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A demonstration of a U.S. Geological Survey ground-water sampling mobile laboratory, techniques and computerized field notes.

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U.S. Geological Survey

Collecting a Representative Ground-Water Water-Quality Sample

- What is being sampled for?
- What materials will touch the water?
- What will the pump do to the water?
- Were all the samples you will be comparing sampled in the same way?
- How do you know?

Factors that affect the chemistry of samples

- Equipment that touches the water.
- Cleanliness of equipment.
- Exposure to the atmosphere.
- Temperature change.
- Pressure decrease.

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A dedicated mobile laboratory is a useful tool to control these factors

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Factors that affect the chemistry of samples

- Equipment material.
- Equipment cleaning protocols.
- Exposure to the atmosphere.

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Factors that affect the chemistry of samples

- Temperature change.
- Pressure decrease.

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Sample Collection

- Position of pump in well is important.
- Pump 3X casing volume.
- Measure pH, temperature, specific conductance, dissolved oxygen and turbidity at regular intervals.
- Continue until 5 consecutive readings are measured that fall with a set range.

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Sample Collection

- Drawdown not to exceed 1 ft.
- Flowrate not to exceed 500 mL/min.
- Fill bottles in consistent order.
- Rinse sample bottles & preserve if appropriate.

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Quality Control

- Validates sampling protocols
- At least 10% replicates, blanks and spikes

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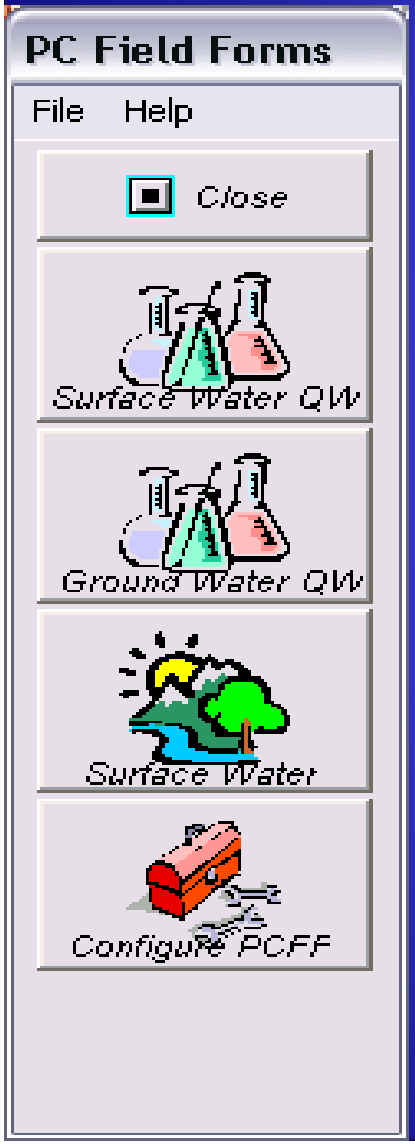
Use of Automation to Increase Efficiency and Accuracy



- Field notes can be pre-populated to save time and reduce errors
- Aids in producing thorough notes
- Dropdown menus expedite note taking
- Greatly increases consistency of filed notes

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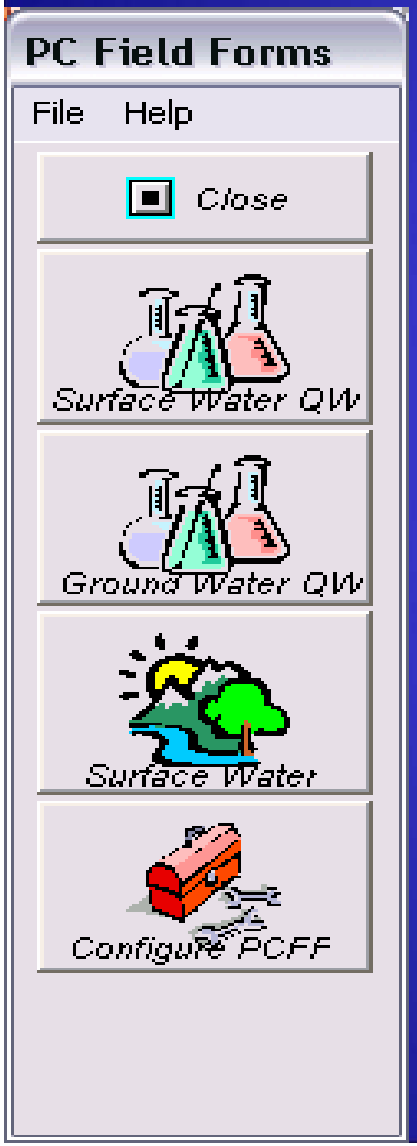
Use of Automation to Increase Efficiency and Accuracy



- Built-in checks prevent math errors and illogical coding errors
- Eliminates transcription errors and deciphering hand written forms
- Expedites uploading field data into databases

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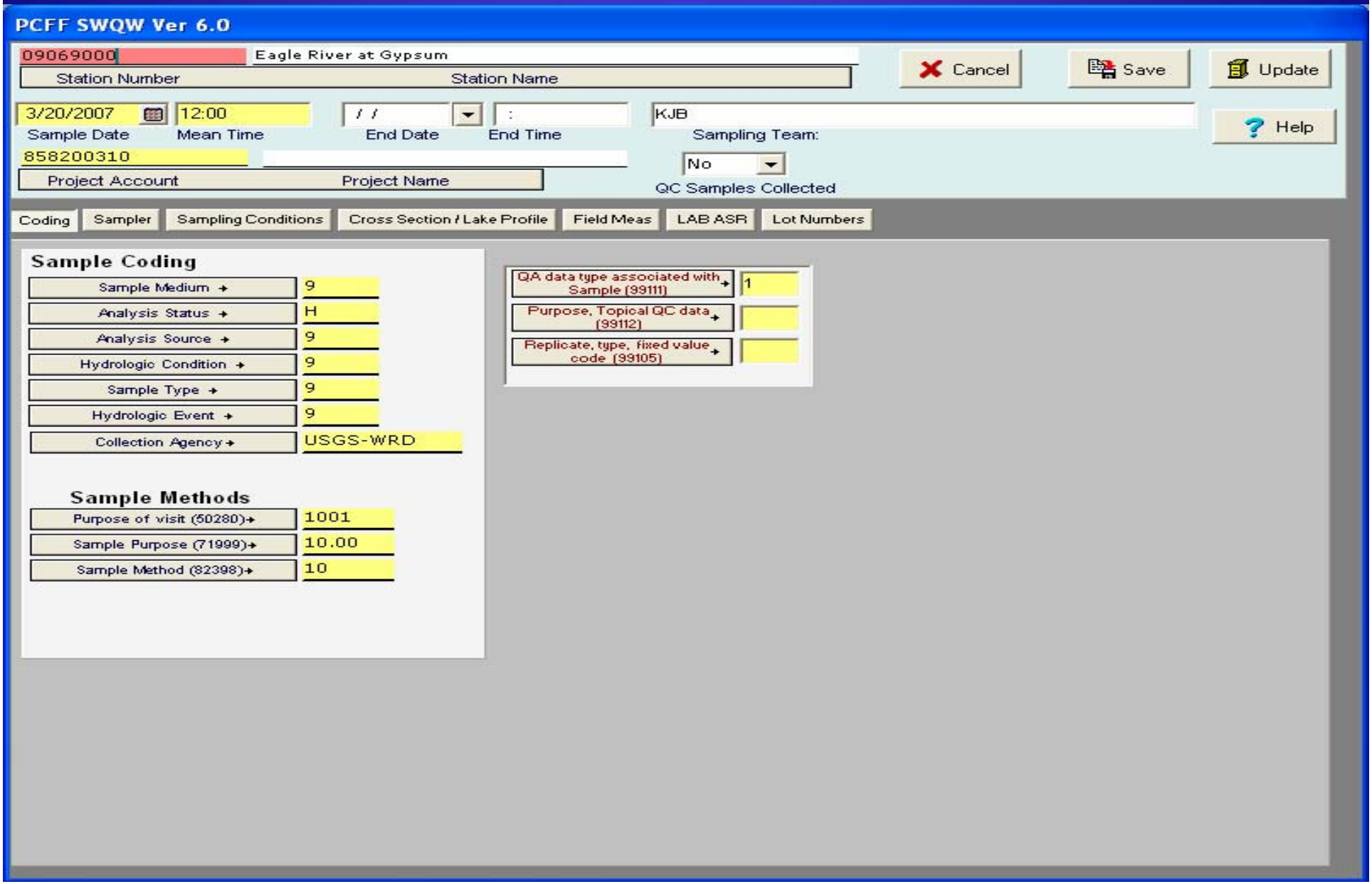
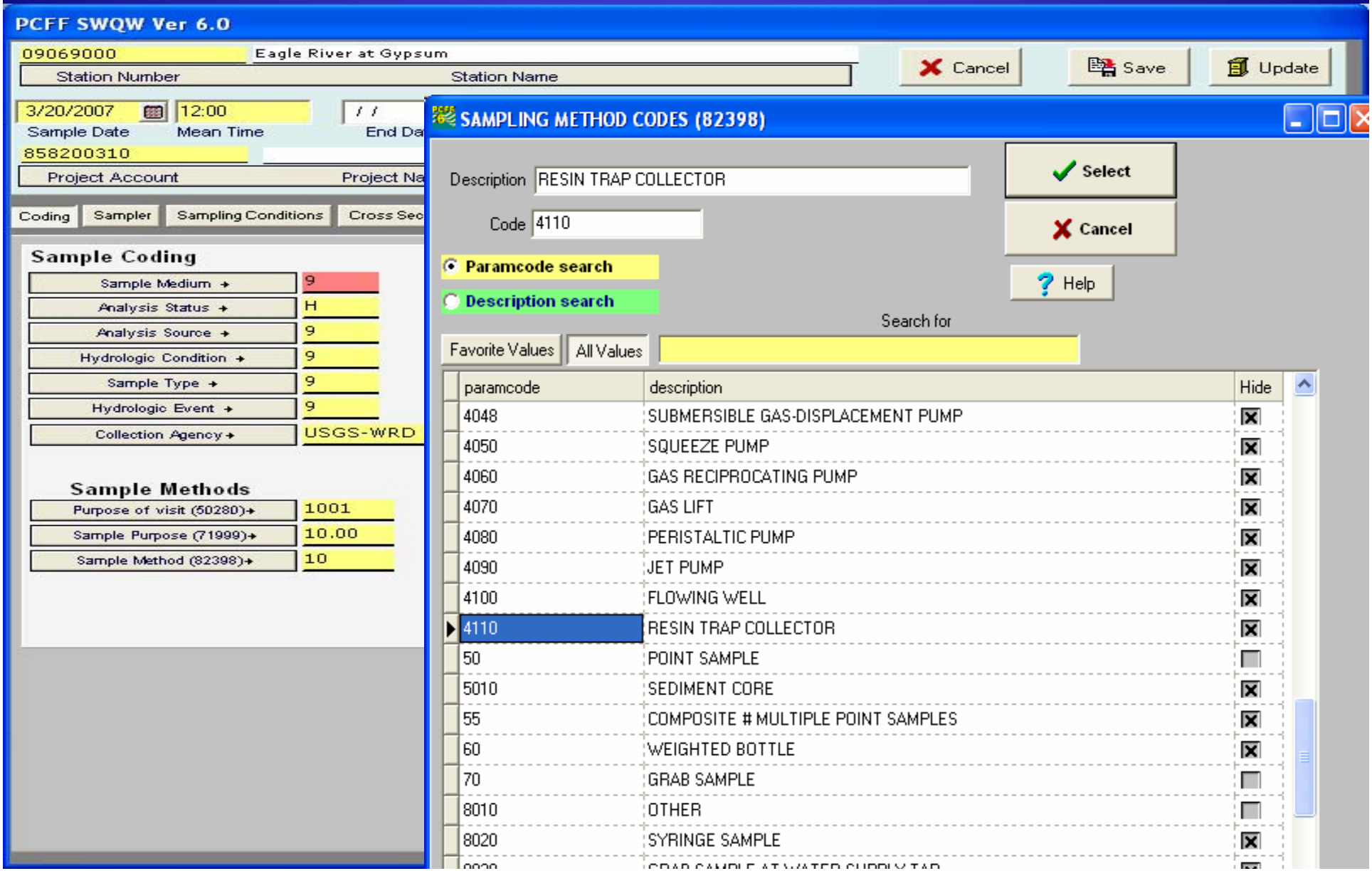
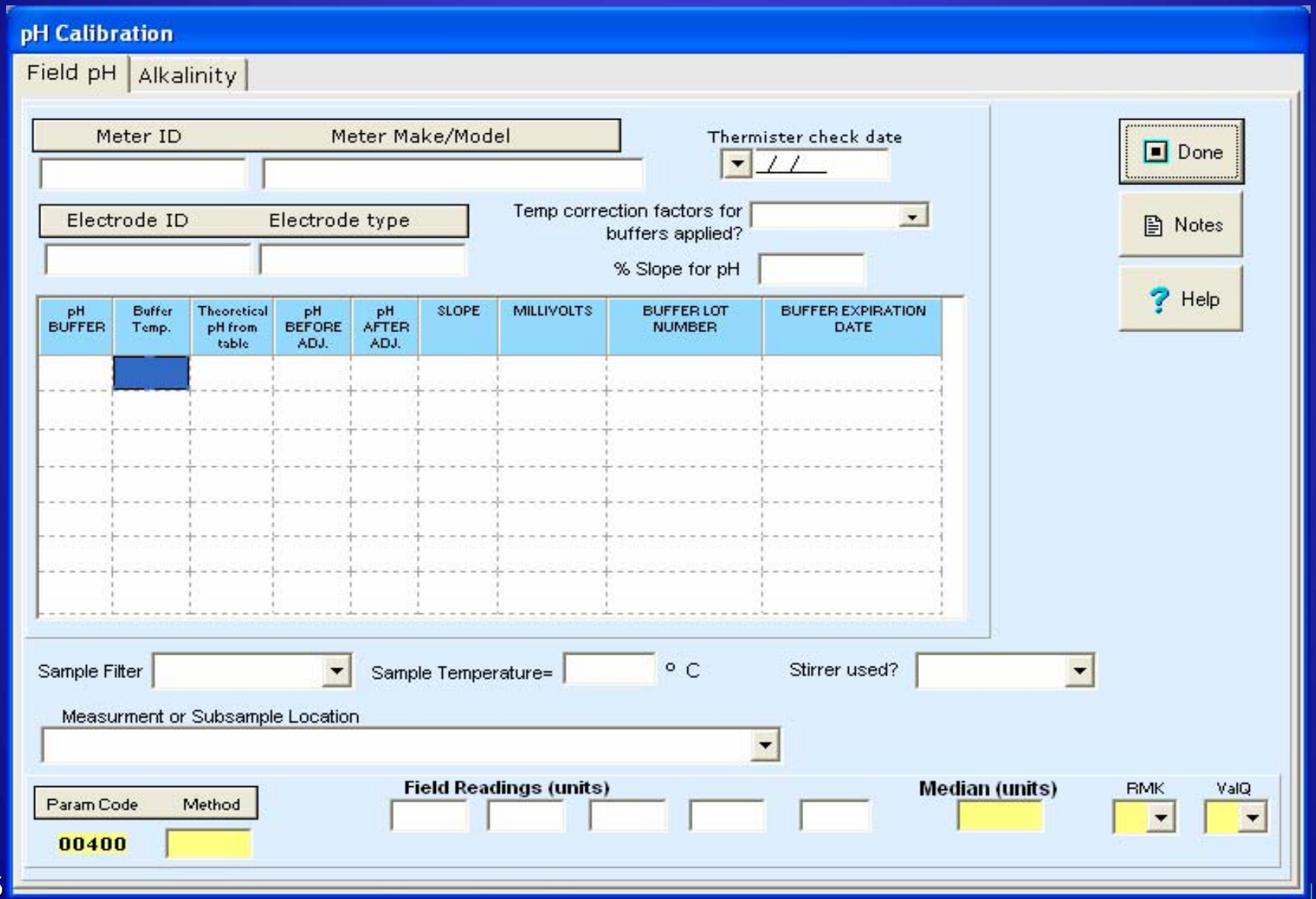
Sample Coding Screen



Example of Dropdown Menus



Example of a Calibration Screen



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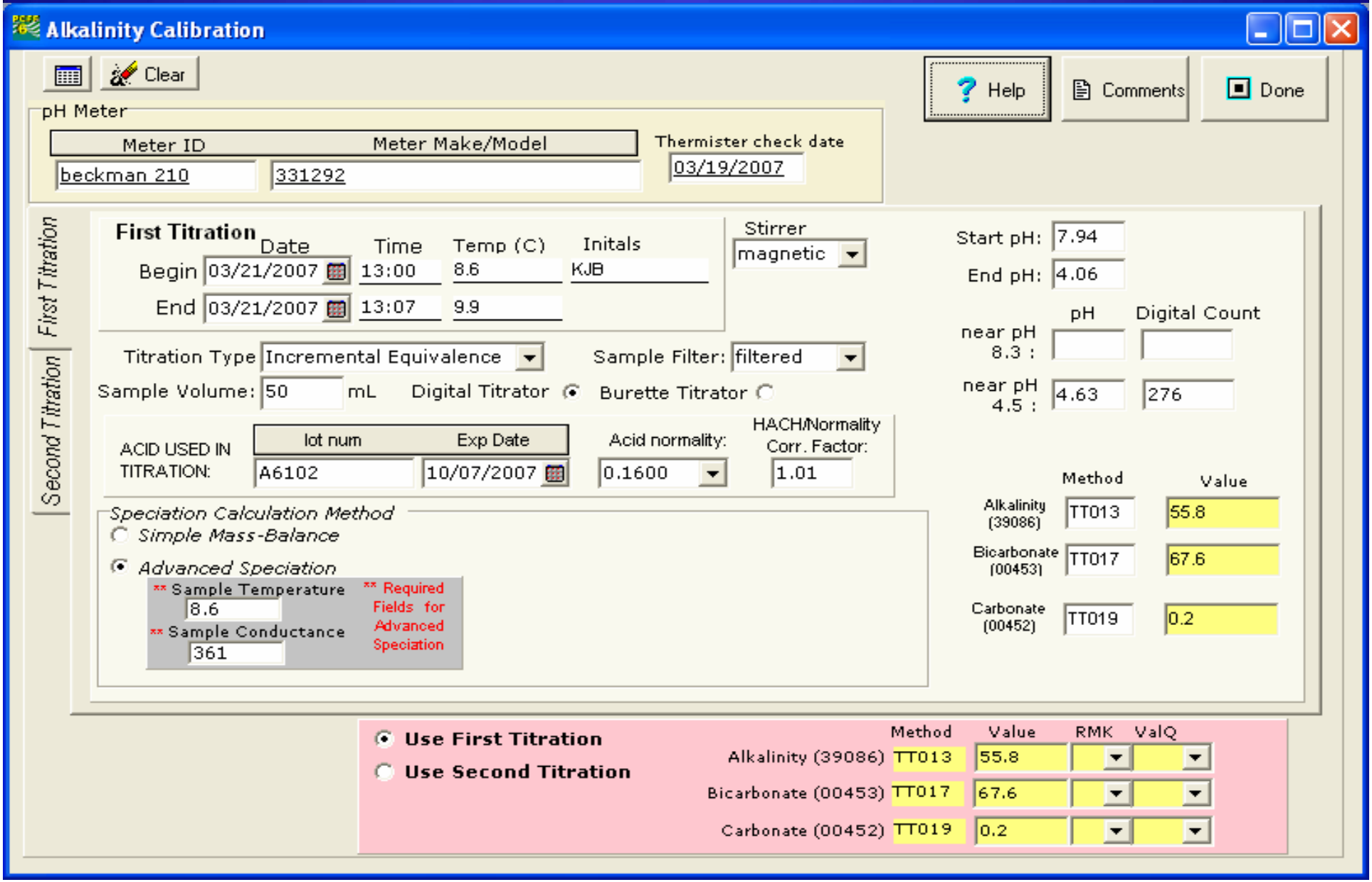
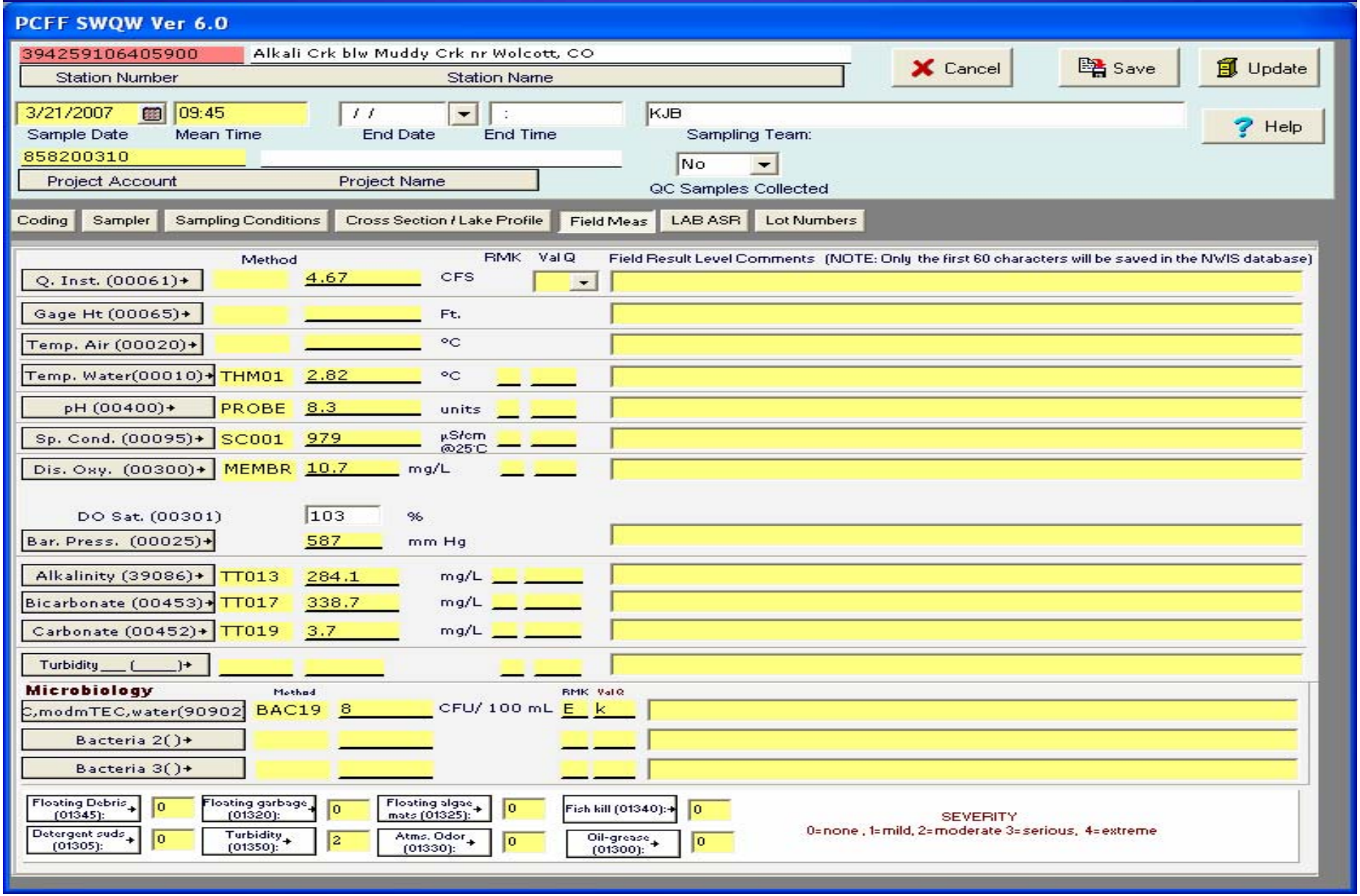
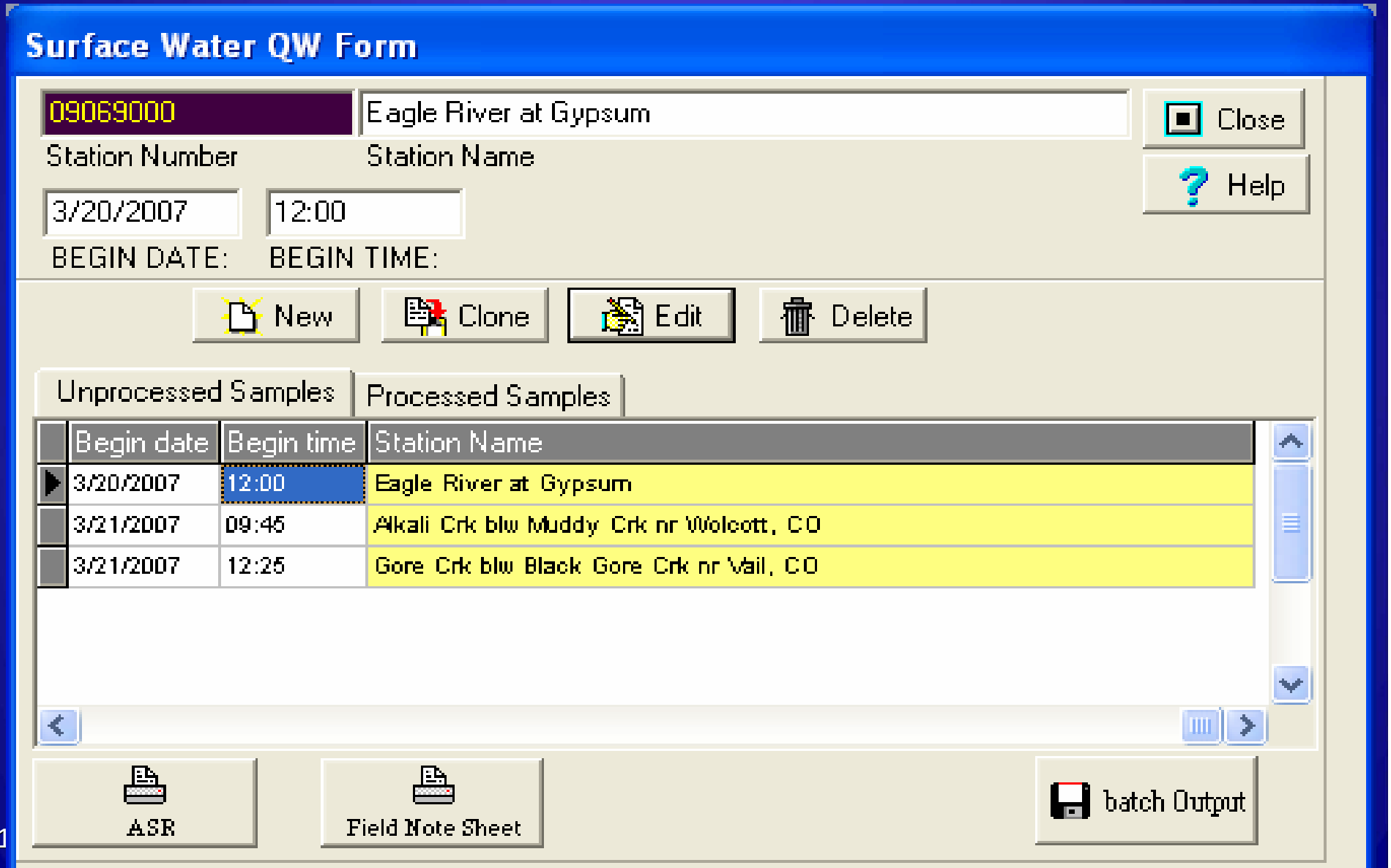
Alkalinity Screen



Field Measurements Screen



Data Output Screen



Ground-water sampling using PCFF

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Summary

- Comparable data requires consistent methodology!
- Mobile laboratories are an effective sampling tool.
- Automation can be a substantial aid to efficiency and accuracy!


QUESTIONS?
http://mn.water.usgs.gov