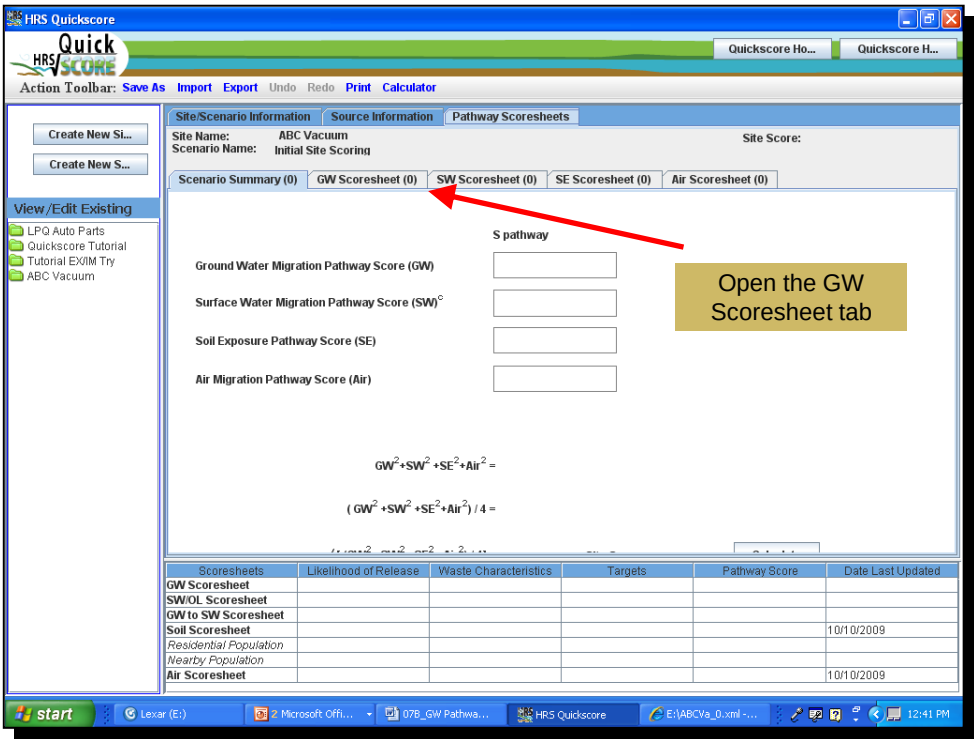
Notes

- **Evaluate if they are served less than 1 mile from source:** Worker and student populations served within 1 mile of sources should be evaluated if they are not already included in the population served by the municipal system.
- **Count same person 3x if they are a worker, student and resident:** A single individual can be counted three times if they are a worker, student and resident.
- **Do NOT spend time collecting information on populations beyond 1 mile because distance-weighting will reduce their score:** It generally will not be advantageous to spend time collecting information on worker and student populations beyond 1 mile because of the effects of distance-weighting. The exception to this may be the presence of a large major university or major manufacturing complex with many employees.



Notes

- The participants will now score the groundwater pathway for the ABC site. Open the Pathway Scoresheets tab.



Notes

- Open the Ground Water Scoresheet tab. Next review groundwater information for the ABC Vacuum Site.

ABC Site Groundwater Pathway Information

- **There are two aquifers of concern:**
  - A shallow, water table aquifer (depth to water = 30 ft) that consist mainly of fine to course-grained sands and gravel
  - A deeper aquifer (depth to water = 160 ft) that consists mainly of fine to coarse-grained sands and gravel
- **Shallow aquifer use**
  - Five nearby residences use private wells that tap the shallow aquifer
  - No other private wells exist within 4 miles of the site

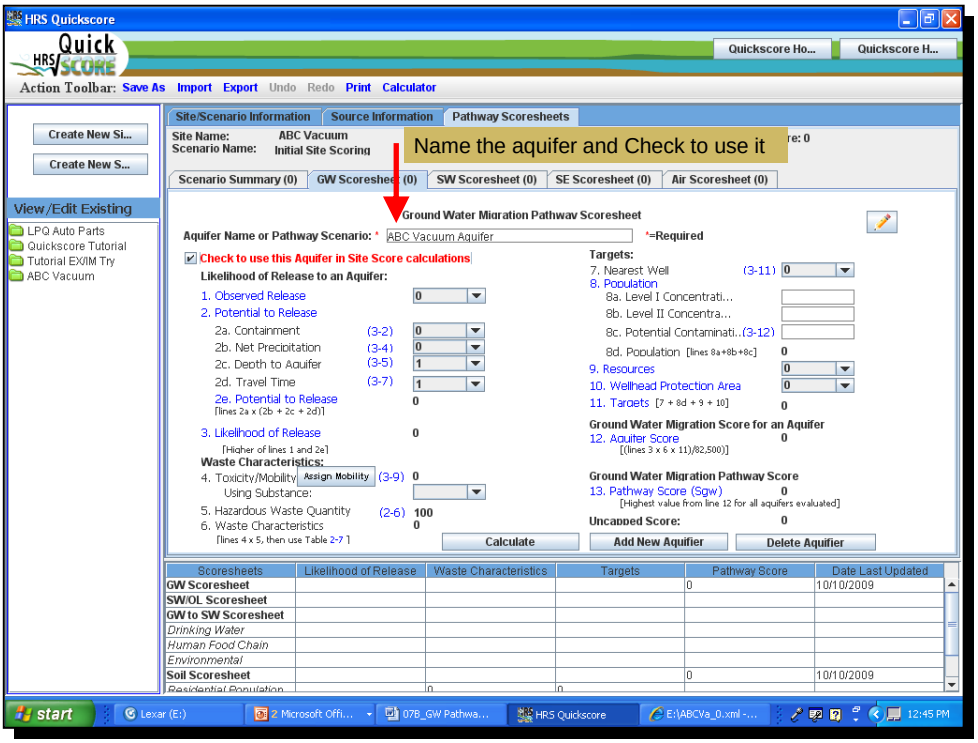
(continued)

EPA 4-22

ABC Site Groundwater Pathway Information

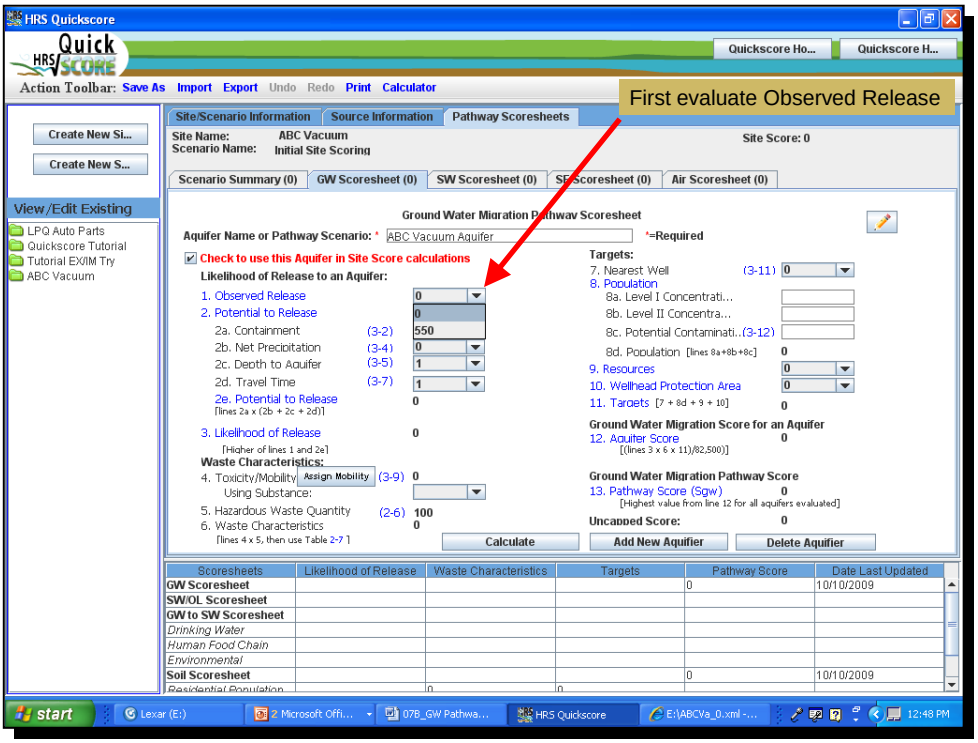
- **Deeper aquifer use**
  - Blended municipal well system present within 1 mile of site
    - Total population served is 8,900
    - Wells tap the deeper aquifer and are screened at approximately 195 ft
- **Groundwater is also used in commercial crayfish ponds**
- **No wellhead protection area is located within 4 miles of the site**
- **The site is not located in an area of karst terrain**
- **Based on 2,000 U.S. Census data, there is an average of 3.8 persons per household in Atlas Parish, Louisiana**

EPA 4-23



Notes

- Go to name the Aquifer or Scenario and check the box below that tells the program to use this aquifer in scoring. The sheet will not go “live” until you name the aquifer. Click on the summary tab to get the program to recognize the name.



Notes

- Click the observed release drop down which shows 550 and 0.

Observed Release Evaluation

- **Review site characteristics, contaminant types and hydrogeology**
- **Use BPJ to determine if observed release has occurred**
- **If yes – select 550 from drop down**
- **If no – select 0 from drop down**

EPA 4-26

Participant Poll – Contaminant Characteristics BPJ

- **Are there any site contaminants that are known to readily migrate from sources to groundwater?**
  - » Yes ____
  - » No ____
- **If yes, what are these contaminants?**
  - » Benzene
  - » Phenol
  - » Chlorinated solvents represented by TCE

EPA 4-27

Participant Poll – Hydrogeology BPJ

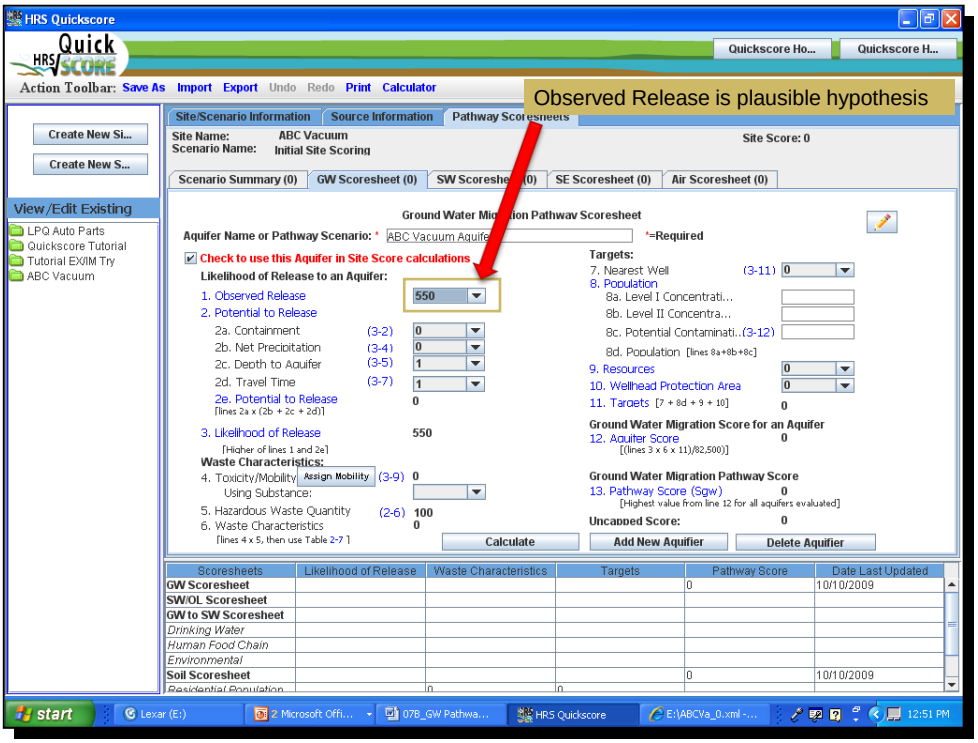
- **What is the depth to the shallow aquifer?**
  - » About 30 feet below ground surface
- **Are there any known users of the shallow aquifer for drinking water?**
  - » Yes, 5 residences
- **Are these users downgradient from any site sources?**
  - » Possibly based on TDL map showing surface topography and possible pumping influence of Crayfish farm
- **Are these users in proximity to any site sources?**
  - » Yes ____
  - » No ____

EPA 4-28

Participant Poll – Groundwater LR BPJ Results

- **Based on review of contaminants, sources and hydrogeology, would you hypothesize an observed release?**
  - » Yes _✓___
  - » No ____
- **If yes, what elements of this hypothesis would need to be tested with the SI strategy?**
  - » See next slide

EPA 4-29



Notes

- The evidence points to a likely observed release.

Potential to Release

- **Used when BPJ cannot conclude that there may be an Observed Release**
- **Evaluates 4 factors to generate a score**
  - » Containment (of sources)
  - » Net precipitation for area
  - » Depth to aquifer
  - » Travel time
- **We will evaluate to ensure you know how to do it, but we believe BPJ supports an observed release**

EPA 4-31

Potential to Release – Containment

- **Evaluate containment of each source using HRS Table 3-2**
  - » Table 3-2 includes descriptions of conditions for the various source types and point values for each description
  - » Point values can be 10, 9, 7, 5, 3 and 0
- **Select the source that gives the highest value for scoring purposes**

EPA 4-32

Source Containment BPJ – Drums and Tanks

- **Drums**
  - 200 drums on a concrete pad
  - No berm around the pad is noted
- **Tanks**
  - On a concrete pad
  - Covered by shed
  - No berm or secondary containment noted

EPA 4-33

All containers buried	Evaluate using All Sources criteria.
Evidence of hazardous substance migration from container area (i.e., container area includes containers and any associated containment structures).	10
No liner (or no essentially impervious base) under container area.	10
No diking (or no similar structure) surrounding container area.	10
Diking surrounding container area unsound or not regularly inspected and maintained.	10
No evidence of hazardous substance migration from container area, container area surrounded by sound diking that is regularly inspected and maintained, and:	
(a) Liner (or essentially impervious base) under container area.	9
(b) Essentially impervious base under container area with liquids collection and removal system.	7
(c) Containment system includes essentially impervious base, liquids collection system, sufficient capacity to contain 10 percent of volume of all containers, and functioning and maintained run-on control; plus functioning groundwater monitoring system, and spilled or leaked hazardous substances and accumulated precipitation removed in timely manner to prevent overflow of collection system, at least weekly inspection of containers, hazardous substances in leaking or deteriorating containers transferred to containers in good condition, and containers sealed except when waste is added or removed.	5
(d) Free liquids present, containment system has sufficient capacity to hold total volume of all containers and to provide adequate freeboard, single liner under container area with functioning leachate collection and removal system below liner, and functioning groundwater monitoring system.	5
(e) Same as (d) except: double liner under container area with functioning leachate collection and removal system between liners.	3
Containers inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate would be generated from any unsealed or ruptured containers, liquids or materials containing free liquids not deposited in any container, and functioning and maintained run-off control present.	0
No evidence of hazardous substance migration from container area, containers leaking, and all free liquids eliminated at closure (either by removal of liquid or solidification of remaining wastes and waste residues).	Evaluate using All Sources criteria (with no bulk or free liquid deposited).

Tank	
Below-ground tank	**Evaluate using All Sources criteria.**
Evidence of hazardous substance migration from tank area (i.e., tank area includes tank, ancillary equipment such as piping, and any associated containment structures).	**10**

Table 3-2. Containment Factor Values for Groundwater Migration Pathway (Continued)

Source	Assigned Value
Tank	
Tank and ancillary equipment not provided with secondary containment (e.g., liner under tank area, vault system, double wall).	**10**
No diking (or no similar structure) surrounding tank and ancillary equipment.	**10**
No evidence of hazardous substance migration from tank area, tank and ancillary equipment surrounded by sound diking that is regularly inspected and maintained, and:	
(a) Tank and ancillary equipment provided with secondary containment.	**9**
(b) Tank and ancillary equipment provided with secondary containment with leak detection and collection system.	**7**
(c) Tank and ancillary equipment provided with secondary containment system that detects and collects spilled or leaked hazardous substances and accumulated precipitation and has sufficient capacity to contain 110 percent of volume of largest tank within containment area, spilled or leaked hazardous substances and accumulated precipitation removed in timely manner, at least weekly inspection of tank and secondary containment system, all leaking or unfit-for-use tank systems promptly responded to, and functioning groundwater monitoring system.	**5**
(d) Containment system has sufficient capacity to hold volume of all tanks within tank containment area and to provide adequate freeboard, single liner under that containment area with functioning leachate collection and removal system below liner, and functioning groundwater monitoring system.	**5**
(e) Same as (d) except: double liner under tank containment area with functioning leachate collection and removal system between liners.	**3**
Tank is above ground, and inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate would be generated from any material released from tank, liquids or materials containing free liquids not deposited in any tank, and functioning and maintained run-on control present.	**0**

Participant Poll – Containment Scores for Drums and Tanks

- **Based on description of the drum storage area and the descriptions in Table 3-2, what score would you assign the drums?**
- **Based on description of the mixing tanks and the descriptions in Table 3-2, what score would you assign the tanks?**

EPA 4-36

Source Containment BPJ – Lagoon and Oxidation Pond

- **Lagoon**
  - Historical reports of hazardous waste disposal in lagoon
  - Stained soil in drainage ditch is evidence of potential hazardous substance migration
  - Existence of liner is unknown
  - No other containment structures noted
- **Oxidation pond**
  - Existence of liner is unknown
  - No other containment structures noted

EPA 4-37

Surface Impoundment	
Evidence of hazardous substance migration from surface impoundment.	**10**
No liner.	**10**
Free liquids present with either no diking, unsound diking, or diking that is not regularly inspected and maintained.	**10**
No evidence of hazardous substance migration from surface impoundment, free liquids present, sound diking that is regularly inspected and maintained, adequate freeboard, and:	
(a) Liner	**9**
(b) Liner with functioning leachate collection and removal system below liner, and functioning groundwater monitoring system	**5**
(c) Double liner with functioning leachate collection and removal system between liners, and functioning groundwater monitoring system.	**3**
No evidence of hazardous substance migration from surface impoundment and all free liquids eliminated at closure (either by removal of liquids or solidification of remaining wastes and waste residues).	**Evaluate using All Sources criteria (with no bulk or free liquid deposited).**

Participant Poll – Containment Scores for Lagoon and Oxidation Pond

- **Based on description of the lagoon and the descriptions in Table 3-2, what score would you assign the lagoon?**
- **Based on description of the oxidation pond and the descriptions in Table 3-2, what score would you assign the oxidation pond?**

EPA 4-39

Source Containment BPJ – Stained Soil and Rubbish Pile

- **Stained soil**
  - » Stained soil near drainage ditch is evidence of hazardous substance migration
  - » Stained soil has no liner
- **Rubbish pile**
  - » Pile appears to be on the ground
  - » No other containment structures noted

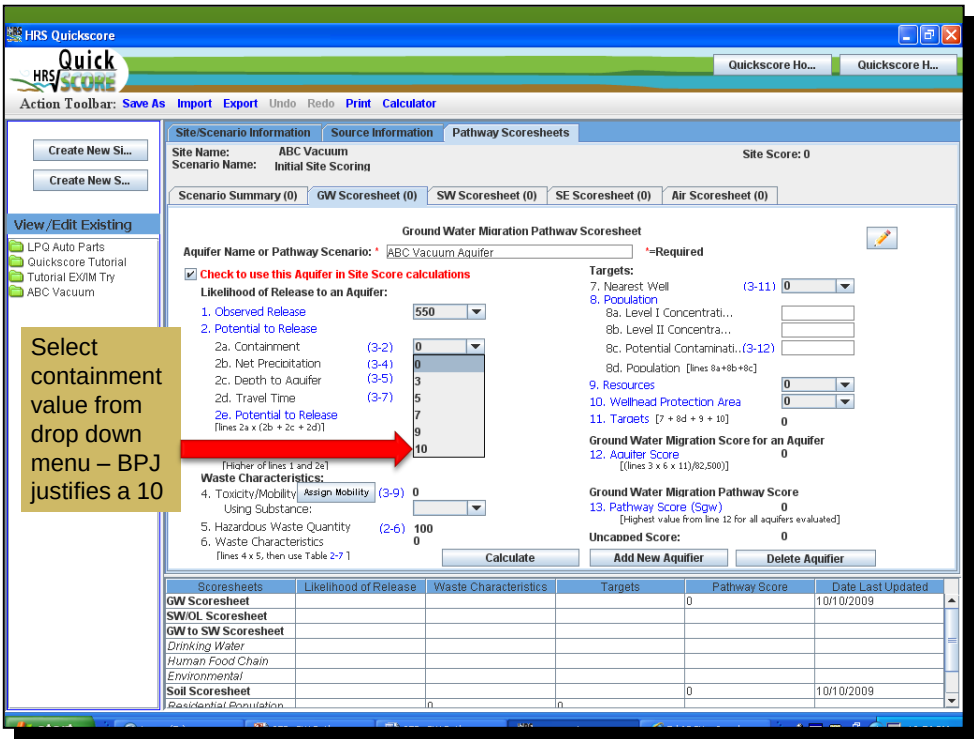
EPA 4-40

All Sources (Except Surface Impoundments, Land Treatment, Containers, and Tanks)	
Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures).	10
No liner	10
No evidence of hazardous substance migration from source area, a liner, and:	
(a) None of the following present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system, or (3) functioning leachate collection and removal system immediately above liner.	10
(b) Any one of the three items in (a) present.	9
(c) Any two of the items in (a) present.	7
(d) All three items in (a) present plus a functioning groundwater monitoring system.	5
(e) All items in (d) present, plus no bulk or non-containerized liquids nor materials containing free liquids deposited in source area.	3
No evidence of hazardous substance migration from source area, double liner with functioning leachate collection and removal system above and between liners, functioning groundwater monitoring system, and:	
(f) Only one of the following deficiencies present in containment: (1) bulk or noncontainerized liquids or materials containing free liquids deposited in source area, or (2) no or nonfunctioning or nonmaintained run-on control system and runoff management system, or (3) no or nonmaintained engineered cover.	3
(g) None of the deficiencies in (f) present.	0
Source area inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate is generated, liquids or materials containing free liquids not deposited in source area, and functioning and maintained run-on control present.	0

Participant Poll – Containment Scores for Stained Soil and Rubbish Pile

- Based on description of the stained soil and the descriptions in Table 3-2, what score would you assign the stained soil
- Based on description of the rubbish pile and the descriptions in Table 3-2, what score would you assign the rubbish pile

EPA 4-42



Notes

- Highest containment value should be 10.

Table 3-2. Containment Factor Values for Groundwater Migration Pathway

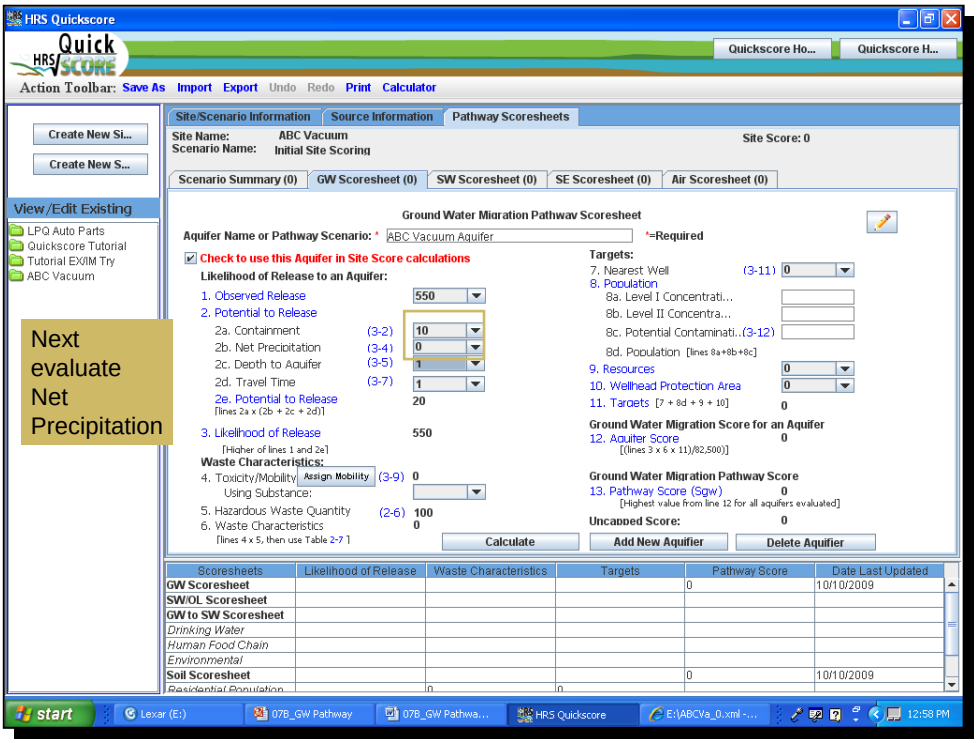
Source	Assigned Value
All Sources (Except Surface Impoundments, Land Treatment, Containers and Tanks)	
Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures).	10
No liner	10
No evidence of hazardous substance migration from source area, a liner, and:	
(a) None of the following present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system, or (3) functioning leachate collection and removal system immediately above liner.	10
(b) Any one of the three items in (a) present.	9
(c) Any two of the items in (a) present.	7
(d) All three items in (a) present plus a functioning groundwater monitoring system.	5
(e) All items in (d) present, plus no bulk or non-containerized liquids nor materials containing free liquids deposited in source area.	3
No evidence of hazardous substance migration from source area, double liner with functioning leachate collection and removal system above and between liners, functioning groundwater monitoring system, and:	
(f) Only one of the following deficiencies present in containment: (1) bulk or noncontainerized liquids or materials containing free liquids deposited in source area, or (2) no or nonfunctioning or nonmaintained run-on control system and runoff management system, or (3) no or nonmaintained engineered cover.	3
(g) None of the deficiencies in (f) present.	0
Source area inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate is generated, liquids or materials containing free liquids not deposited in source area, and functioning and maintained run-on control present.	0
Surface Impoundment	
Evidence of hazardous substance migration from surface impoundment.	10
No liner.	10
Free liquids present with either no diking, unsound diking or diking that is not regularly inspected and maintained.	10
No evidence of hazardous substance migration from surface impoundment, free liquids present, sound diking that is regularly inspected and maintained, adequate freeboard, and:	
(a) Liner	9
(b) Liner with functioning leachate collection and removal system below liner, and functioning groundwater monitoring system	5
(c) Double liner with functioning leachate collection and removal system between liners, and functioning groundwater monitoring system.	3
No evidence of hazardous substance migration from surface impoundment and all free liquids eliminated at closure (either by removal of liquids or solidification of remaining wastes and waste residues).	Evaluate using All Sources criteria (with no bulk or free liquid deposited).
Land Treatment	
Evidence of hazardous substance migration from land treatment zone.	10
No functioning, maintained, run-on control and runoff management system.	10

Table 3-2. Containment Factor Values for Groundwater Migration Pathway (Continued)

Source	Assigned Value
Land Treatment	
No evidence of hazardous substance migration from land treatment zone and:	
(a) Functioning and maintained run-on control and runoff management system.	7
(b) Functioning and maintained run-on control and runoff management system, and vegetative cover established over entire land treatment area.	5
(c) Land treatment area maintained in compliance with 40 CFR 264.280.	0
Containers	
All containers buried	Evaluate using All Sources criteria.
Evidence of hazardous substance migration from container area (i.e., container area includes containers and any associated containment structures).	10
No liner (or no essentially impervious base) under container area.	10
No diking (or no similar structure) surrounding container area.	10
Diking surrounding container area unsound or not regularly inspected and maintained.	10
No evidence of hazardous substance migration from container area, container area surrounded by sound diking that is regularly inspected and maintained, and:	
(a) Liner (or essentially impervious base) under container area.	9
(b) Essentially impervious base under container area with liquids collection and removal system.	7
(c) Containment system includes essentially impervious base, liquids collection system, sufficient capacity to contain 10 percent of volume of all containers, and functioning and maintained run-on control; plus functioning groundwater monitoring system, and spilled or leaked hazardous substances and accumulated precipitation removed in timely manner to prevent overflow of collection system, at least weekly inspection of containers, hazardous substances in leaking or deteriorating containers transferred to containers in good condition, and containers sealed except when waste is added or removed.	5
(d) Free liquids present, containment system has sufficient capacity to hold total volume of all containers and to provide adequate freeboard, single liner under container area with functioning leachate collection and removal system below liner, and functioning groundwater monitoring system.	5
(e) Same as (d) except: double liner under container area with functioning leachate collection and removal system between liners.	3
Containers inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate would be generated from any unsealed or ruptured containers, liquids or materials containing free liquids not deposited in any container, and functioning and maintained run-off control present.	0
No evidence of hazardous substance migration from container area, containers leaking and all free liquids eliminated at closure (either by removal of liquid or solidification of remaining wastes and waste residues).	Evaluate using All Sources criteria (with no bulk or free liquid deposited).
Tank	
Below-ground tank	Evaluate using All Sources criteria.
Evidence of hazardous substance migration from tank area (i.e., tank area includes tank, ancillary equipment such as piping, and any associated containment structures).	10

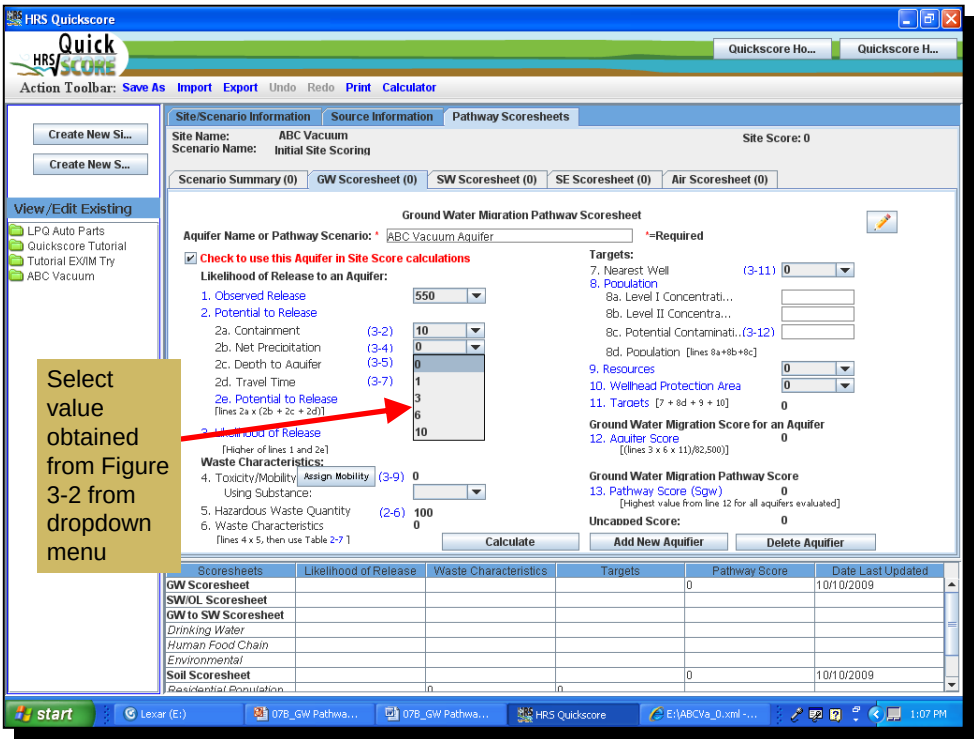
Table 3-2. Containment Factor Values for Groundwater Migration Pathway (Continued)

Source	Assigned Value
Tank	
Tank and ancillary equipment not provided with secondary containment (e.g., liner under tank area, vault system, double wall).	10
No diking (or no similar structure) surrounding tank and ancillary equipment.	10
No evidence of hazardous substance migration from tank area, tank and ancillary equipment surrounded by sound diking that is regularly inspected and maintained, and:	
(a) Tank and ancillary equipment provided with secondary containment.	9
(b) Tank and ancillary equipment provided with secondary containment with leak detection and collection system.	7
(c) Tank and ancillary equipment provided with secondary containment system that detects and collects spilled or leaked hazardous substances and accumulated precipitation and has sufficient capacity to contain 110 percent of volume of largest tank within containment area, spilled or leaked hazardous substances and accumulated precipitation removed in timely manner, at least weekly inspection of tank and secondary containment system, all leaking or unfit-for-use tank systems promptly responded to, and functioning groundwater monitoring system.	5
(d) Containment system has sufficient capacity to hold volume of all tanks within tank containment area and to provide adequate freeboard, single liner under that containment area with functioning leachate collection and removal system below liner, and functioning groundwater monitoring system.	5
(e) Same as (d) except: double liner under tank containment area with functioning leachate collection and removal system between liners.	3
Tank is above ground, and inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate would be generated from any material released from tank, liquids or materials containing free liquids not deposited in any tank, and functioning and maintained run-on control present.	0



Notes

- Next evaluate net precipitation.



Notes

- Select the value from the dropdown menu that is obtained from Figure 3-2 in the HRS rule.

Net Precipitation BPJ

- **Not the same as mean annual precipitation**
- **Net precipitation considers mean annual precipitation and evapotranspiration**
- **It can be calculated site-specifically with meteorological data**
  - » Usually is not calculated at PA or SI stage; calculated later in process if site score depends on it
  - » If needed, calculate average net precipitation over a period of time (about 10 years)
- **Easiest way to obtain value is to use HRS Figure 3-2**
  - » Requires knowledge of where the site is
  - » ABC Vacuum is in Louisiana

EPA 4-46

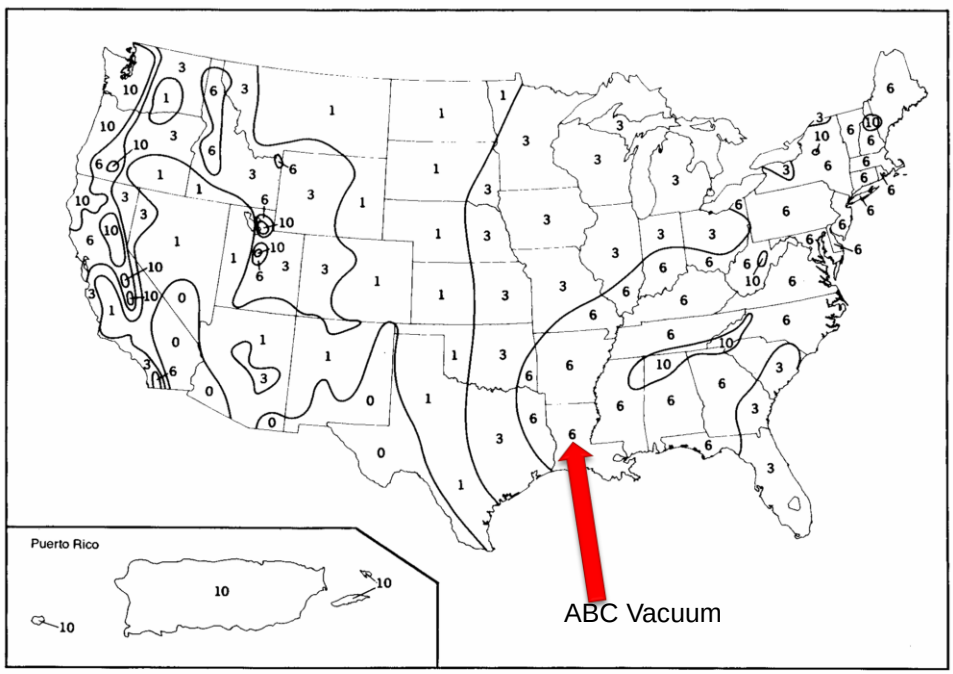


FIGURE 3-2
NET PRECIPITATION FACTOR VALUES

Participant Poll - Net Precipitation Factor Value

What is the correct net precipitation value for the ABC Vacuum Site?

A. 6

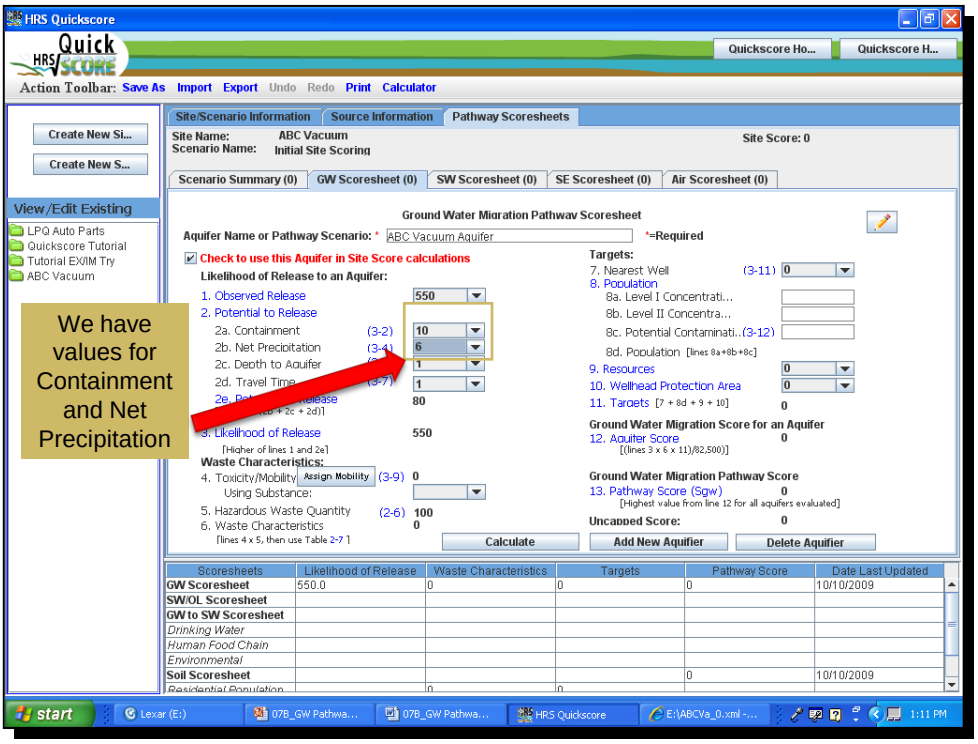
B. 10

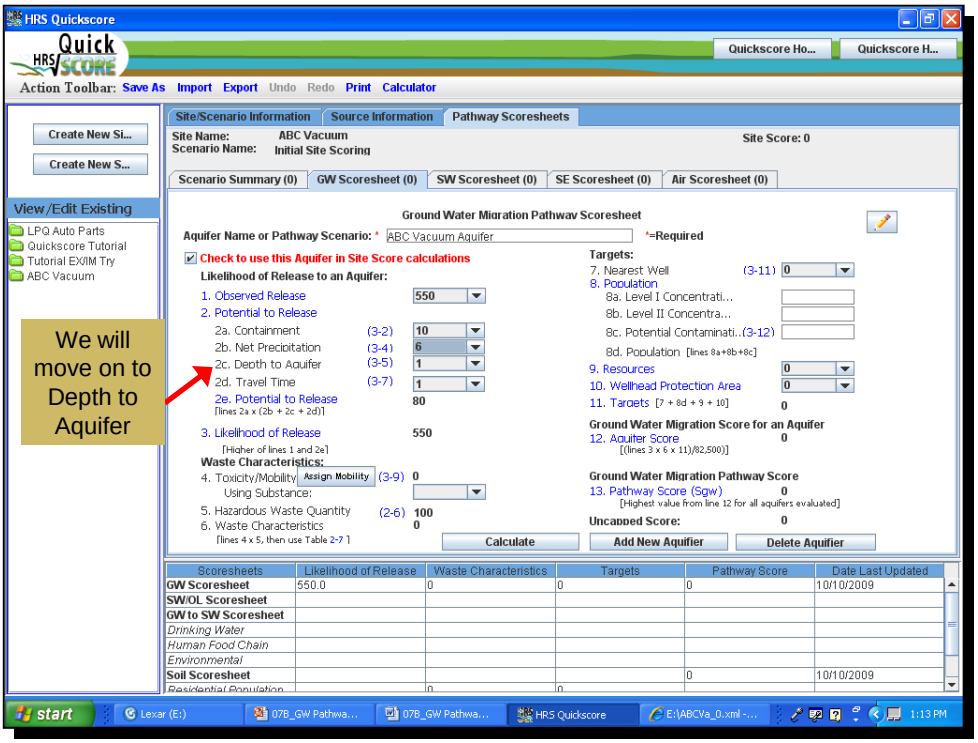
C. 3

D. 1

E. 0

EPA 4-48





Notes

- Now evaluate depth to aquifer.

Depth to Aquifer Evaluation

- **Distance from lowest known point of hazardous substances to top of aquifer being evaluated**
- **Smaller distances give greater scores**
- **HRS Table 3-5 is presented on the next slide, which provides the factor values and range of depths to which the values apply**

EPA 4-51

Depth to Aquifer Factor Values

----------Table 3-5_Depth to Aquifer Factor Values ----------

Depth to aquifer [a] (feet)	Assigned Value
Less than or equal to 25	5
Greater than 25 to 250	3
Greater than 250	1

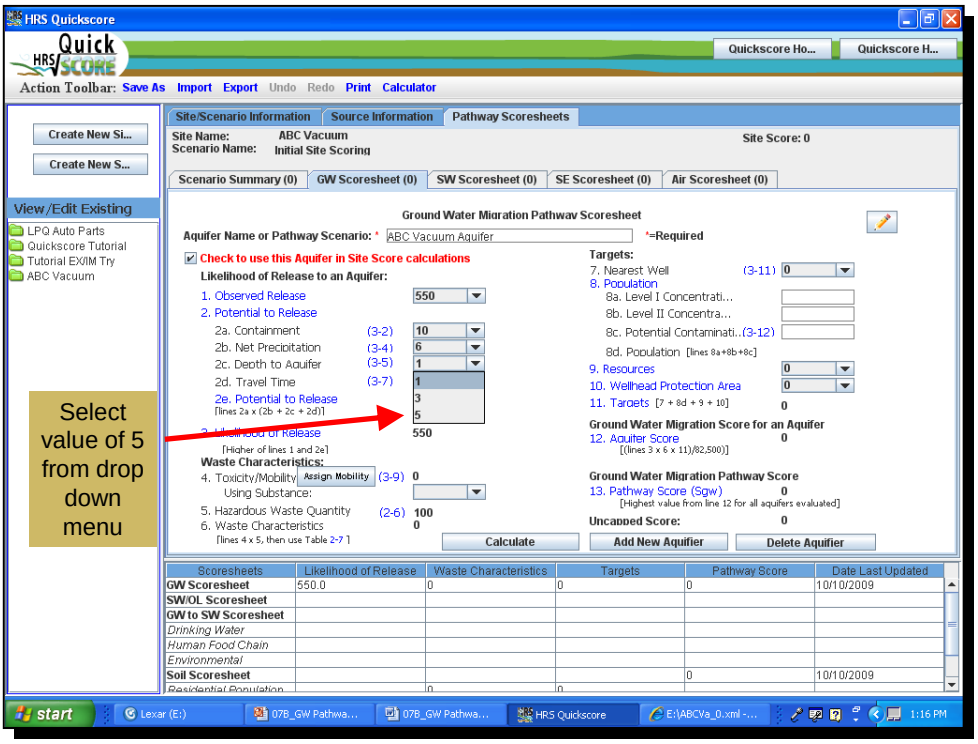
a Use depth of all layers between the hazardous substances and aquifer. Assign a thickness of 0 feet to any karst aquifer that underlies any portion of the sources at the site.

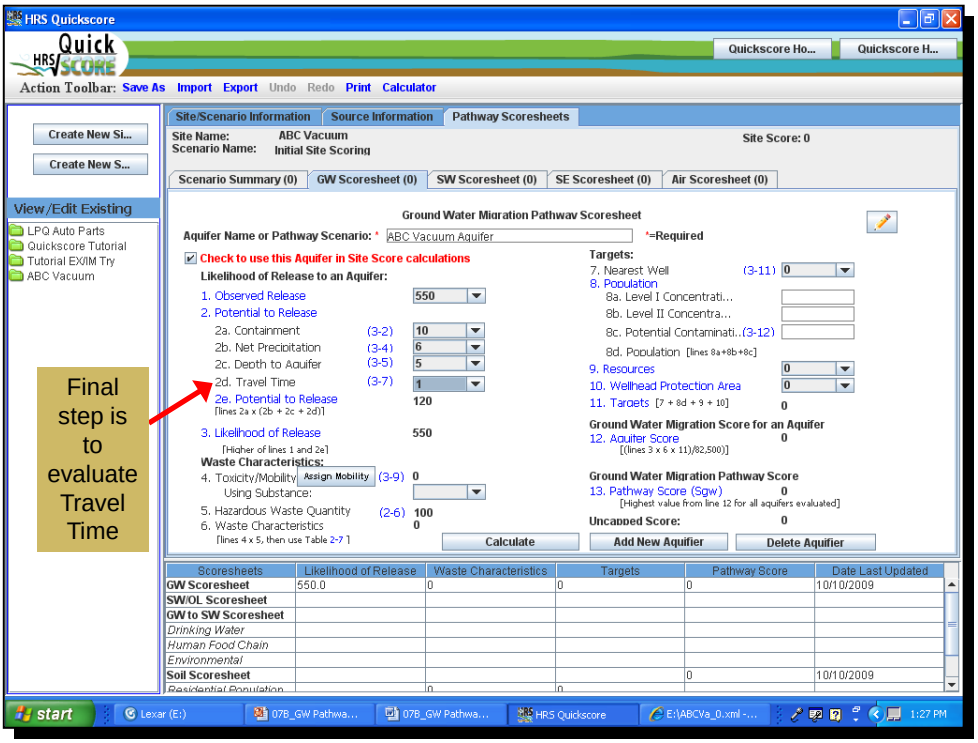
EPA 4-52

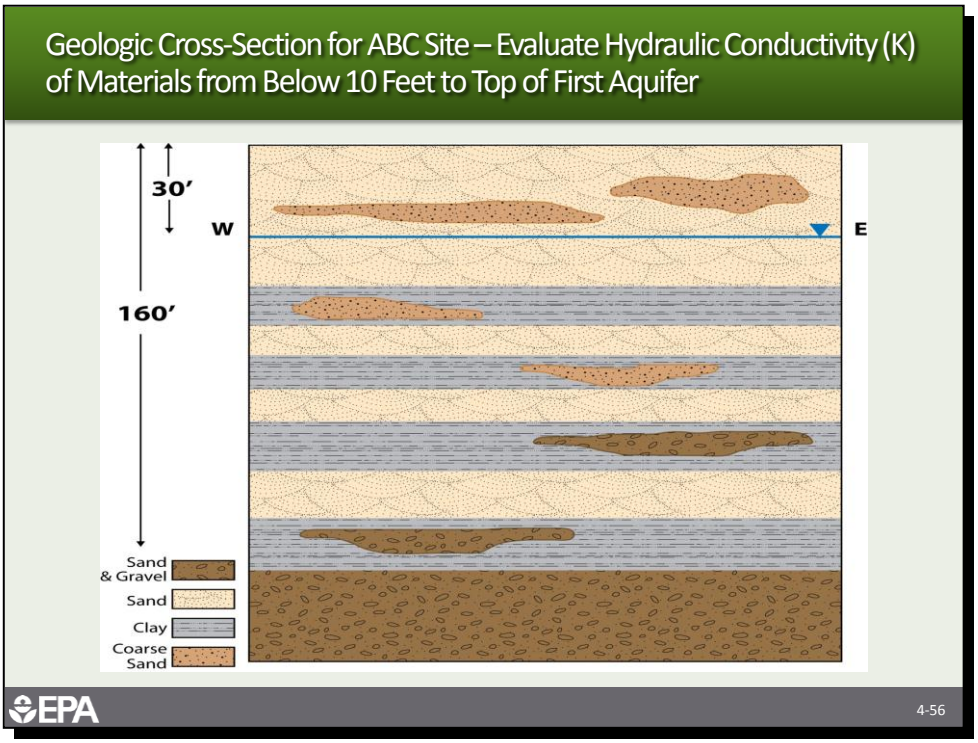
Participant Poll: Depth to Aquifer BPJ

- **What is depth to shallow water-table aquifer at ABC site?**
  - » 30 feet
- **What is estimated lowest known point of hazardous substances in ABC sources?**
  - » At least 5 feet

EPA 4-53




HRS Quickscore
Quick SCORE
Quickscore Ho...
Quickscore H...
Action Toolbar: Save As Import Export Undo Redo Print Calculator
Create New Si...
Create New S...
View/Edit Existing
LPQ Auto Parts
Quickscore Tutorial
Tutorial EXIM Try
ABC Vacuum
Site/Scenario Information
Source Information
Pathway Scoresheets
Site Name: ABC Vacuum
Scenario Name: Initial Site Scoring
Site Score: 0
Scenario Summary (0)
GW Scoresheet (0)
SW Scoresheet (0)
SE Scoresheet (0)
Air Scoresheet (0)
Ground Water Migration Pathway Scoresheet
Aquifer Name or Pathway Scenario: * ABC Vacuum Aquifer
*=Required
Check to use this Aquifer in Site Score calculations
Likelihood of Release to an Aquifer:
1. Observed Release 550
2. Potential to Release
2a. Containment (3-2) 10
2b. Net Precipitation (3-4) 6
2c. Depth to Aquifer (3-5) 5
2d. Travel Time (3-7) 1
2e. Potential to Release [lines 2a x (2b + 2c + 2d)] 120
3. Likelihood of Release 550
[Higher of lines 1 and 2e]
Waste Characteristics:
4. Toxicity/Mobility Assign Mobility (3-9) 0
Using Substance:
5. Hazardous Waste Quantity (2-6) 100
6. Waste Characteristics 0
[lines 4 x 5, then use Table 2-7]
Targets:
7. Nearest Well (3-11) 0
8. Population
8a. Level I Concentrati...
8b. Level II Concentra...
8c. Potential Contaminati.. (3-12)
8d. Population [lines 8a+8b+8c]
9. Resources 0
10. Wellhead Protection Area 0
11. Targets [7 + 8d + 9 + 10] 0
Ground Water Migration Score for an Aquifer
12. Aquifer Score 0
[(lines 3 x 6 x 11)/82,500)]
Ground Water Migration Pathway Score
13. Pathway Score (Sgw) 0
[Highest value from line 12 for all aquifers evaluated]
Uncapped Score: 0
Calculate
Add New Aquifer
Delete Aquifer
Final step is to evaluate Travel Time
Scoresheets | Likelihood of Release | Waste Characteristics | Targets | Pathway Score | Date Last Updated
GW Scoresheet | 550.0 | 0 | 0 | 0 | 10/10/2009
SW/OL Scoresheet
GW to SW Scoresheet
Drinking Water
Human Food Chain
Environmental
Soil Scoresheet | 0 | 10/10/2009
start
Lexar (E:)
07B_GW Pathwa...
07B_GW Pathwa...
HRS Quickscore
E:\ABCVa_0.xml -...
1:27 PM



Notes

- This factor value estimates contaminant travel time in the interval between 10 feet below ground surface and the top of the aquifer.

Use Table 3-6 to Determine Hydraulic Conductivity

Table 3-6. Hydraulic Conductivity of Geologic Materials

Type of material	Assigned Hydraulic Conductivity (cm/sec)[a]
Clay; low permeability till (compact unfractured till); shale; unfractured metamorphic and igneous rocks.	10^{-8}
Silt; losses; silty clays; sediments that are predominantly silts; moderately permeable till (fine-grained, unconsolidated till, or compact till with some fractures); low permeability limestones and dolomites (no karst); low permeability sandstone; low permeability fractured igneous and metamorphic rocks.	10^{-6}
Sands; sandy silts; sediments that are predominantly sand; highly permeable till (coarse-grained, unconsolidated or compact and highly fractured); peat; moderately permeable limestones and dolomites (no karst); moderately permeable sandstone; moderately permeable fractured igneous and metamorphic rocks.	10^{-4} 10^{-3} ?
Gravel; clean sand; highly permeable fractured igneous and metamorphic rocks; permeable basalt; karst limestones and dolomites	10^{-2}

[a] Do not round to the nearest integer.

EPA 4-57

Use Table 3-7 and Hydraulic Conductivity from Table 3-6 to Determine Score for Travel Time

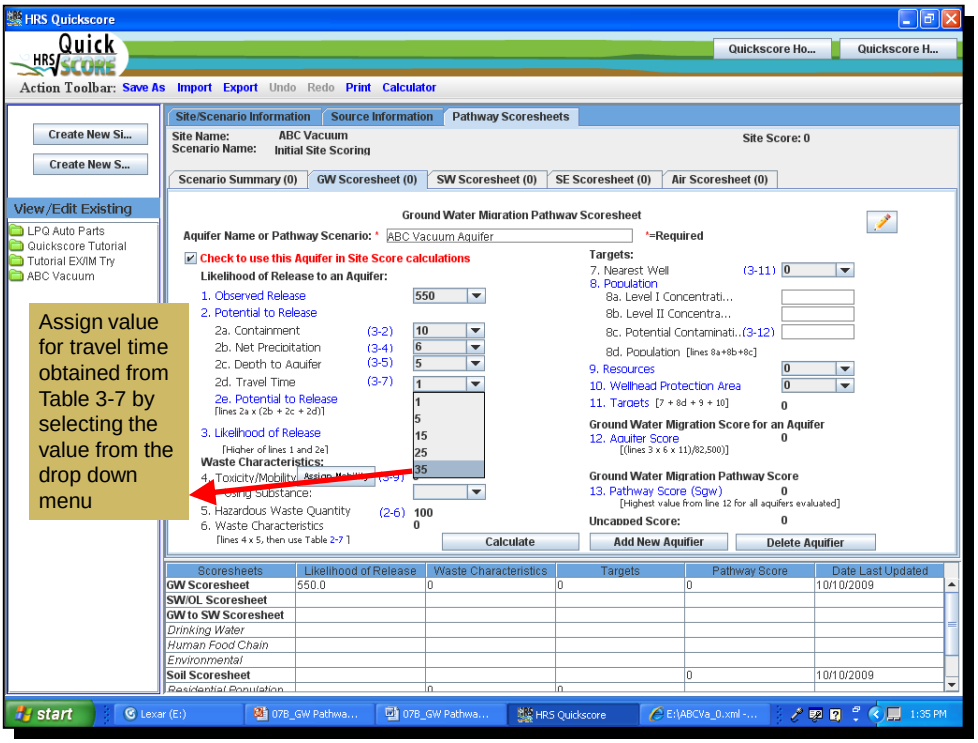
Table 3-7: Travel Time Factor Values[a]

Hydraulic Conductivity (cm/sec)	Thickness of Lowest Hydraulic Conductivity Layer(s) (feet)[b]			
	Greater than 3 to 5	Greater than 5 to 100	Greater than 100 to 500	Greater than 500
Greater than or equal to 10^{-3}	35	35	35	25
Less than 10^{-3} to 10^{-5}	35	25	15	15
Less than 10^{-5} to 10^{-7}	15	15	5	5
Less than 10^{-7}	5	5	1	1

[a] If depth to aquifer is 10 feet or less or if, for the interval being evaluated, all layers that underlie a portion of the sources at the site are karst, assign a value of 35.

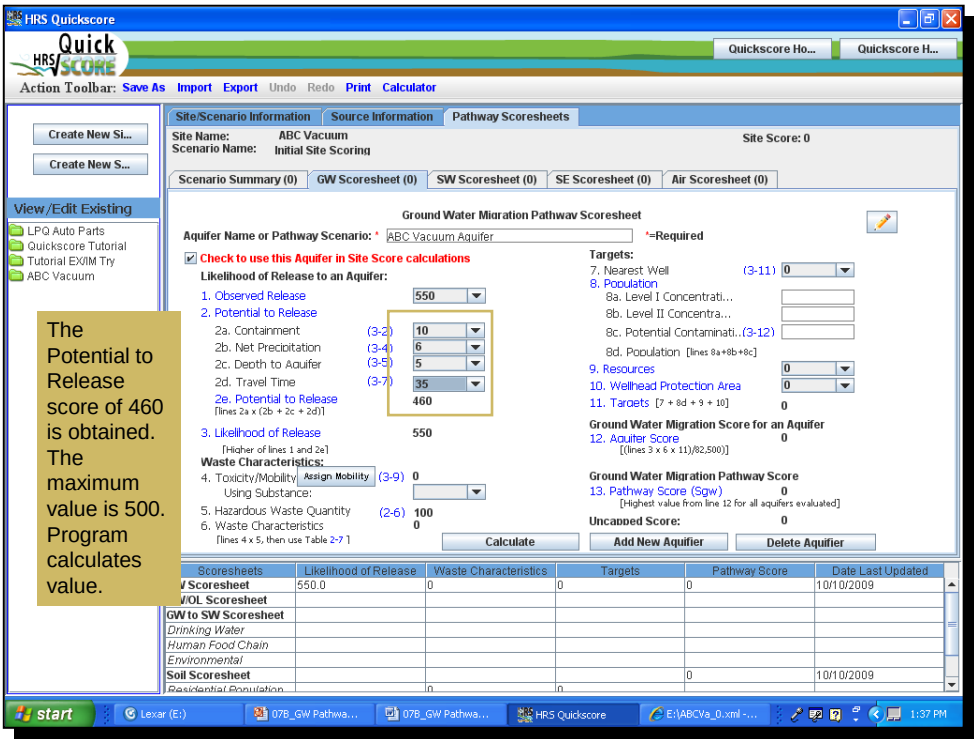
[b] Consider only layers at least 3 feet thick. Do not consider layers or portions of layers within the first 10 feet of the depth to the aquifer.

EPA 4-58

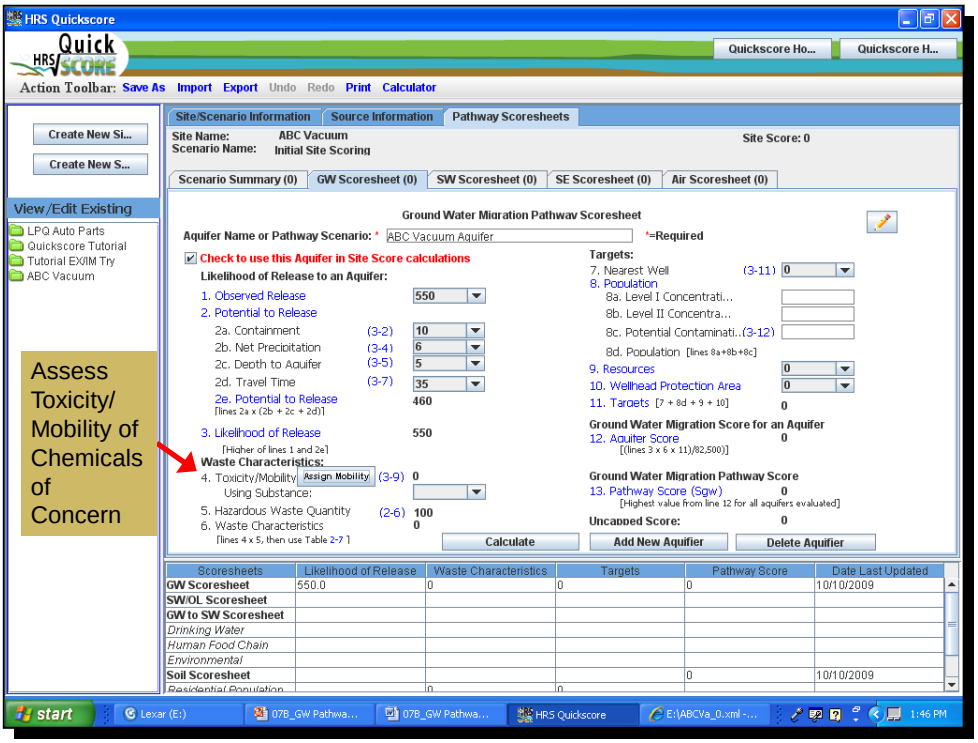


Notes

- The score of 35 can be justified. A more conservative score would be 25. Either is acceptable for the data we now have. Note the potential to release score has a maximum of 500 and will always be lower than an observed release score.

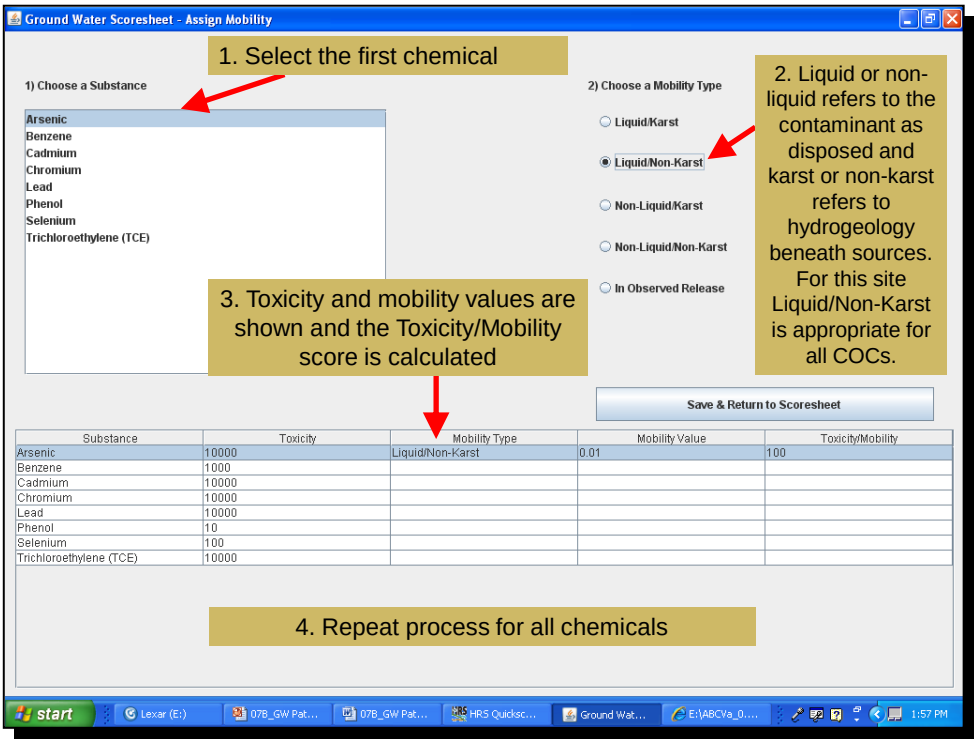


The Potential to Release score of 460 is obtained. The maximum value is 500. Program calculates value.



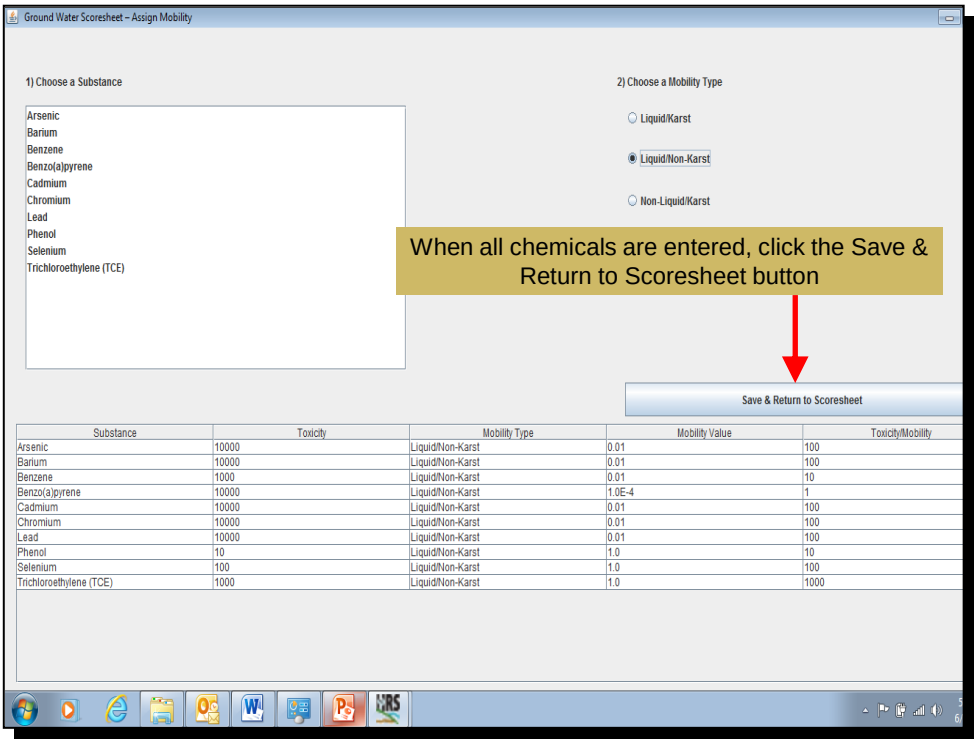
Notes

- Now score waste characteristics. Click on Assign Mobility to begin.



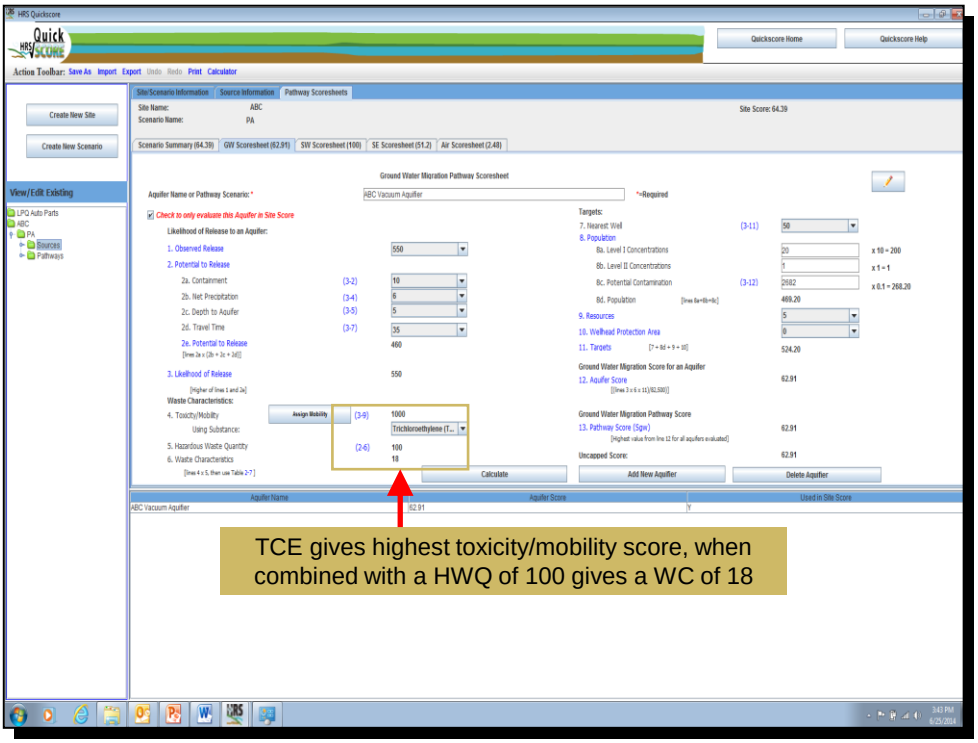
Notes

- Click on the first chemical and then click Liquid/Non-karst. The chemical and its values will show up in the table at the bottom. Repeat this for every chemical.



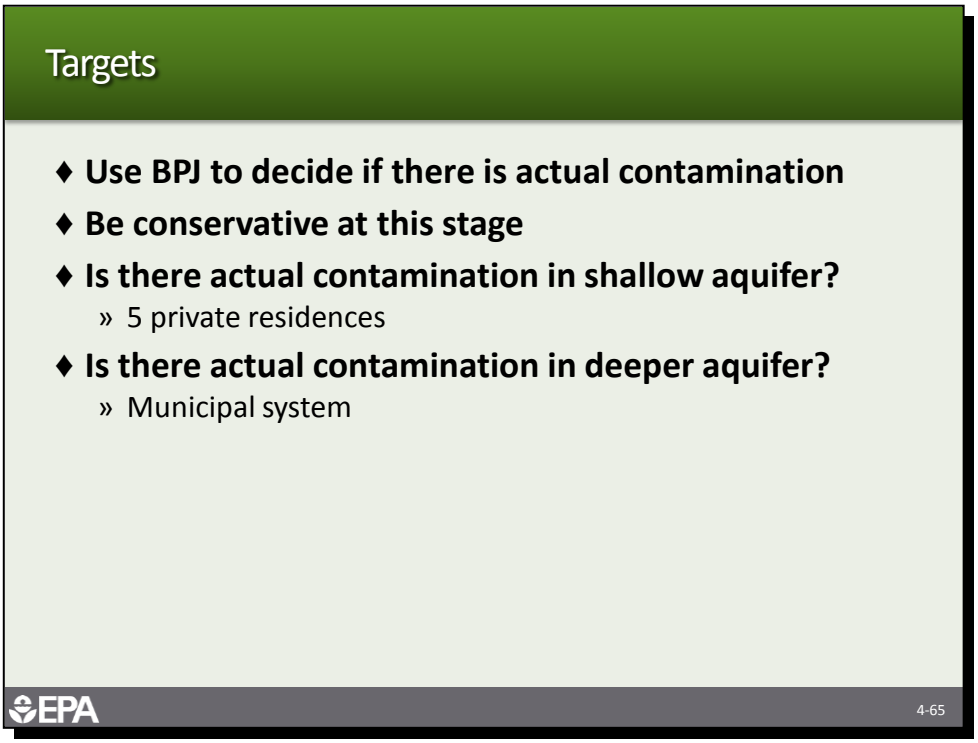
Notes

- When all substances are in the table at the bottom, click Save & Return to Scoresheet.



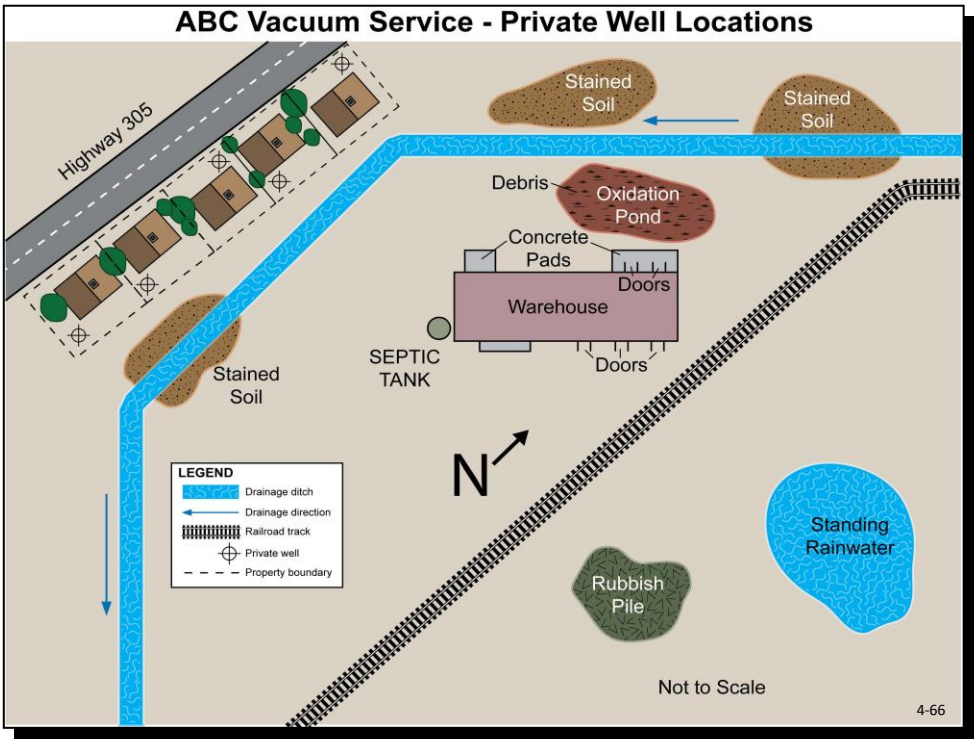
Notes

- The program should select the substance with the highest toxicity/mobility score as shown. The program also uses the information from sources to calculate the WC.



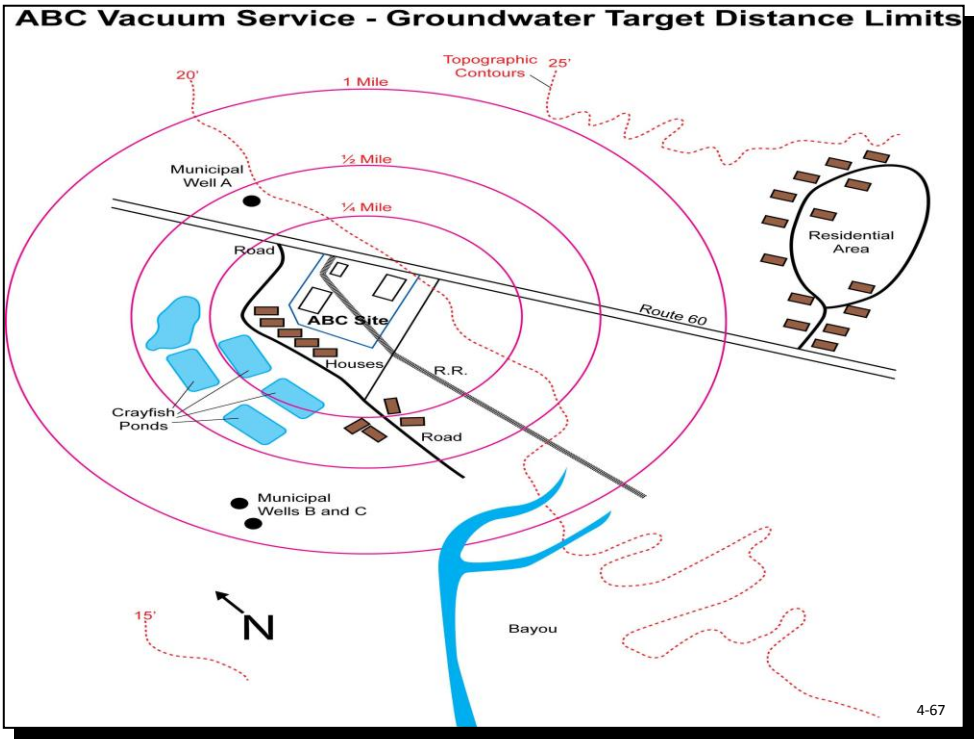
Notes

- Use BPJ to decide if there is actual contamination and that they should be conservative at this stage. They will need to decide for both aquifers.



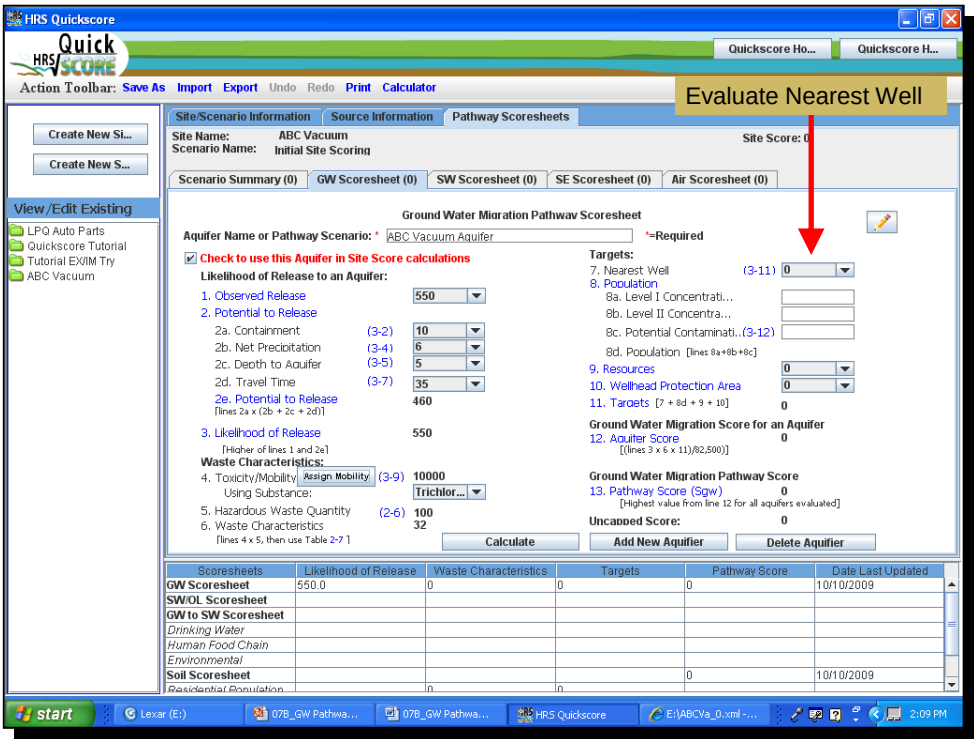
Notes

- This map shows the location of the 5 private wells.



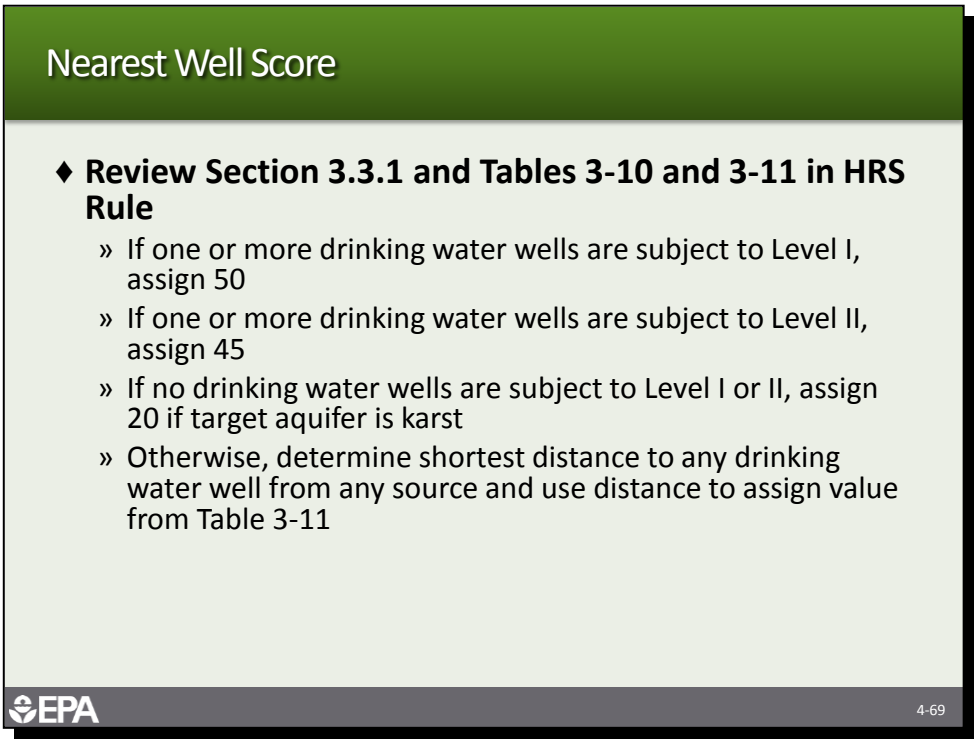
Notes

- This map shows the location of the municipal wells that draw from lower aquifer. Although the 4 miles target distance limit is not shown, these are the only wells within the 4 mile target distance limit.



Notes

- First evaluate the nearest well.



Notes

◆ This slide summarizes Section 3.3.1 from the HRS rule and describes how Tables 3-10 and 3-11 are used to select the factor value for the nearest well.

Table 3-10: Health-Based Benchmarks for Hazardous Substances in Drinking Water

- **Concentration corresponding to Maximum Contaminant Level (MCL)**
- **Concentration corresponding to a nonzero Maximum Contaminant Level Goal (MCLG)**
- **Screening concentration for cancer corresponding to that concentration that corresponds to the 10-6 SU individual cancer risk for oral exposures**
- **Screening concentration for noncancer toxicological responses corresponding to the Reference Dose (RfD) for oral exposures**

EPA 4-70

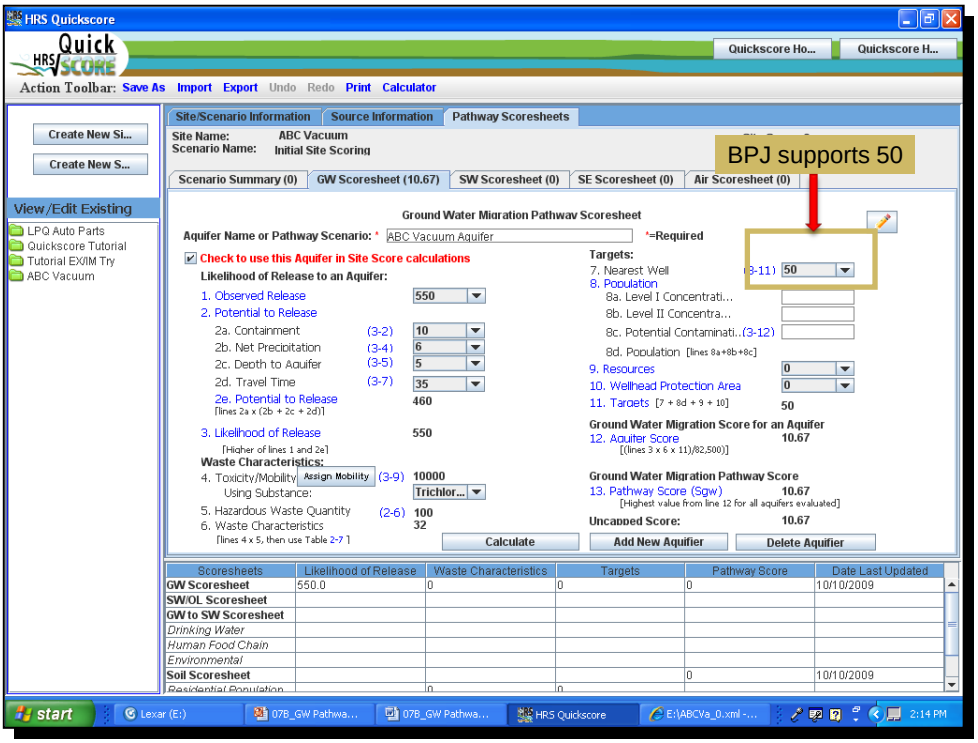
Table 3-11 Values

Table 3-11: Nearest Well Factor Values

Distance from Source (miles)	Assigned Value
Level I concentrations[a]	50
Level II concentrations[a]	45
0 to 1/4	20
Greater than 1/4 to 1/2	18
Greater than 1/2 to 1	9
Greater than 1 to 2	5
Greater than 2 to 3	3
Greater than 3 to 4	2
Greater than 4	0

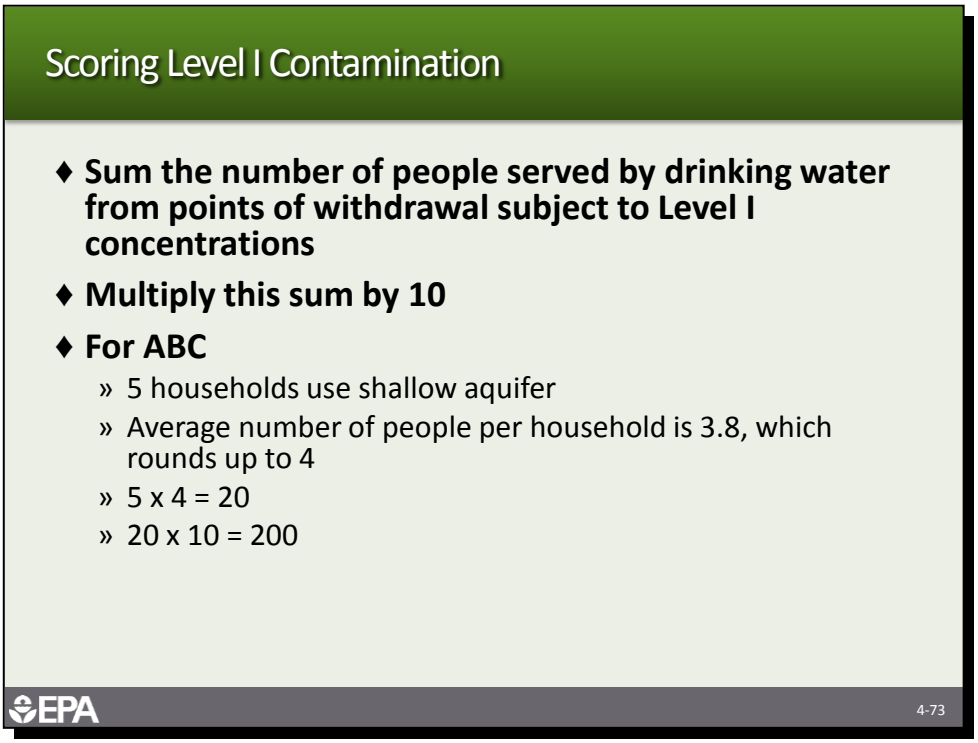
[a] Distance does not apply.

EPA 4-71



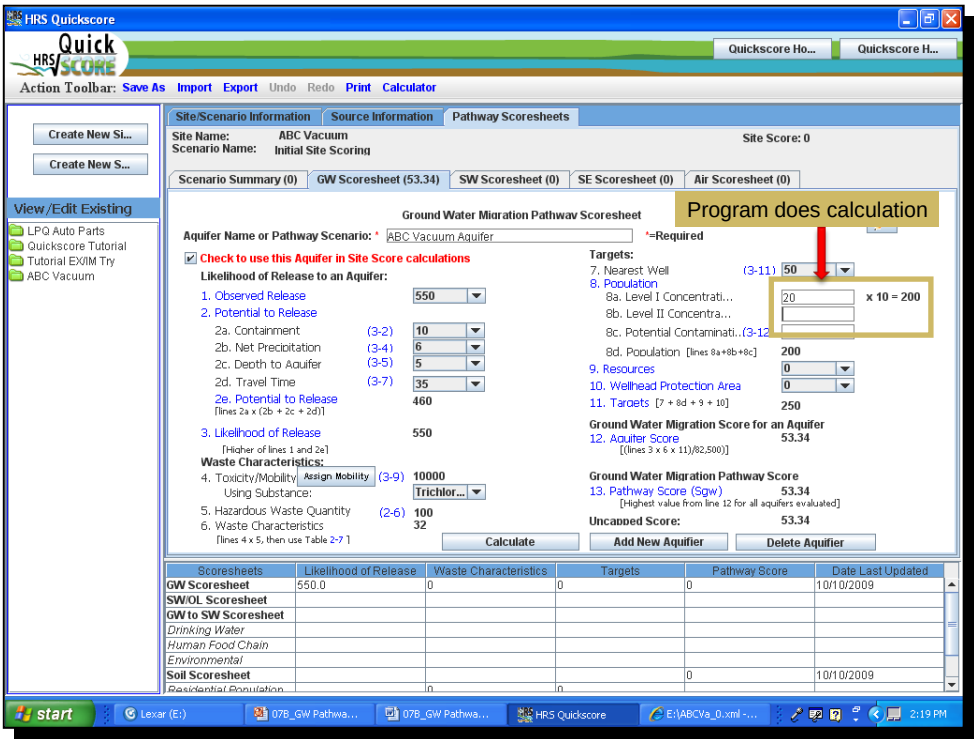
Notes

- Level I contamination of at least the shallow aquifer is justified based on existing information.



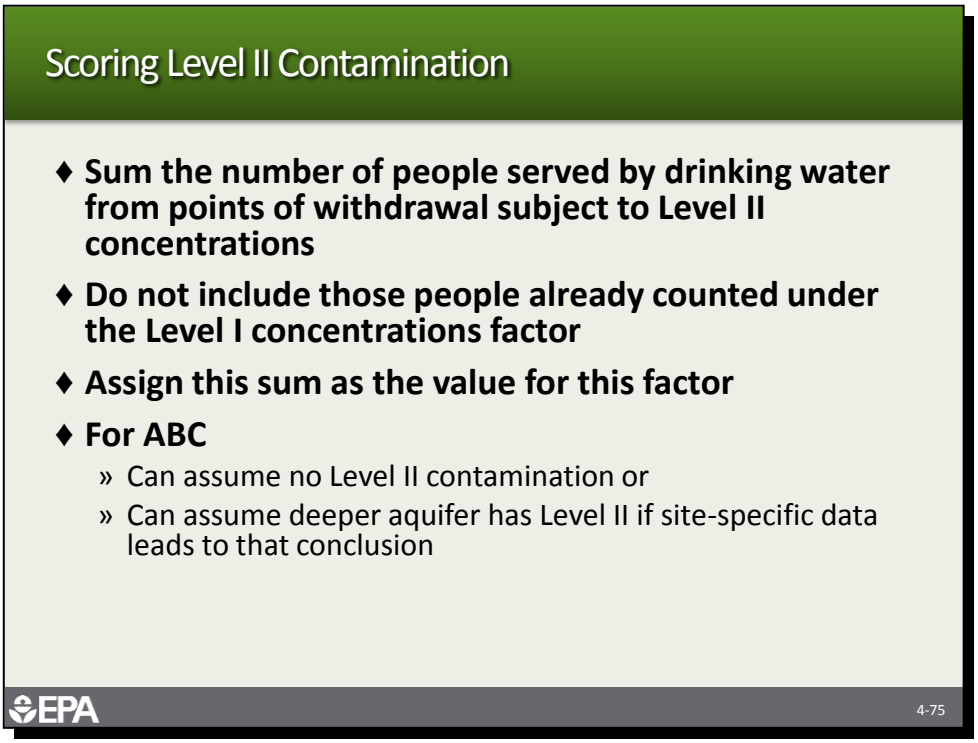
Notes

◆ A 50 for nearest well requires an estimation of Level I population. Sum the number of people served by contaminated wells and then multiply this by 10.



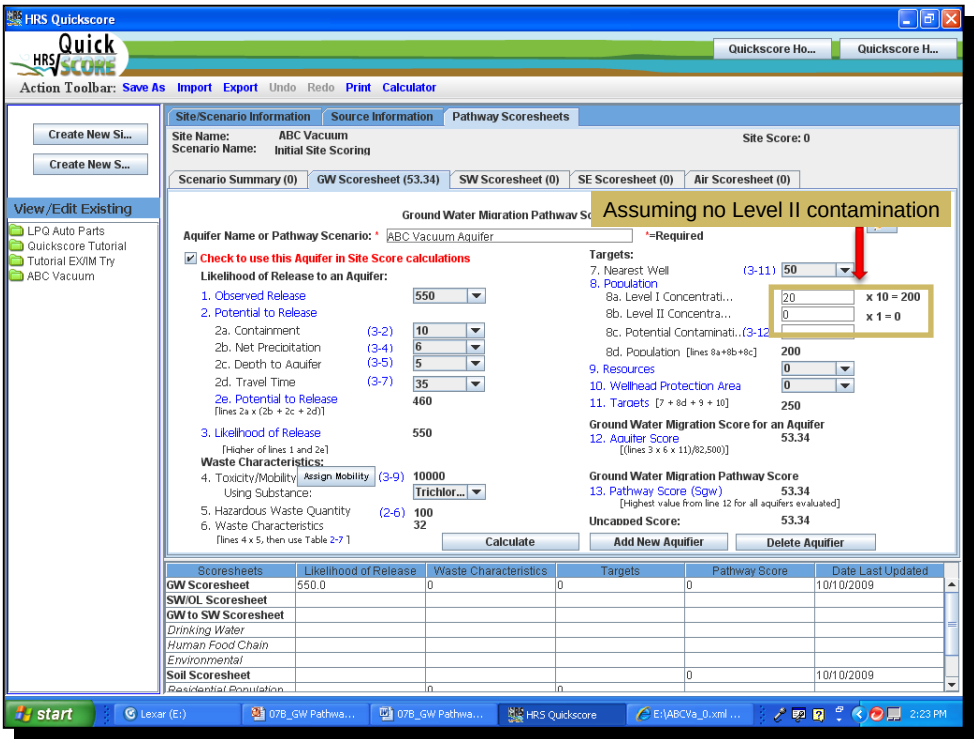
Notes

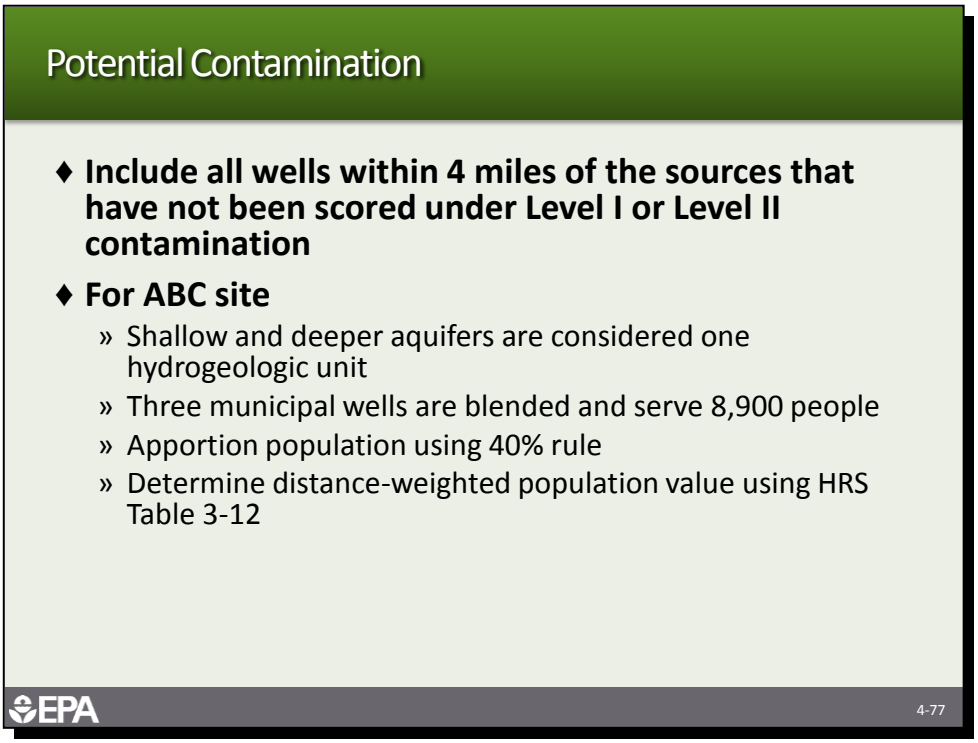
- Record 20 in Level I contamination box. The Quickscore program does the calculation.



Notes

◆ The process for scoring Level II contamination is similar as that for Level I except that is does not include Level I populations and that there is no multiplier.


HRS Quickscore
Quick HRS SCORE
Quickscore Ho...
Quickscore H...
Action Toolbar: Save As Import Export Undo Redo Print Calculator
Create New Si...
Create New S...
View/Edit Existing
LPQ Auto Parts
Quickscore Tutorial
Tutorial EXIM Try
ABC Vacuum
Site/Scenario Information
Source Information
Pathway Scoresheets
Site Name: ABC Vacuum
Scenario Name: Initial Site Scoring
Site Score: 0
Scenario Summary (0)
GW Scoresheet (53.34)
SW Scoresheet (0)
SE Scoresheet (0)
Air Scoresheet (0)
Assuming no Level II contamination
Ground Water Migration Pathway Sc
Aquifer Name or Pathway Scenario: * ABC Vacuum Aquifer
*=Required
Check to use this Aquifer in Site Score calculations
Likelihood of Release to an Aquifer:
1. Observed Release 550
2. Potential to Release
2a. Containment (3-2) 10
2b. Net Precipitation (3-4) 6
2c. Depth to Aquifer (3-5) 5
2d. Travel Time (3-7) 35
2e. Potential to Release [lines 2a x (2b + 2c + 2d)] 460
3. Likelihood of Release 550
[Higher of lines 1 and 2e]
Waste Characteristics:
4. Toxicity/Mobility Assign Mobility (3-9) 10000
Using Substance: Trichlor...
5. Hazardous Waste Quantity (2-6) 100
6. Waste Characteristics 32
[lines 4 x 5, then use Table 2-7]
Calculate
Targets:
7. Nearest Well (3-11) 50
8. Population
8a. Level I Concentrati... 20 x 10 = 200
8b. Level II Concentra... 0 x 1 = 0
8c. Potential Contaminati.. (3-12
8d. Population [lines 8a+8b+8c] 200
9. Resources 0
10. Wellhead Protection Area 0
11. Targets [7 + 8d + 9 + 10] 250
Ground Water Migration Score for an Aquifer
12. Aquifer Score 53.34
[(lines 3 x 6 x 11)/82,500)]
Ground Water Migration Pathway Score
13. Pathway Score (Sgw) 53.34
[Highest value from line 12 for all aquifers evaluated]
Uncapped Score: 53.34
Add New Aquifer
Delete Aquifer
Scoresheets | Likelihood of Release | Waste Characteristics | Targets | Pathway Score | Date Last Updated
GW Scoresheet | 550.0 | 0 | 0 | 0 | 10/10/2009
SW/OL Scoresheet
GW to SW Scoresheet
Drinking Water
Human Food Chain
Environmental
Soil Scoresheet | 0 | 10/10/2009
start
Lexar (E:)
07B_GW Pathwa...
07B_GW Pathwa...
HRS Quickscore
E:\ABCVa_0.xml ...
2:23 PM



Notes

◆ Potential Contamination they should evaluate all wells within 4 miles of sources that have not been scored under Level I or II. The approach for the shallow and deeper aquifers is to consider them as one hydrogeological unit. Connecting the two aquifers makes scoring easier but whether or not they are connected would need to be addressed by the SI. The population for the blended municipal well system at ABC Vacuum must be apportioned and then distance-weighted.

Apply 40% Rule to ABC Site – Total Population is 8,900

Well Identification	Distance from Site	Percent Annual Production	Population Apportionment
Well A	2,600 ft (0.45 miles)	30	
Well B	4,000 ft (0.76 miles)	35	
Well C	4,000 ft (0.76 miles)	35	

EPA 4-78

Notes

- Complete this table using the 40% rule.

40% Rule Solution for ABC Site – Apportion Evenly

Well Identification	Distance from Site	Percent Annual Production	Population Apportionment
Well A	2,600 ft (0.45 miles)	30	2,966
Well B	4,000 ft (0.76 miles)	35	2,966
Well C	4,000 ft (0.76 miles)	35	2,966

EPA 4-79

Notes

- This is the ABC site apportionment.

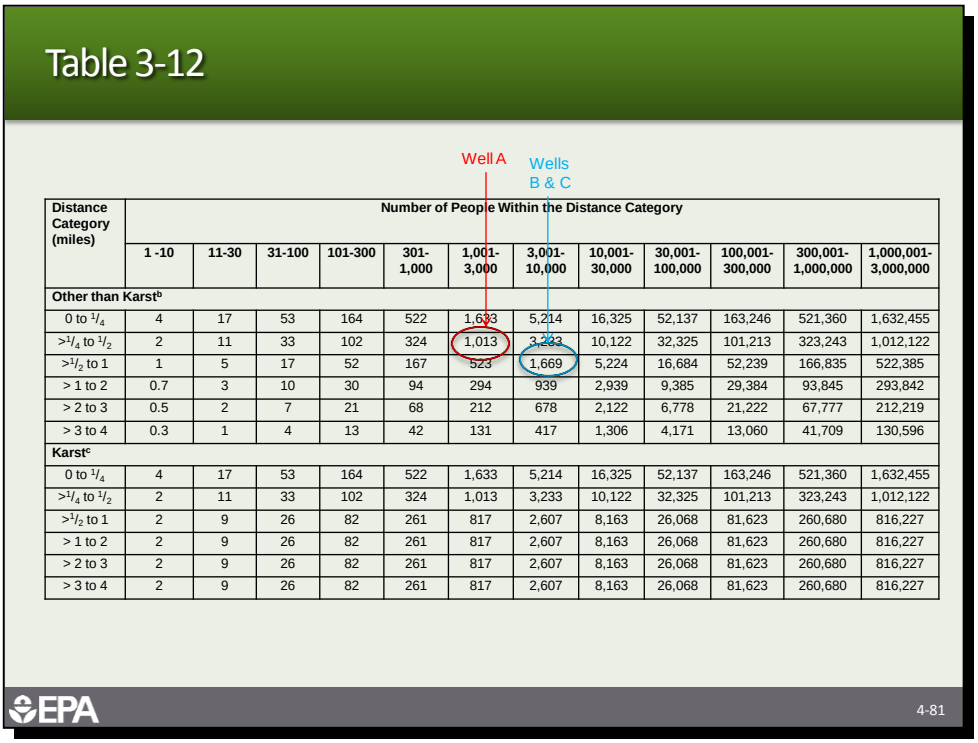
Determine Distance-weighted Population Value Using HRS Table 3-12 (Provided on next page)

Well Identification	Distance from Site	Population Apportionment	Table 3-12 Weighting
Well A	2,600 ft (0.45 miles)	2,966	
Wells B and C	4,000 ft (0.76 miles)	5,932	

EPA 4-80

Notes

- Use Table 3-12 on the following slide to determine the distance weighted populations associated with Well A and the combined population of Wells B and C. Wells B and C can be combined because they are in the same target distance limit.



Distance Category (miles)	Number of People Within the Distance Category											
	1 -10	11-30	31-100	101-300	301-1,000	1,001-3,000	3,001-10,000	10,001-30,000	30,001-100,000	100,001-300,000	300,001-1,000,000	1,000,001-3,000,000
Other than Karst[b]												
0 to 1/4	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455
>1/4 to 1/2	2	11	33	102	324	1,013	3,233	10,122	32,325	101,213	323,243	1,012,122
>1/2 to 1	1	5	17	52	167	523	1,669	5,224	16,684	52,239	166,835	522,385
> 1 to 2	0.7	3	10	30	94	294	939	2,939	9,385	29,384	93,845	293,842
> 2 to 3	0.5	2	7	21	68	212	678	2,122	6,778	21,222	67,777	212,219
> 3 to 4	0.3	1	4	13	42	131	417	1,306	4,171	13,060	41,709	130,596
Karst[c]												
0 to 1/4	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455
>1/4 to 1/2	2	11	33	102	324	1,013	3,233	10,122	32,325	101,213	323,243	1,012,122
>1/2 to 1	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,680	816,227
> 1 to 2	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,680	816,227
> 2 to 3	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,680	816,227
> 3 to 4	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,680	816,227

Notes

- Well A is in the ¼ to ½ TDL and serves an apportioned population of 2,966 which equates to a distance-weighted population of 1,013. Wells B and C are in the ½ to 1 mile TDL and serve an apportioned population of 5,932 which equates to a distance-weighted population of 1,669.

Table 3-12: Distance-Weighted Population Values for Potential Contamination Factor for Groundwater Migration Pathway[a]

Distance Category (miles)	Number of People Within the Distance Category											
	1 -10	11-30	31-100	101-300	301-1,000	1,001-3,000	3,001-10,000	10,001-30,000	30,001-100,000	100,001-300,000	300,001-1,000,000	1,000,001-3,000,000
Other than Karst[b]												
0 to 1/4	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455
>1/4 to 1/2	2	11	33	102	324	1,013	3,233	10,122	32,325	101,213	323,243	1,012,122
>1/2 to 1	1	5	17	52	167	523	1,669	5,224	16,684	52,239	166,835	522,385
> 1 to 2	0.7	3	10	30	94	294	939	2,939	9,385	29,384	93,845	293,842
> 2 to 3	0.5	2	7	21	68	212	678	2,122	6,778	21,222	67,777	212,219
> 3 to 4	0.3	1	4	13	42	131	417	1,306	4,171	13,060	41,709	130,596
Karst[c]												
0 to 1/4	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455
>1/4 to 1/2	2	11	33	102	324	1,013	3,233	10,122	32,325	101,213	323,243	1,012,122
>1/2 to 1	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,680	816,227
> 1 to 2	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,680	816,227
> 2 to 3	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,680	816,227
> 3 to 4	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,680	816,227

[a] Round the number of people present within a distance category to nearest integer. Do not round the assigned distance-weighted population value to nearest integer.
[b] Use for all aquifers, except karst aquifers underlying any portion of the sources at the site.
[c] Use only for karst aquifers underlying any portion of the sources at the site.

-Assign a distance-weighted population value for each distance category based on the number of people included within the distance category.
-Use the "Other Than Karst" portion of table 3-12 for the remainder of the population served by points of withdrawal subject to potential contamination.
-For this portion of the population, determine the number of people included within each "Other Than Karst" distance category in table 3-12.
-Assign a distance-weighted population value for each distance category based on the number of people included within the distance category.
-Calculate the value for the potential contamination factor (PC) as follows:

where: PC = 1/10 x (Wi + Ki)

Wi = Distance-weighted population from "Other Than Karst" portion of table 3-12 for distance category i.
Ki = Distance-weighted population from "Karst" portion of table 3-12 for distance category i.
n = Number of distance categories.

If PC is less than 1, do not round it to the nearest integer; if PC is 1 or more, round to the nearest integer. Enter this value in table 3-1.

Weighted Population for ABC Site

Well Identification	Distance from Site	Population Apportionment	Table 3-12 Weighting
Well A	2,600 ft (0.45 miles)	2,966	1,013
Wells B and C	4,000 ft (0.76 miles)	5,932	1,669

EPA 4-82

Potential Contamination Calculation

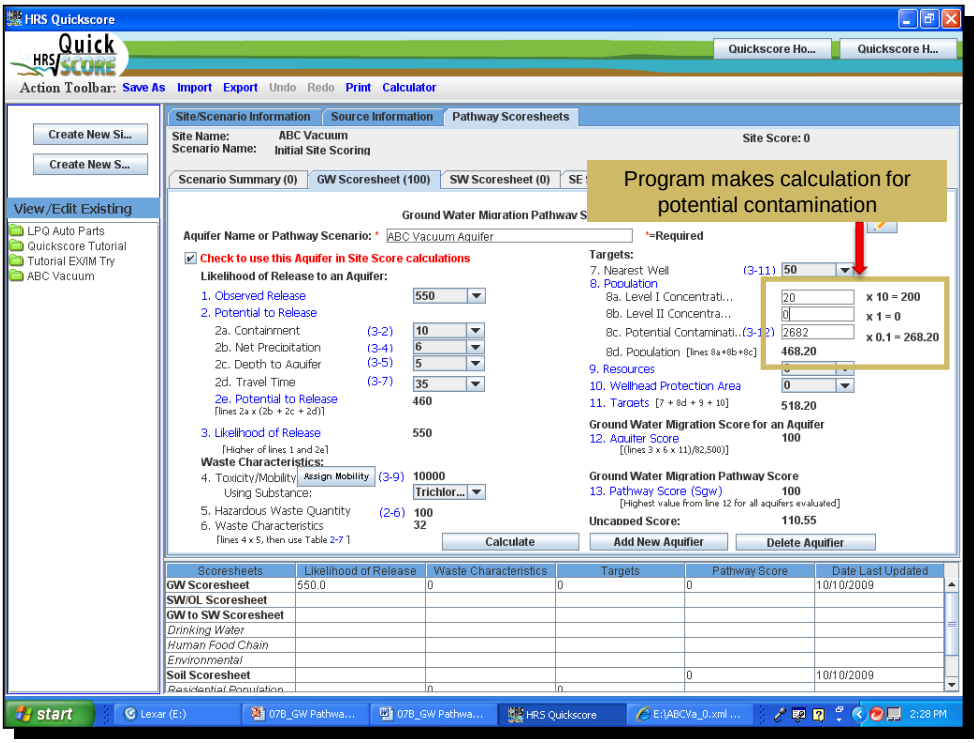
PC = 1/10 x (1,013 + 1,669)

PC = 1/10 x (2,682)

PC = 268.2

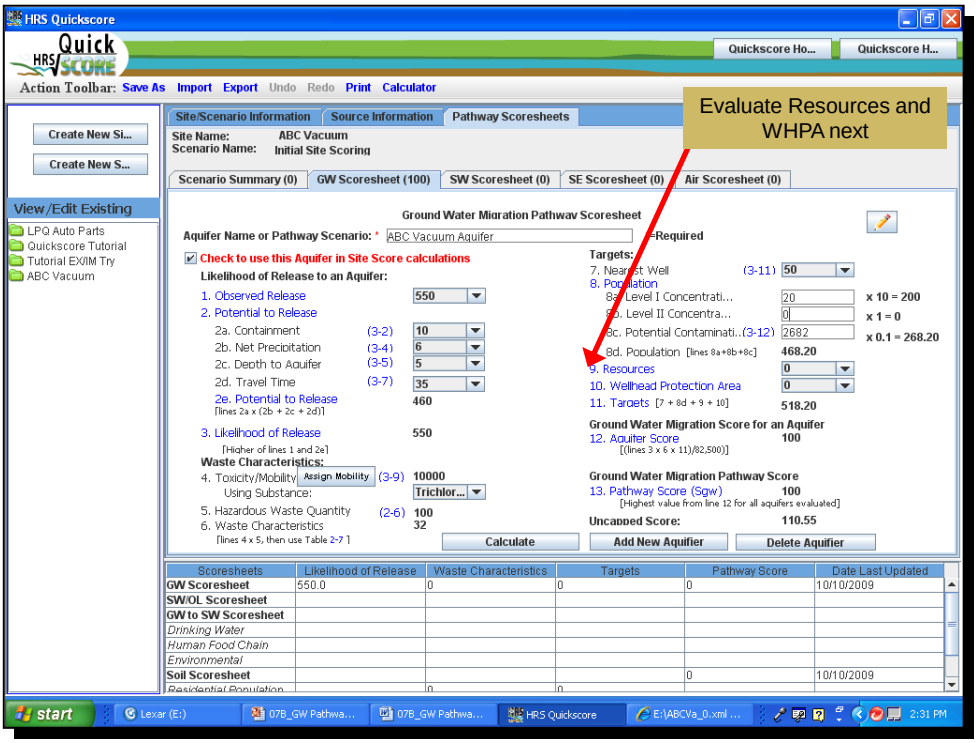
PC = 268

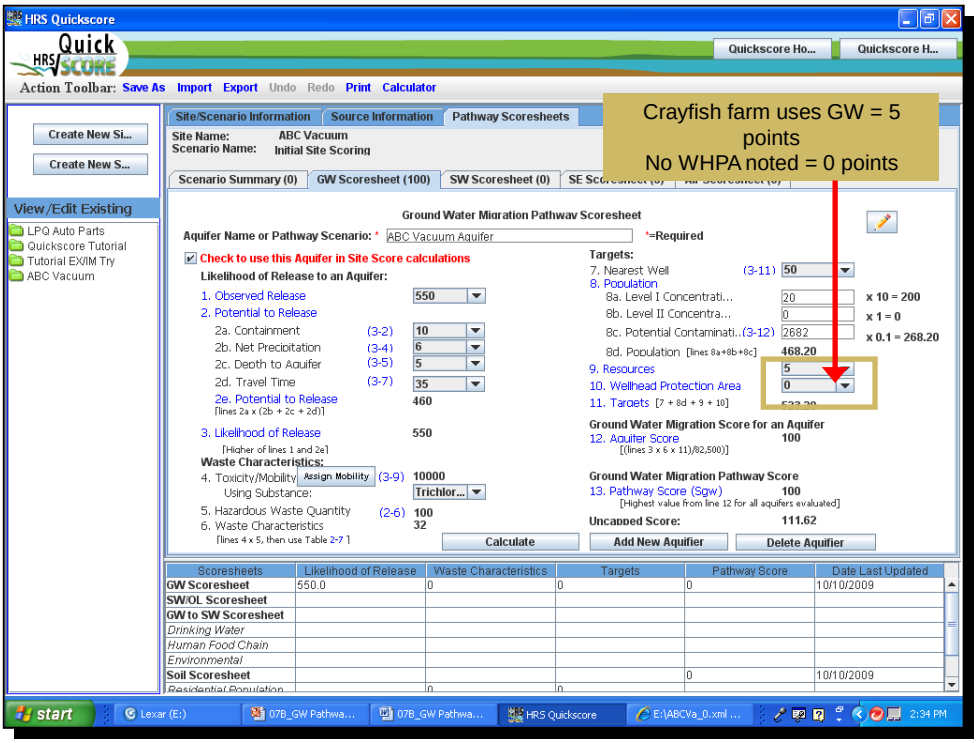
EPA 4-83



Notes

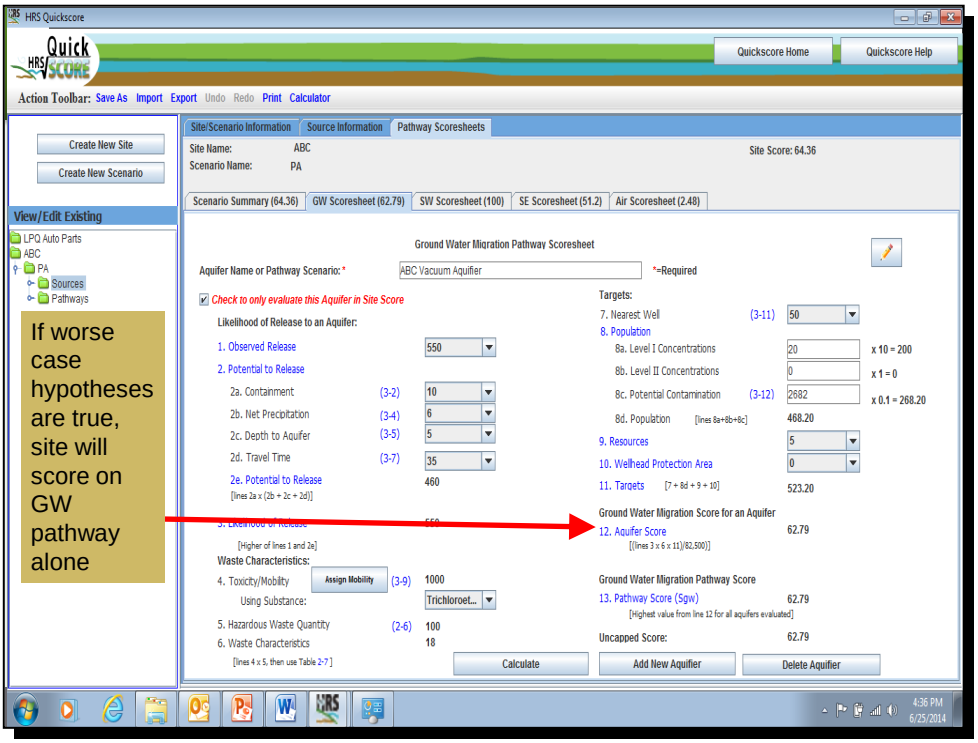
- Record 2,682 in the Potential Contamination box. Quickscore will perform the division that is required.

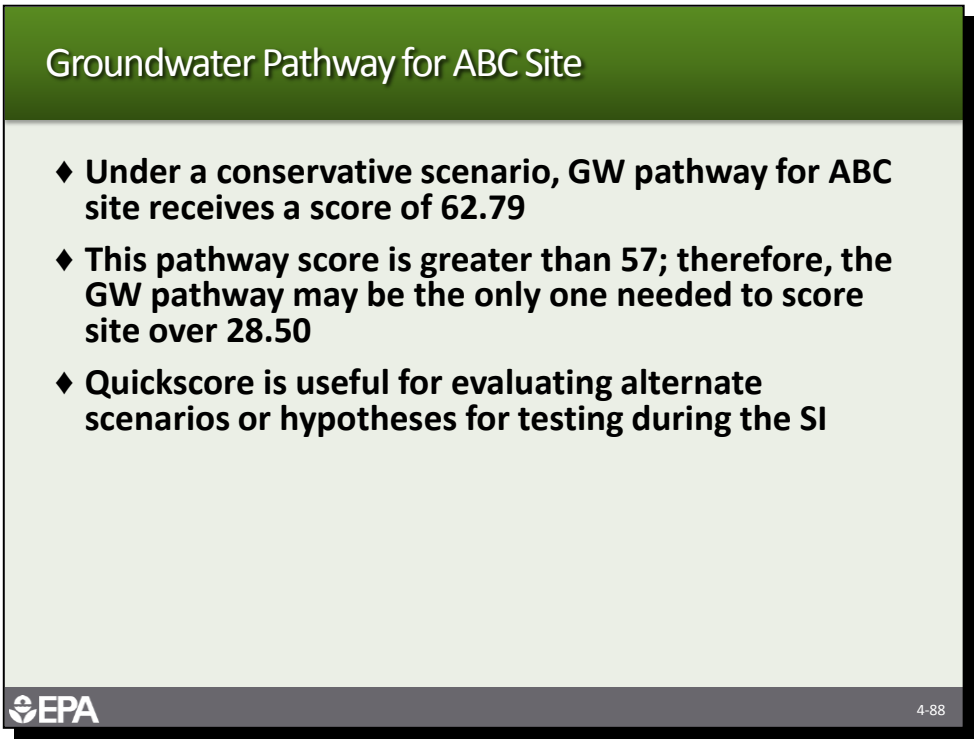

HRS Quickscore
Quick SCORE
Quickscore Ho...
Quickscore H...
Action Toolbar: Save As Import Export Undo Redo Print Calculator
Evaluate Resources and WHPA next
Create New Si...
Create New S...
View/Edit Existing
LPQ Auto Parts
Quickscore Tutorial
Tutorial EXIM Try
ABC Vacuum
Site/Scenario Information
Source Information
Pathway Scoresheets
Site Name: ABC Vacuum
Scenario Name: Initial Site Scoring
Scenario Summary (0)
GW Scoresheet (100)
SW Scoresheet (0)
SE Scoresheet (0)
Air Scoresheet (0)
Ground Water Migration Pathway Scoresheet
Aquifer Name or Pathway Scenario: * ABC Vacuum Aquifer
=Required
Check to use this Aquifer in Site Score calculations
Likelihood of Release to an Aquifer:
1. Observed Release 550
2. Potential to Release
2a. Containment (3-2) 10
2b. Net Precipitation (3-4) 6
2c. Depth to Aquifer (3-5) 5
2d. Travel Time (3-7) 35
2e. Potential to Release [lines 2a x (2b + 2c + 2d)] 460
3. Likelihood of Release 550
[Higher of lines 1 and 2e]
Waste Characteristics:
4. Toxicity/Mobility Assign Mobility (3-9) 10000
Using Substance: Trichlor...
5. Hazardous Waste Quantity (2-6) 100
6. Waste Characteristics 32
[lines 4 x 5, then use Table 2-7]
Calculate
Targets:
7. Nearest Well (3-11) 50
8. Population
8a. Level I Concentrati... 20 x 10 = 200
8b. Level II Concentra... 0 x 1 = 0
8c. Potential Contaminati.. (3-12) 2682 x 0.1 = 268.20
8d. Population [lines 8a+8b+8c] 468.20
9. Resources 0
10. Wellhead Protection Area 0
11. Targets [7 + 8d + 9 + 10] 518.20
Ground Water Migration Score for an Aquifer
12. Aquifer Score 100
[(lines 3 x 6 x 11)/82,500)]
Ground Water Migration Pathway Score
13. Pathway Score (Sgw) 100
[Highest value from line 12 for all aquifers evaluated]
Uncapped Score: 110.55
Add New Aquifer
Delete Aquifer
Scoresheets | Likelihood of Release | Waste Characteristics | Targets | Pathway Score | Date Last Updated
GW Scoresheet | 550.0 | 0 | 0 | 0 | 10/10/2009
SW/OL Scoresheet
GW to SW Scoresheet
Drinking Water
Human Food Chain
Environmental
Soil Scoresheet | 0 | 10/10/2009
start
Lexar (E:)
07B_GW Pathwa...
07B_GW Pathwa...
HRS Quickscore
E:\ABCVa_0.xml ...
2:31 PM



Notes

- Determine if groundwater within 4 miles of the site is used for any resources. Groundwater is used at the commercial cray fish farm. The site information indicated there was no WHPA. Resources gets a score of 5 and WHPA gets a score of 0.


HRS Quickscore
Quick HRS SCORE
Quickscore Home
Quickscore Help
Action Toolbar: Save As Import Export Undo Redo Print Calculator
Create New Site
Create New Scenario
View/Edit Existing
LPQ Auto Parts
ABC
PA
Sources
Pathways
If worse case hypotheses are true, site will score on GW pathway alone
Site/Scenario Information
Source Information
Pathway Scoresheets
Site Name: ABC
Scenario Name: PA
Site Score: 64.36
Scenario Summary (64.36)
GW Scoresheet (62.79)
SW Scoresheet (100)
SE Scoresheet (51.2)
Air Scoresheet (2.48)
Ground Water Migration Pathway Scoresheet
Aquifer Name or Pathway Scenario: *
ABC Vacuum Aquifer
*=Required
Check to only evaluate this Aquifer in Site Score
Likelihood of Release to an Aquifer:
1. Observed Release 550
2. Potential to Release
2a. Containment (3-2) 10
2b. Net Precipitation (3-4) 6
2c. Depth to Aquifer (3-5) 5
2d. Travel Time (3-7) 35
2e. Potential to Release 460
[lines 2a x (2b + 2c + 2d)]
[Higher of lines 1 and 2e]
Waste Characteristics:
4. Toxicity/Mobility Assign Mobility (3-9) 1000
Using Substance: Trichloroet...
5. Hazardous Waste Quantity (2-6) 100
6. Waste Characteristics 18
[lines 4 x 5, then use Table 2-7]
Calculate
Targets:
7. Nearest Well (3-11) 50
8. Population
8a. Level I Concentrations 20 x 10 = 200
8b. Level II Concentrations 0 x 1 = 0
8c. Potential Contamination (3-12) 2682 x 0.1 = 268.20
8d. Population [lines 8a+8b+8c] 468.20
9. Resources 5
10. Wellhead Protection Area 0
11. Targets [7 + 8d + 9 + 10] 523.20
Ground Water Migration Score for an Aquifer
12. Aquifer Score 62.79
[(lines 3 x 6 x 11)/82,500)]
Ground Water Migration Pathway Score
13. Pathway Score (Sgw) 62.79
[Highest value from line 12 for all aquifers evaluated]
Uncapped Score: 62.79
Add New Aquifer
Delete Aquifer
4:36 PM
6/25/2014



Notes

- Using worst case assumptions guided by BPJ, the ground water pathway for ABC gets a score of 62.79. This indicates that the ground water pathway may be the only one needed to score the site.
- Quickscore can be used to run various scenarios to evaluate the minimum amount of information that needs to be collected. For example, a potential contamination scenario could be run to see if the site would score on potential alone if the shallow and deeper aquifers are connected. Other scenarios involving use of fewer private wells could also be evaluated.

Groundwater Hypothesis Testing

- **What elements of the GW hypothesis would need to be tested with the SI strategy?**
  - Confirm the types of contaminants present in the sources
  - Confirm groundwater flow direction in shallow and deeper aquifer
  - Confirm water quality in 5 wells of the adjacent private residences and municipal wells
  - Confirm number of residences served by the 5 private wells and the municipal system
  - Determine which aquifer the Crayfish farm draws their groundwater from and at what level and frequency they pump to assess pumping influence on groundwater flow direction
  - Determine if the shallow and deeper aquifer can be treated as one unit

EPA 4-89

Next Webinar – Friday, July 11, 2014

- **Module 5: PA Scoring Exercise: Surface Water Migration Pathway** will be held on Friday, July 11 from 1 p.m. to 3 p.m.

EPA 4-90