THE PRESENT AND FUTURE STATE OF THE
ENHANCED OIL RECOVERY
GEOGRAPHICAL INFORMATION SYSTEM (EOR-GIS)

Technical Advisory Board
Enhanced Oil Recovery Commission
Joint Meeting
January 15, 2009
Brian Reyes
Provide a complete and comprehensive tool for enhanced oil recovery efforts in the state of Wyoming.

Design GIS tools in order to query an accurate geodatabase that integrates and refines several different data sources.

Better understand the spatial distribution of related entities.
- Proximity to sources, sinks, infrastructure, utilities, etc.
- Geological and reservoir characteristics.
EOR-GIS in 2008

✧ Integrated and refined data from many sources into one geodatabase (including base map layers).

✧ Improved spatial locations of fields.

✧ Development of Field Reservoir Combinations (FRCs).

http://eori.uwyo.edu
EOR-GIS in 2008

Data mining (e.g. Minnelusa).
Assisted WPA with designing possible CO₂ pipeline pathways for potential future EOR projects.
 Defined FRC boundary reservoir areas from well data for volumetric calculations.
FRC Boundaries – The Process

Legend
AllWells
- FIDDLER CREEK EAST MUDDY
- FIDDLER CREEK EAST NEWCASTLE
- FIDDLER CREEK EAST UNKNOWN
- FIDDLER CREEK MADISON
- FIDDLER CREEK MUD
- FIDDLER CREEK NEWCASTLE
- FIDDLER CREEK UNKNOWN

Correct Locations??
FRC Boundaries – The Process

Legend
FRC_Centroids
- FIDDLER CREEK EAST MUDDY
- FIDDLER CREEK EAST NEWCASTLE
- FIDDLER CREEK EAST UNKNOWN
- FIDDLER CREEK MADISON
- FIDDLER CREEK MUDDY
- FIDDLER CREEK NEWCASTLE
- FIDDLER CREEK UNKNOWN

0 8,750 17,500 35,000 Feet
Select wells within 1 Standard Distance to eliminate wells with inaccurate coordinates.
FRC Boundaries – The Process

Legend
WellsForFRCs
- FIDDLER CREEK EAST MUDDY
- FIDDLER CREEK EAST NEWCASTLE
- FIDDLER CREEK EAST UNKNOWN
- FIDDLER CREEK MADISON
- FIDDLER CREEK MUDDY
- FIDDLER CREEK NEWCASTLE
- FIDDLER CREEK UNKNOWN
FRC Boundary for FCE Muddy

Legend
WellsForFRCs
- FIDDLER CREEK EAST MUDDY
- FIDDLER CREEK EAST NEWCASTLE
- FIDDLER CREEK EAST UNKNOWN
- FIDDLER CREEK MADISON
- FIDDLER CREEK MUDDY
- FIDDLER CREEK NEWCASTLE
- FIDDLER CREEK UNKNOWN
- FIDDLER CREEK EAST MUDDY

0 8,750 17,500 35,000 Feet
Update data, spatial data mining (e.g. geological and reservoir characteristics).
Refinement of volumetrics tool.
Minnelusa EOR Consortium.
Query tools for in-house use.
Presentation at AAPG Annual Convention, Denver, CO.
Continue Strategic Alliance with WPA.
Internet mapping with query tools.
✧ WPA - Development of possible CO₂ EOR hub locations and pipelines.

✧ Possible finance student to work on the cost end of the project as M.S. thesis.
In collaboration with database public release.

Specific out of the box query tools designed from GIS model builder.

Accessible through EORI webpage.

Workshops/presentations for owners/operators.

http://eori.uwyo.edu
Based on criteria from Taber et al., 1997
What is the OOIP (Bbls) calculated from Public FRC Attribute Data?

- Area, NetPay, and Porosity for 513 out of 1487 mapped FRCs
- Used 0.50 for saturation

Legend
EstOOIP_Bbls
0 - 33,244,887
33,244,888 - 83,179,848
83,179,849 - 213,520,312
213,520,313 - 490,243,948
490,243,949 - 1,039,494,670
Counties
Other Public FRC Attribute Data

- NetPay – 588 out of 1487 mapped FRCs have data.

- Porosity – 529 out of 1487 mapped FRCs have data.
Other Public FRC Attribute Data

- **API** – 1055 out of 1487 mapped FRCs have data.

- **MMP** – 1055 out of 1487 mapped FRCs have data.
Viscosity – 1055 out of 1487 mapped FRCs have data.

Permeability – 376 out of 1487 mapped FRCs have data.
EORI Reservoir Database

2008
✧ Data collation, cleaning and infilling.

Status
✧ ~ 80 downloads as at January 6, 2009.
✧ Integrated with GIS.

2009
✧ Descriptive and predictive data-mining.
✧ Greater integration with GIS.
✧ Continued data acquisition and collation (e.g. tops data from WOGCC).

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2008
❖ Internal and external analysis started mid 2008, once db was in workable form.

Status
❖ Six ‘screening’ projects have been conducted, ranging from basic db filters (e.g. all reservoirs with API > 22), to process screening (e.g. all reservoirs amenable to CO$_2$ flooding).

2009
❖ Tuning of criteria for Wyoming.
❖ Experience based (data-mining).
❖ Simulation based.
❖ Development of weighting system – for fuzzy screening.

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Thank you.