



PHOENIX Tank Farms Application

PNNL-Hanford On-line Environmental Information Exchange

Tank Farms Web Application: <http://phoenix.pnnl.gov/apps/tanks>

Web Application Gallery: <http://phoenix.pnnl.gov/>



Functions and usage guide (PNNL-SA-98508, Rev. 8 - 6/8/2015)

The PHOENIX Tank Farms application is a joint effort between the Department of Energy Office of River Protection and the Pacific Northwest National Laboratory that provides a single access point to multiple data sets via standard web browsers. PHOENIX provides open and transparent access to current and historical data relevant to understanding the storage conditions of Hanford's tank waste.

The PHOENIX Tank Farms Application provides access to:

- Leak status and other basic information about SSTs and DSTs
- Historical and current in-tank sensor data: surface level, interstitial liquid level, temperature readings
- Atmospheric temperature and barometric pressure
- Tank/farm waste volume by phase (sludge, supernate, saltcake) and source
- Tank-specific inventory of key risk driving constituents
- Drywell gamma logging results for selected tank farms
- Tank volume and waste transfer history
- Trends in key groundwater contaminants (Central Plateau only)
- Multiple Hanford site GIS layers: facilities, waste sites, wells, etc.

The PHOENIX development team wants to make the PHOENIX Tank Farms Application as useful to the Hanford community as possible. If you have any questions, ideas, suggestions or comments please use the Feedback button or contact:

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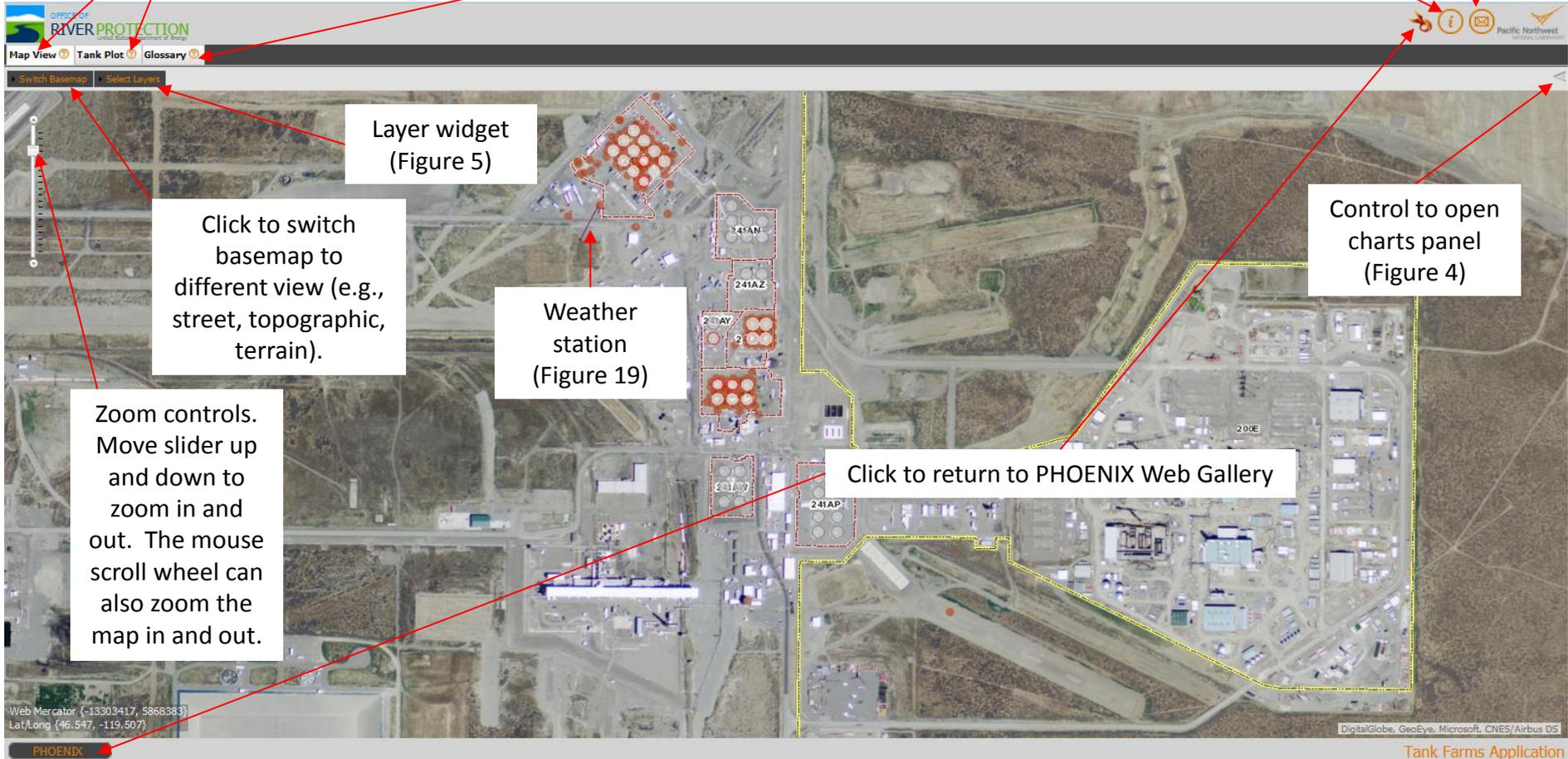
DJ Watson
509-372-6456
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Toggle these tabs to switch between the aerial map view and tank plot view (Figure 2).

Glossary (Figure 18)

Feedback icon (Figure 3)

Information widget (Figure 3)



Layer widget (Figure 5)

Click to switch basemap to different view (e.g., street, topographic, terrain).

Weather station (Figure 19)

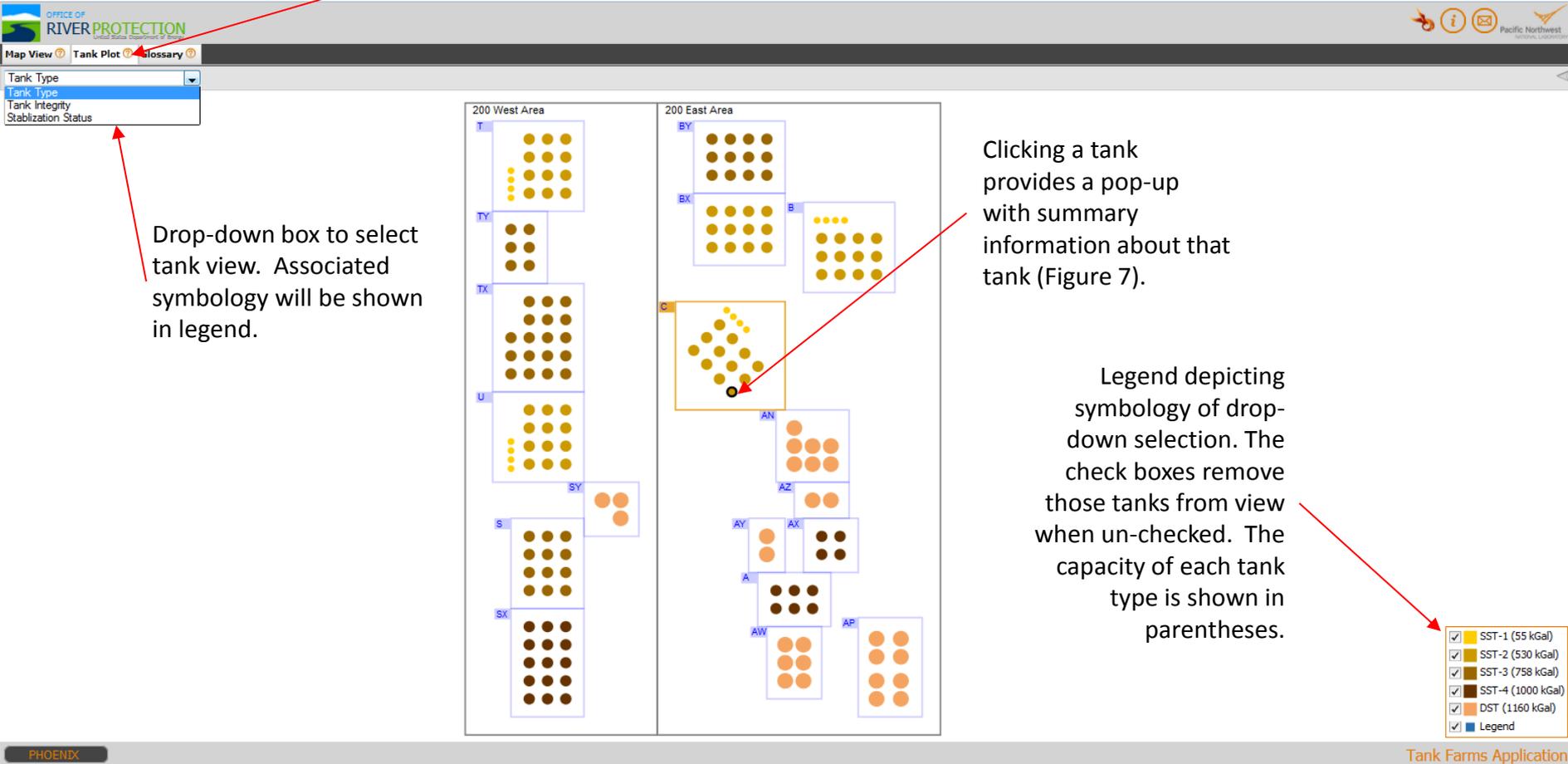
Zoom controls. Move slider up and down to zoom in and out. The mouse scroll wheel can also zoom the map in and out.

Click to return to PHOENIX Web Gallery

Control to open charts panel (Figure 4)

Figure 1. Initial map view highlighting basic application controls

Click the Question Mark icon to view the information widget to read more detailed information about the Tank Plot view.



Drop-down box to select tank view. Associated symbology will be shown in legend.

Clicking a tank provides a pop-up with summary information about that tank (Figure 7).

Legend depicting symbology of drop-down selection. The check boxes remove those tanks from view when un-checked. The capacity of each tank type is shown in parentheses.

Figure 2. Tank plot view highlighting basic application controls

Figure 3. Information widget

Click on each tab to view more detailed information about each tank farm application feature.

Click on "References" to access the other PHOENIX editions, along with online data references, including a downloadable user's guide.

Settings function (Figure 4).

Click on "Future" to view see potential future capabilities within the Tank Farms Application.

Click on "Feedback" to provide feedback to the PHOENIX team.

PHOENIX - Hanford Tanks

Welcome

Map View

Tank Plot

Glossary

Sensor/Weather

Tank Best-Basis

Farm Best-Basis

Gamma Logs

Groundwater

References

Settings

Future

Feedback

About PHOENIX Tank Farms Application

PNNL-Hanford Online ENvironmental Information eXchange (PHOENIX) provides a single access point to multiple data sets via standard web browsers. PHOENIX also provides data visualization tools and provides explanations of key data sets to aid understanding. This application is based on the innovative technology applied by the Pacific Northwest National Laboratory (PNNL) to access and visualize other environmental data sets at the Hanford Site ([PHOENIX Applications](#)). The PHOENIX Tank Farm Application provides access to:

- Basic information about SSTs and DSTs including leak status
- Historical and current in-tank sensor data: surface level, interstitial liquid level, temperature readings
- Atmospheric temperature and barometric pressure
- Tank/farm waste volume by phase (sludge, supernate, saltcake) and source
- Tank-specific inventory of key risk driving constituents
- Drywell gamma logging results for selected tank farms
- Tank volume and waste transfer history
- Trends in key groundwater contaminants (Central Plateau only)
- Multiple Hanford site GIS layers: facilities, waste sites, wells, etc.

As per the Tri-Party Agreement Databases, Access Mechanism, and Procedures report ([DOE/RL-93-69](#)), the Tank Waste Information Network System ([TWINS](#)) is identified as one of the Tri-Party Agreement related databases. PHOENIX shares many data sources with TWINS but is not intended to replace TWINS. TWINS provides additional data sources not available through PHOENIX and provides the primary source (per the

Figure 5. Layer widget

Check a box to show the layer. The parent layer must also be checked.

Clicking the "+" symbol expands the node to show all the child nodes; clicking "-" collapses it.

The layers widget also serves as a legend.

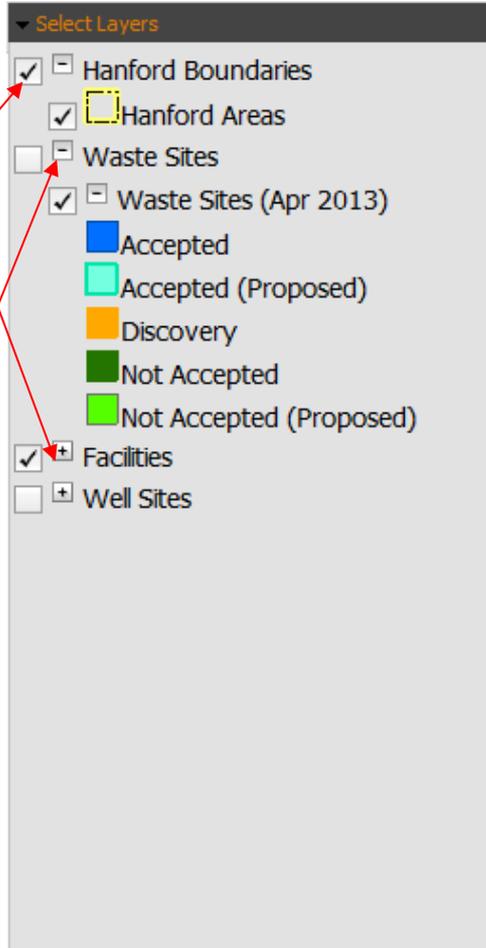


Figure 6. Map controls and features

Blue dots indicate groundwater wells. Clicking a well provides a pop-up with well information (Figure 16). Wells are only visible after zooming in to a certain extent.

Brown dots indicate boreholes or dry wells with available gamma log and concentration profile data. Clicking a well provides a pop-up with well information (Figure 14). Wells are only visible after zooming in to a certain extent.



Clicking a tank provides a pop-up with summary information about that tank (Figure 7).



Sensor data icon. Click this icon to see Sensor data for the selected tank (Figure 10).

Tank Best-Basis Inventory data icon. Click this icon to see Best-Basis Inventory data for the selected tank (Figure 13).

Farm Best-Basis Inventory data icon. Click this icon to see Best-Basis Inventory data for the selected tank farm (Figure 9).

Clicking the tank name opens a pop-up with more detailed tank information (Figure 8).

Click the "x" to close the pop-up. This will not affect the right-hand panel (if open).

Basic information about the selected tank

Interim stabilization method and date

These graphs show 5 years of data for the three metrics, if available, in a qualitative fashion. The data can be inspected more closely in the right-hand panel of the application by clicking the three graph/plot icons at the top of this tank pop-up dashboard (Figures 9-13).

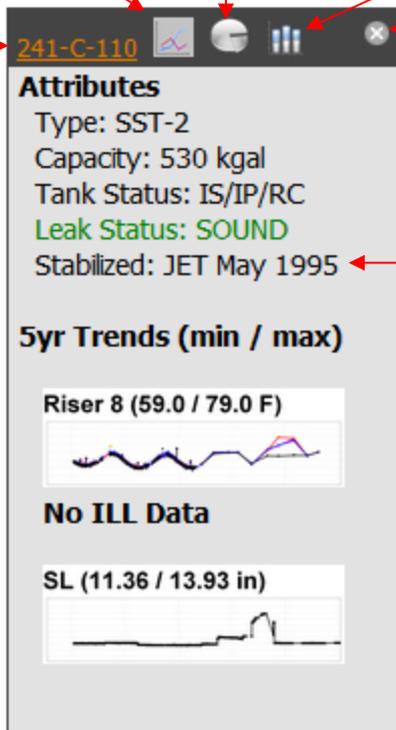
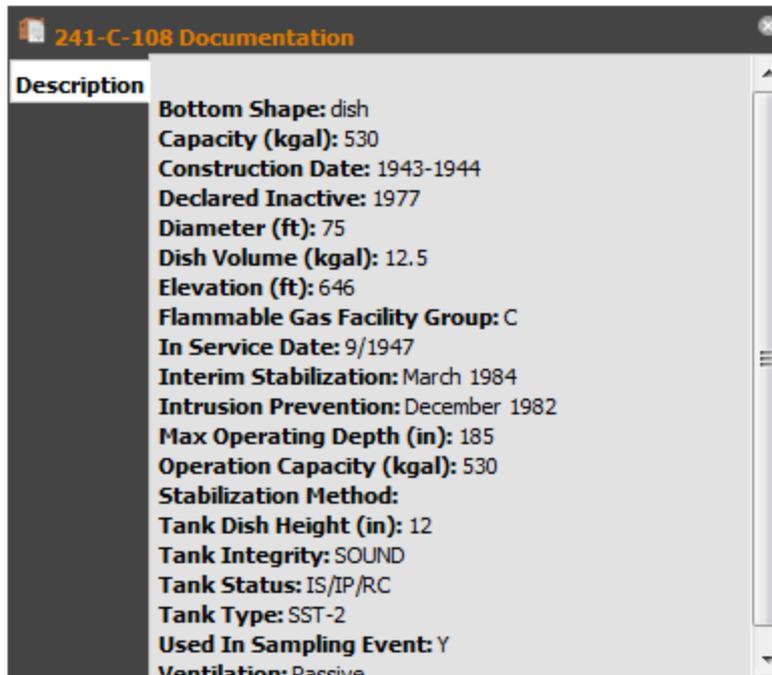


Figure 7. Tank pop-up



Figure 8. Detailed tank information pop-up. “Description” tab provides detailed information about the tank.





Select which tank farm to view Best-Basis Inventory data for from drop-down menu.

Select which data/charts to view from drop-down menu.

Click the Question Mark icon to view the information widget to read more detailed information about the Farm Best Basis Inventory data.

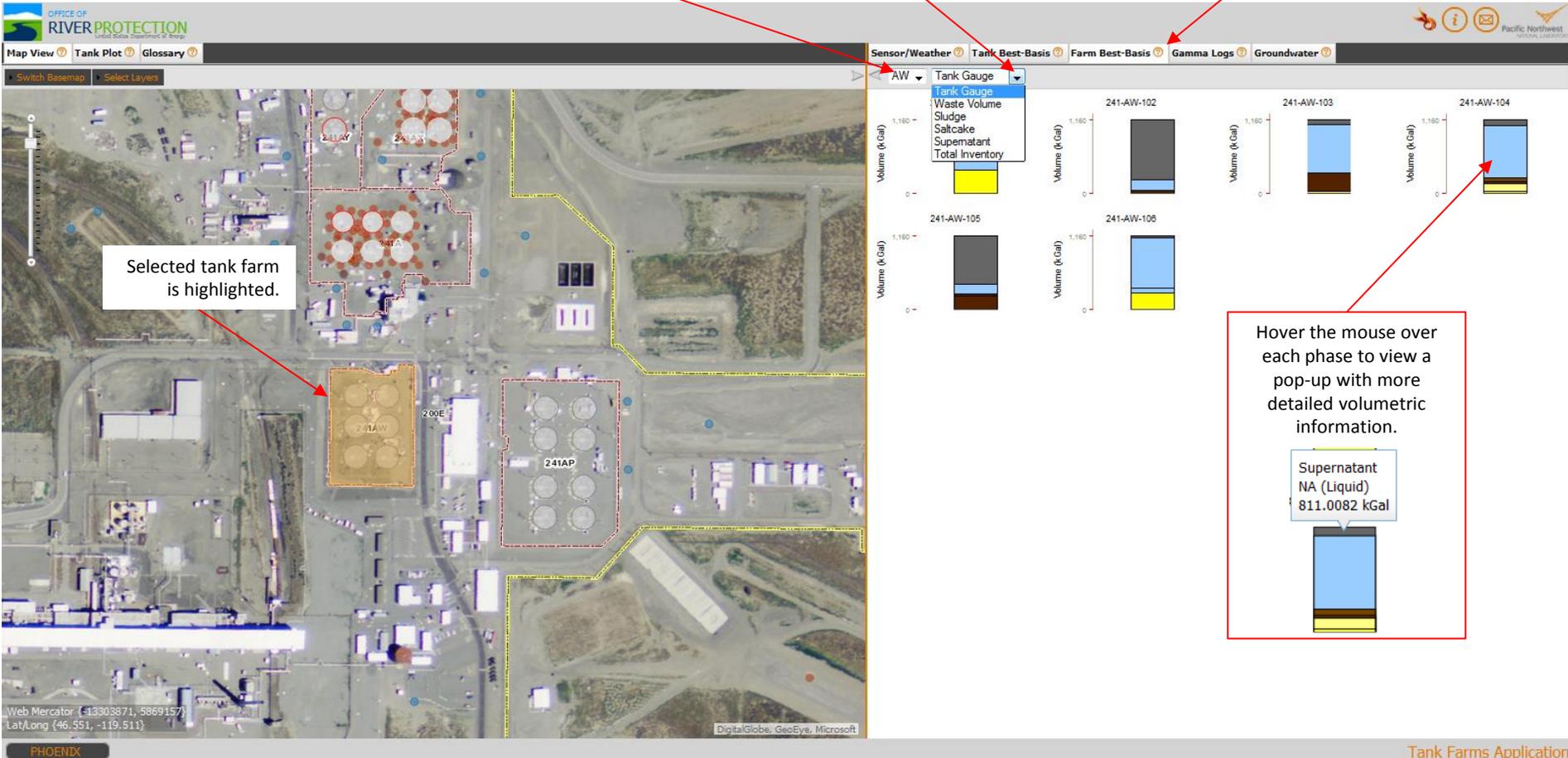


Figure 9. Farm Best-Basis Inventory chart panel



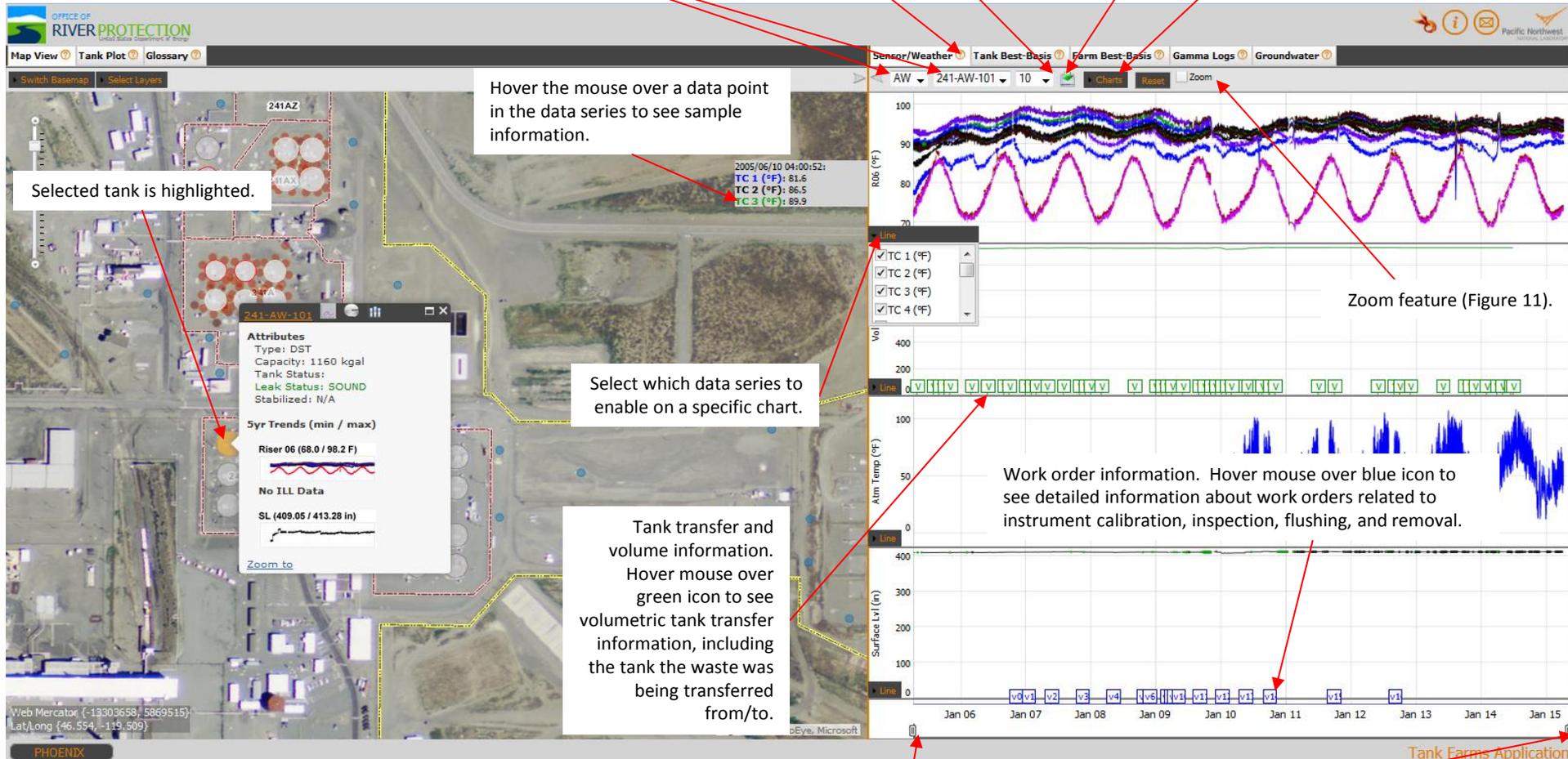
Select which tank farm and specific tank to view Sensor data for from drop-down menus.

Click the Question Mark icon to view the information widget to read more detailed information about the tank Sensor data.

Select the number of years of data to be viewed in the chart.

Click the "Tank Info" icon to see corresponding chart data in tabular view (Figure 12A).

Select which sensors to appear in chart panel. Changes will not take effect until this button is clicked a second time.



Selected tank is highlighted.

Hover the mouse over a data point in the data series to see sample information.

Select which data series to enable on a specific chart.

Tank transfer and volume information. Hover mouse over green icon to see volumetric tank transfer information, including the tank the waste was being transferred from/to.

Zoom feature (Figure 11).

Work order information. Hover mouse over blue icon to see detailed information about work orders related to instrument calibration, inspection, flushing, and removal.

Figure 10. Sensor chart panel

Slide the bars to increase or decrease the temporal extent of the x-axis. Double-click to zoom back to initial temporal extent. Other options for changing chart extents are shown in Figure 12B.



When "Zoom" is unchecked, the charts in the panel are shown at an absolute scale (i.e. the operational depth of the tank for surface level).

When "Zoom" is checked, the charts in the panel are shown at a relative scale (see both the volume and surface level charts).

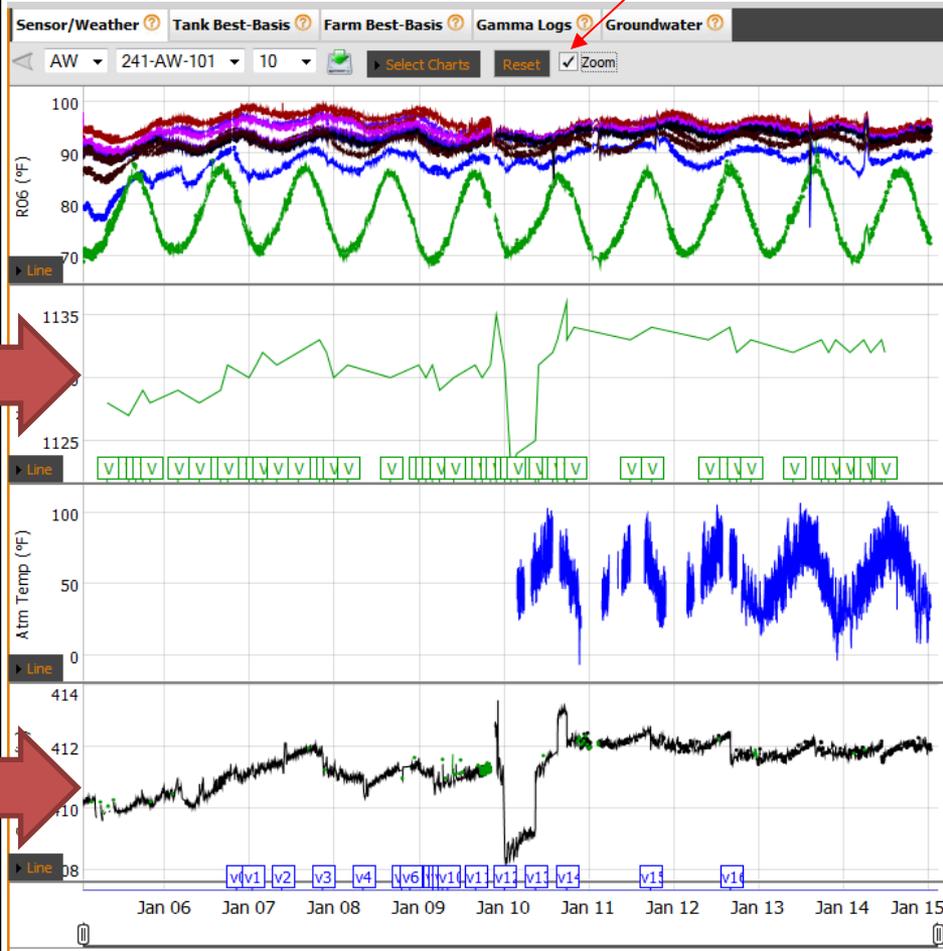
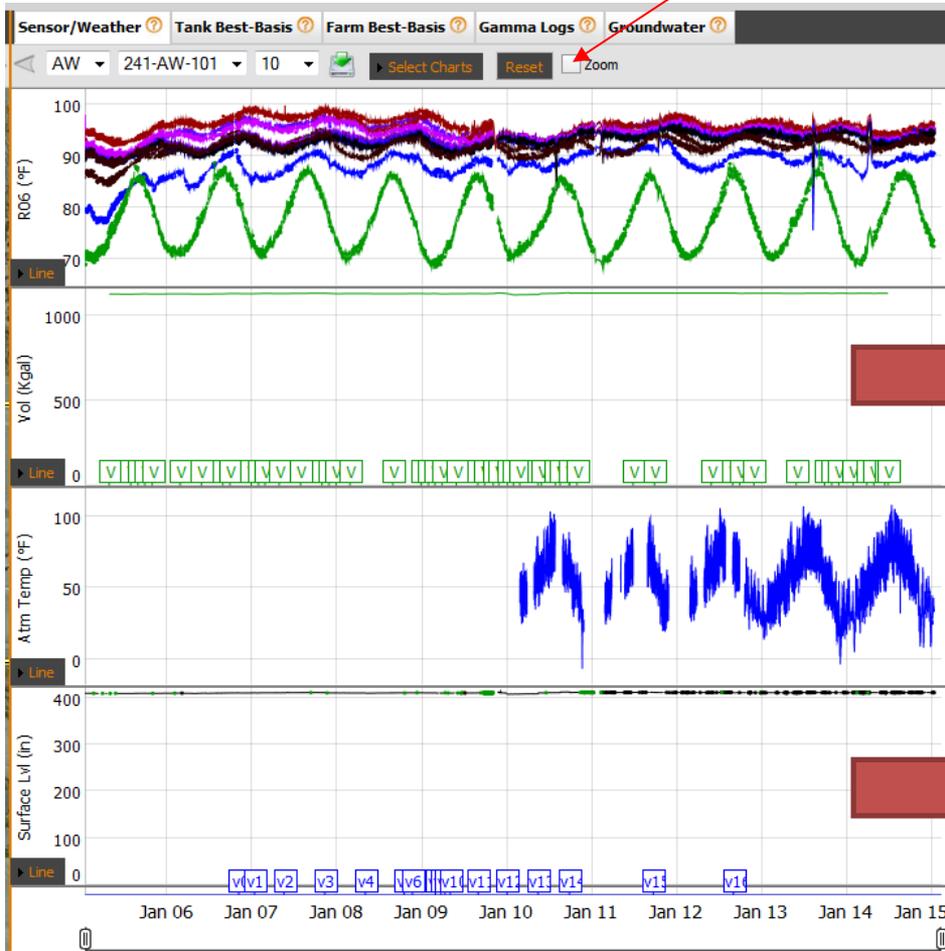


Figure 11. Zoom feature on sensor chart panel

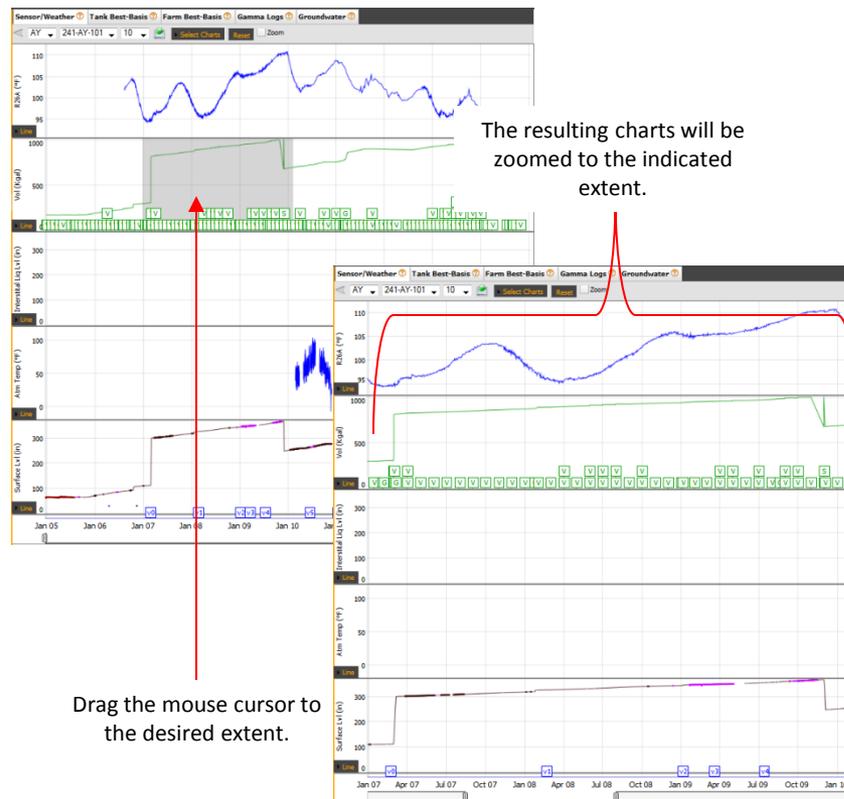
Figure 12A. Tabular data view. Click through each tab on the left of the pop-up to view tab-specific data.

241-C-110 Sensor Data

- SL Auto Enraf/ENRAF Sensor
- SL Manual Enraf/ENRAF Sensor
- SL Weight Factor/Weight Factor Sensor
- RISER 8 Thermocouples

Date	Manual Enraf/ENRAF (Inches)	Qualifier
4/4/2002 8:24:00 AM	72.08	G
4/5/2002 1:00:00 PM	72.03	G
4/6/2002 1:00:00 PM	72.03	G
4/7/2002 1:00:00 PM	72.08	G
4/8/2002 8:18:00 AM	72.08	G
4/9/2002 8:03:00 AM	72.08	G
4/10/2002 8:35:00 AM	72.08	G
4/11/2002 10:01:00 AM	72.07	G

Figure 12B. Cursor zoom capability. Drag the mouse cursor to the extent of the data wished to be viewed. The resulting charts will be zoomed to the indicated extent. The cursor can be dragged to change the extent of either the x- or y- axis. Double-click to zoom back to initial temporal extent.

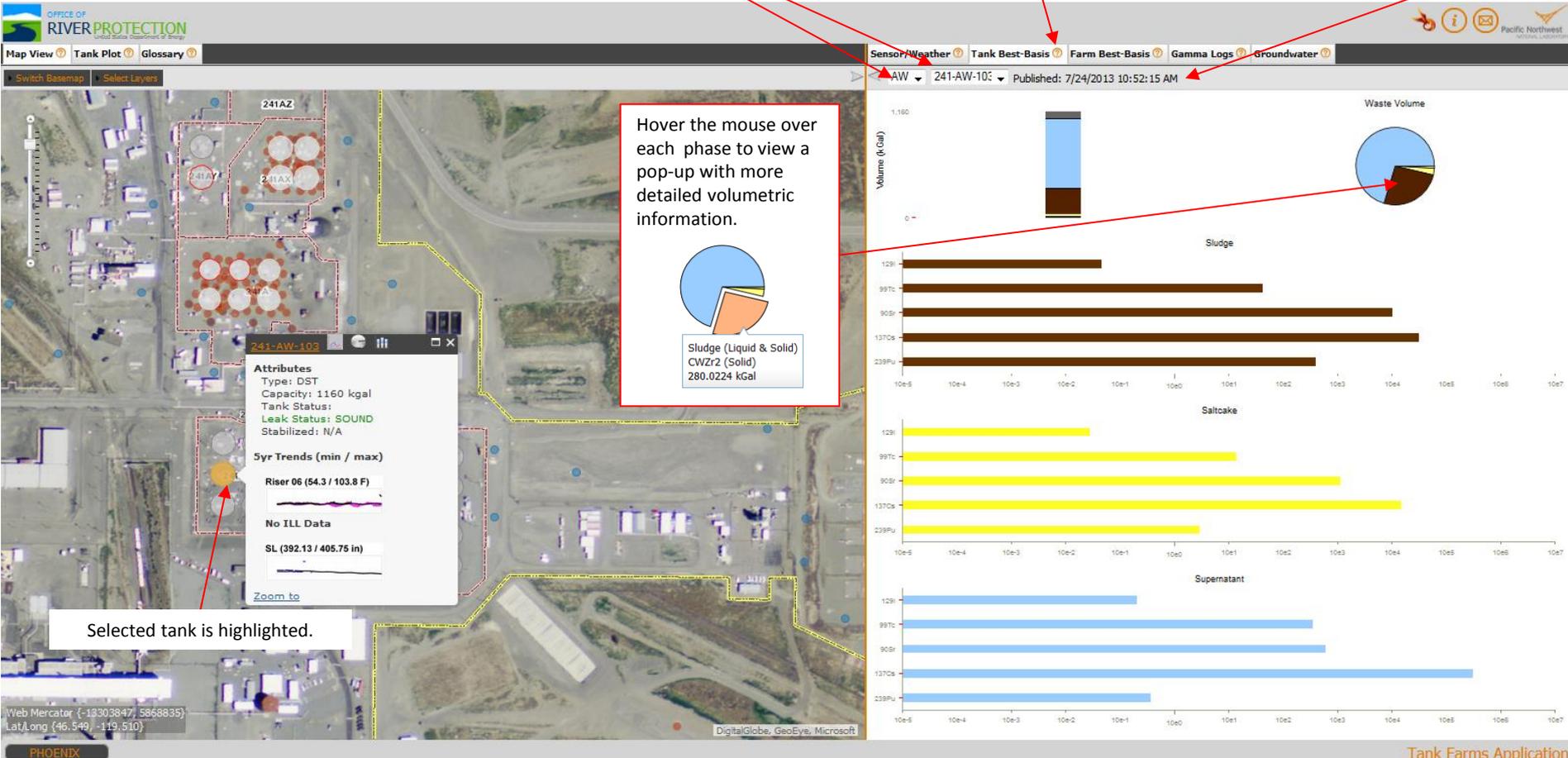




Select which tank farm and specific tank to view Best-Basis Inventory data for from drop-down menus.

Click the Question Mark icon to view the information widget to read more detailed information about the Tank Best Basis Inventory data.

Date the data was published and last updated.



Selected tank is highlighted.

Figure 13. Tank Best-Basis Inventory chart panel



Figure 14A. Drywell pop-up. Click on a well to see well ID and type.

Click the well name to view the detailed well information pop-up (Figure 14B).

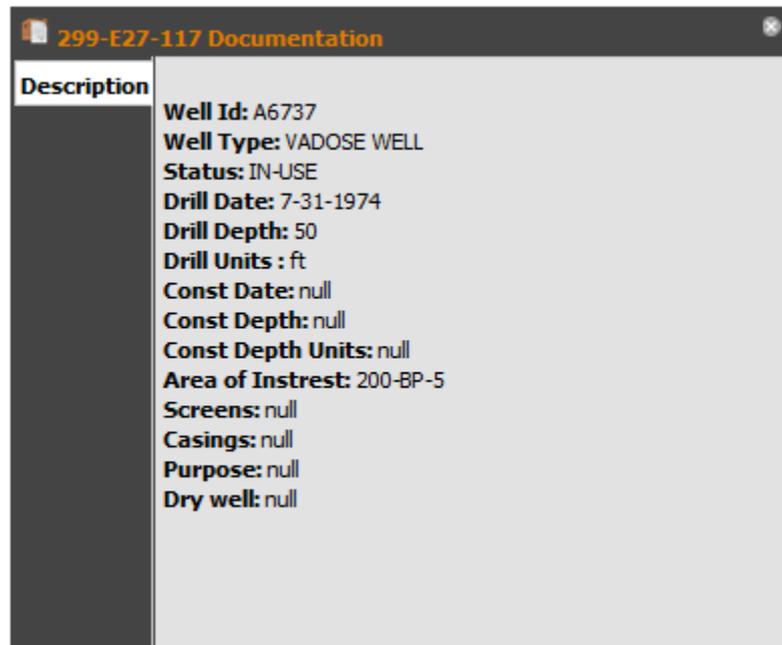
Click the Gamma Logs icon to view the gamma logs chart in the panel to the right of the screen (Figure 15).



Click to zoom in closer to the well on the map.

Click the Groundwater icon to view the groundwater monitoring results in the panel to the right of the screen (Figure 17).

Figure 14B. Detailed drywell well information pop-up. “Description” tab provides detailed information about the well.



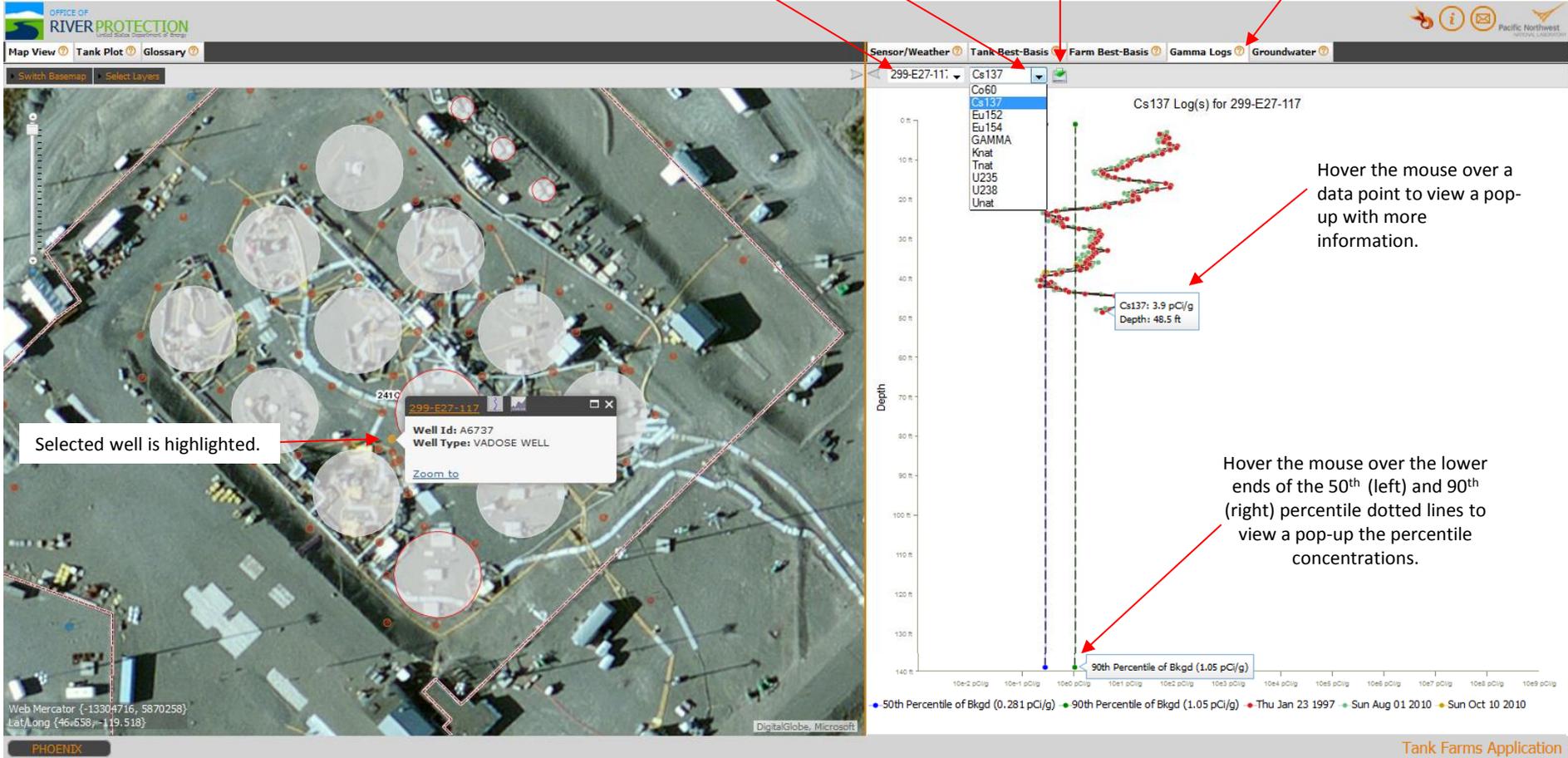


Select well to view log charts for that specific well.

Select which analyte to view well log data for in the drop-down menu. Each sampling event is shown as a separate data series in the legend on the bottom of the chart.

Click the "Well Info" button to see corresponding chart data in tabular view (Figure 12A).

Click the Question Mark icon to view the information widget to read more detailed information about the Gamma Logs data.



Selected well is highlighted.

Hover the mouse over a data point to view a pop-up with more information.

Hover the mouse over the lower ends of the 50th (left) and 90th (right) percentile dotted lines to view a pop-up the percentile concentrations.

Figure 15. Drywell gamma logs chart panel



Figure 16A. Groundwater well pop-up. Click on a well to see well ID and type.

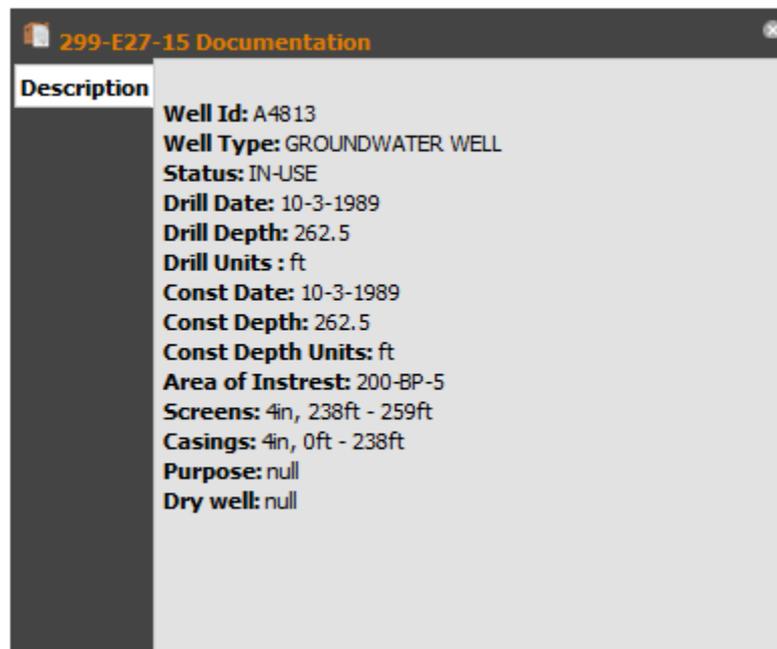
Click the well name to view the detailed well information pop-up (Figure 16B).



Click to zoom in closer to the well on the map.

Click the Groundwater icon to view the groundwater monitoring results in the panel to the right of the screen (Figure 17).

Figure 16B. Detailed groundwater well information pop-up. "Description" tab provides detailed information about the well.





Click "Clear Monitor Wells" to clear all monitoring data on the charts.

Select which contaminants to view monitoring data for in the drop-down menu. Each contaminant will have its own chart added to the panel below.

Click the Question Mark icon to view the information widget to read more detailed information about the groundwater monitoring data.

Select which wells to view in each contaminant chart in the panel. Each well will be shown as its own data series. The drinking water standard (DWS) for each contaminant can also be shown on the chart if selected.

To show multiple wells on chart, click each well to view the well pop-up, and then click the Groundwater icon to add the data series to the plots. All wells that are included in the charts are highlighted on the map.

Hover the mouse over a data point to view a pop-up with more information.

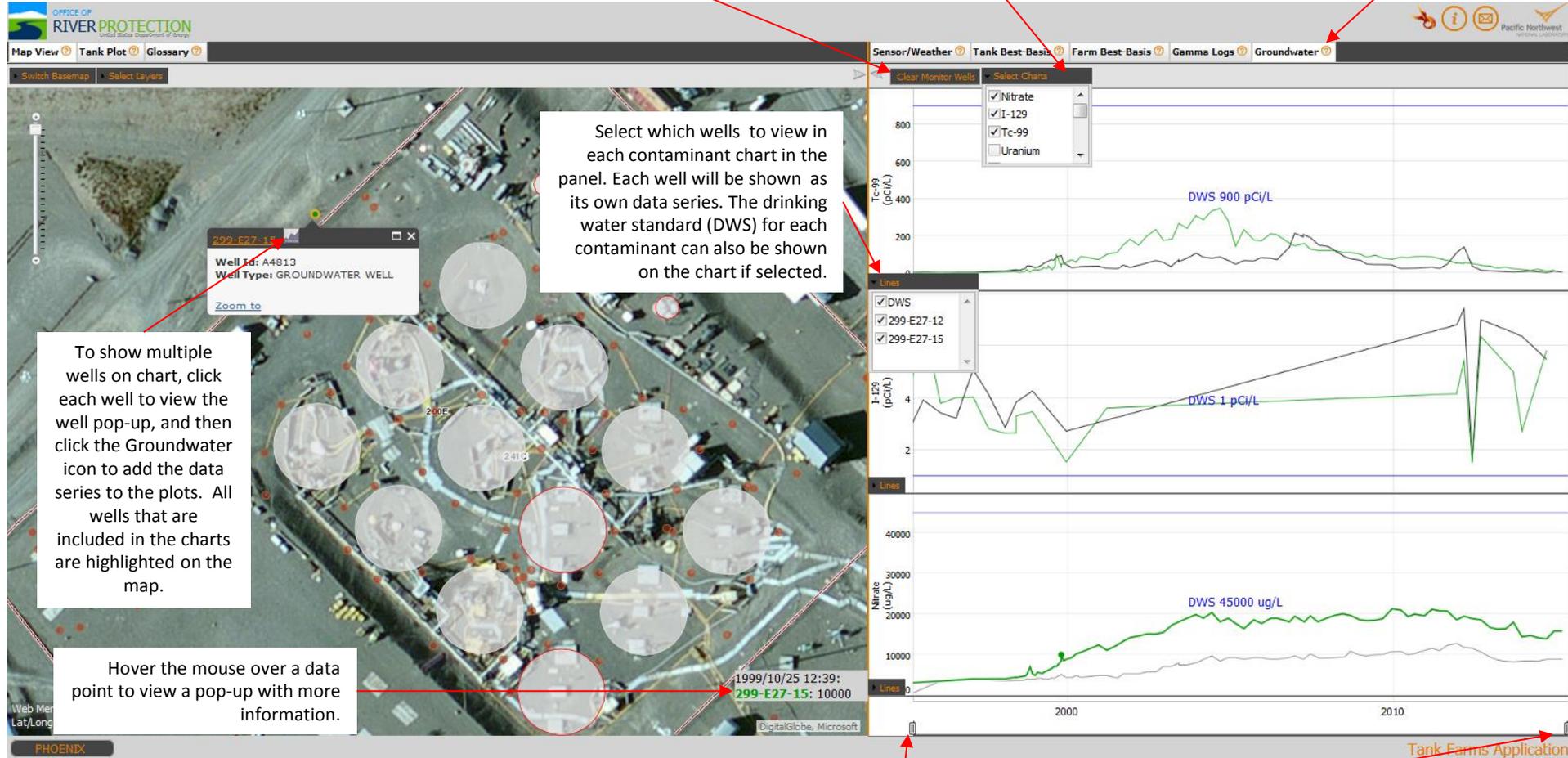


Figure 17. Groundwater monitoring chart panel

Slide the bars to increase or decrease the temporal extent of the x-axis. Double-click to zoom back to initial temporal extent. Other options for changing chart extents are shown in Figure 12B.

Hover the mouse over each letter/number to move to the respective section within the Glossary.

B

B
(BBI Waste Type) B-Plant high-activity waste - Rare earth (RE) fission products, recovered current acid waste (CAW), solvent wash waste, and any solution containing high activity (including cask station receipts, cell drainage containing product spills) (1967-1972)

B Plant
One of the three original Bismuth-Phosphate processing facilities. Later converted to waste fractional plant. B Plant used for BiPO₄ 1944-52, then for FP recovery. See also 222-B and TK.

basemap data set
Mapping data that contains basic reference data, such as roads, cities, prominent landscape features, etc. to orient the user.

Best Basis Inventory (BBI)
The best-basis inventory (BBI) represents a process used to establish the estimate of the current tank waste inventories for a standard set of chemicals and radionuclides (consisting of 46 radionuclides and 29 chemicals). In the BBI process, waste concentration and volume estimates are established and used to calculate inventories. Available analytical data (waste sample analyte results) are evaluated to determine the constituent concentrations that best represent the waste in a tank in comparison to actual waste volume measurements and the Hanford Defense Waste (HDW) waste type summaries. When analytical data is not available for a chemical or radionuclide, waste concentrations are estimated based on waste process information derived from the HDW summaries. Waste volume estimates in the BBI are based on tank measurements but can also be based on information associated with waste transfers compiled in the HDW. The most current version of the BBI process is provided in RPP-7625, Best-Basis Inventory Process Requirements, Rev. 9.

BiPO₄
Bismuth Phosphate Process. First precipitation process used at the Hanford Site for separating plutonium from the irradiated uranium fuels. This process was replaced by REDOX and PUREX processes to gain the advantages of separation and recovery of the uranium and plutonium fission products in B-222 and U-222, 1944-56. Left U in waste. See also MW, 1C, and 2C.

BL
(BBI Waste Type) B-Plant low-activity waste - 1AW solvent extraction waste stream (includes complexants added for solvent extraction), the 1CP/organic wash waste during PAS processing, and insoluble solids remaining after treatment of solids centrifuged from CAW feed (i.e., acid leached and water washed PUREX high-level waste [HLW] sludge). Cell drainage and Waste Encapsulation Storage Facility(WESF) transfers with low radionuclide content (1967- 1976)

Boiling Waste
Waste containing sufficient radioactive decay heat to self-boil.

Bottom Referenced Tank
Either a dished bottom tank or a flat bottom tank where the zero point for liquid level gages is the lowest elevation in the tank.

Bottoms Receivers
Tank designated for receiving evaporator bottoms.

Breach
Any through-wall hole, typically used to describe a small through-wall hole in a tank liner. A large breach is typically described as a tear in the liner.

BT-SltCk
(BBI Waste Type) Saltcake from 242-B Evaporator operation (1951-1953) and the 242-T Evaporator operation (1951-1955). Formerly BSltCk and TISltCk.

Bumping, Tank Bump
A tank bump occurs when solids overheat in the lower portion of the tank. The hot solids are mixed with the cooler fluid either by operation of the airlift circulators (ACLs) or by natural means. The hot solids rapidly transfer heat to the liquid, some of which quickly vaporizes. The sudden pressurization caused by vapor generation is called a "bump".

Burial Ground (certain)

Figure 18. Glossary

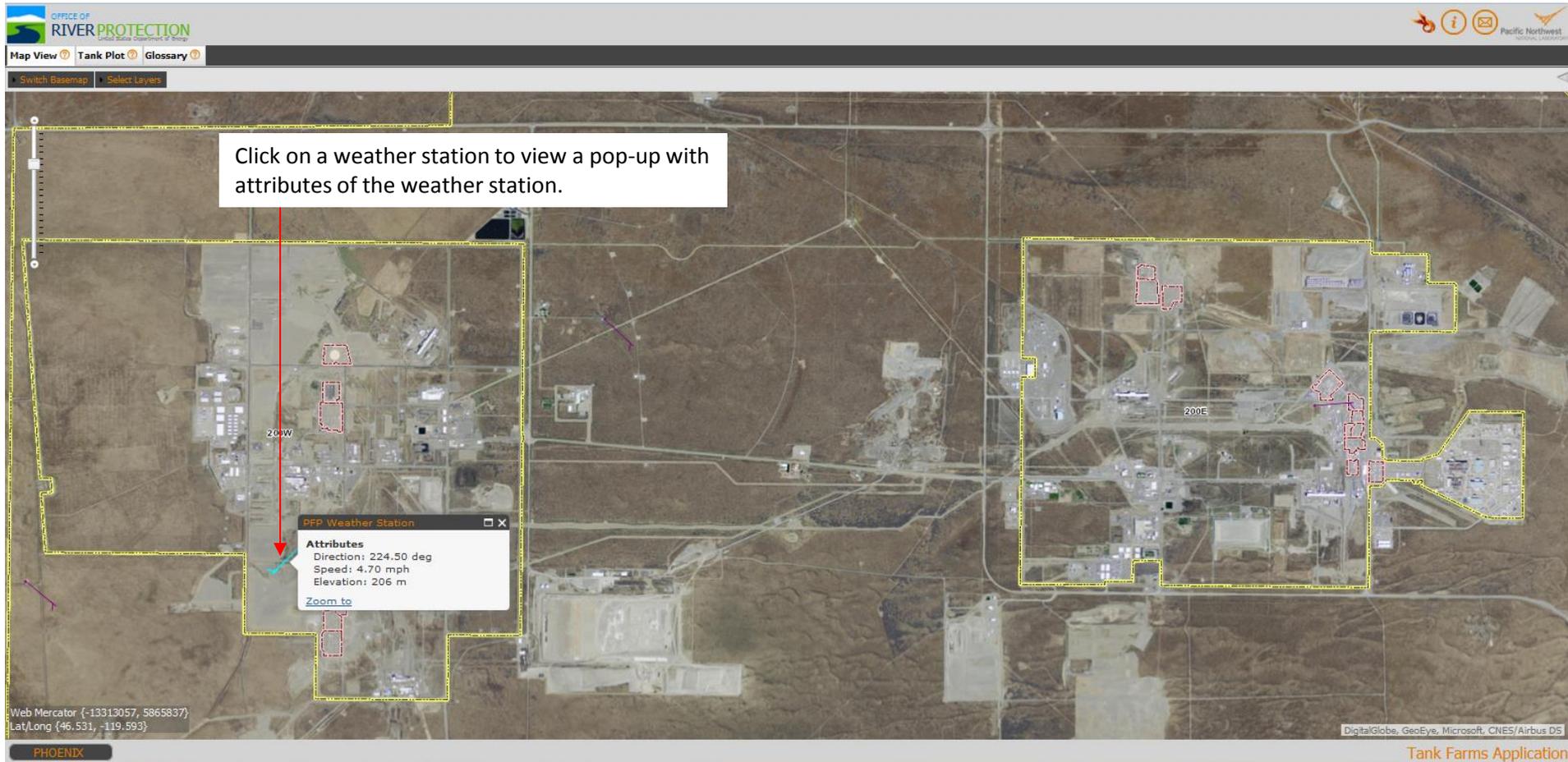


Figure 19. Weather stations