



# Anadarko<sup>®</sup>

Canada  Corporation

Feeding ESRI's ArcGIS Desktop  
with Query Tool Extensions at  
Anadarko Canada.

Primary Author: John Gillatt, Anadarko  
Secondary Author: Chuck Smith, Divestco  
Inc.



ESRI PUG  
Houston  
March 2005



## Agenda

- Introduction
- Abstract
- ArcGIS at Anadarko Canada
- Limitations of the Initial ArcGIS System
- Relational Data Modeling Workflow
- Using the Query Tool After Modeling
- Specific User Problem
- Summary



## Abstract

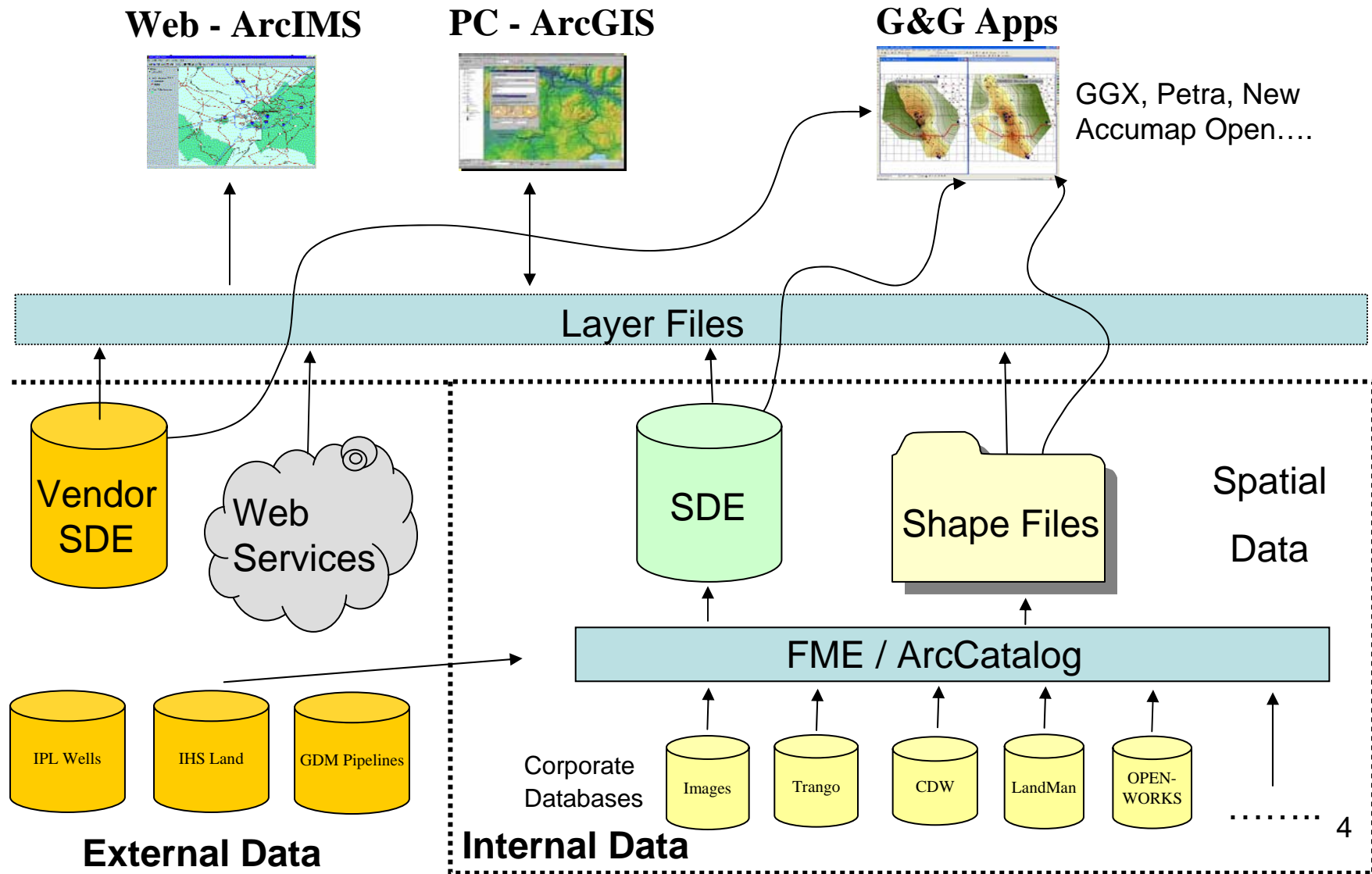
Oil and gas information is stored in a vast number of public and proprietary databases usually managed in heterogeneous database formats outside of the realm of ArcSDE. In order to integrate these data sources for presentation in ArcGIS by technology wary users, an intermediate interface was designed and built for use at Anadarko that combined ease of use with sophisticated query capability. Flexibility in modeling to any data source without programmer involvement required the implementation of a meta-model that provides the rules for navigating these databases. This resulted in powerful data access capabilities combined with the world's leading GIS technology to assist Anadarko in identifying oil and gas opportunities, through the integration of geological and reservoir data, including well log data, seismic data, pipelines, and land leases.



## ArcGIS At Anadarko

- ArcView 3.2 since 2000.
- Rolled out ArcGIS Q4 2003, currently v8.3
- Live connections to IHS Energy & IPL relational data stores (Canadian public well, land and pipe data).
- Live connections to internal proprietary well, land and seismic relational data stores.
- Gradually increasing the use of SDE and reducing use of shapefiles.
- Architecture

# Anadarko Canada GIS



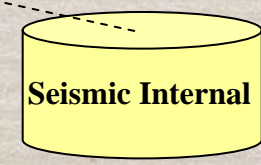
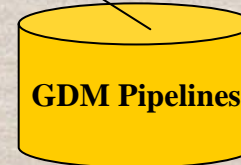
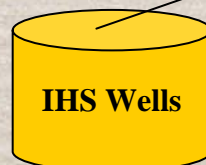
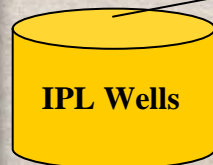
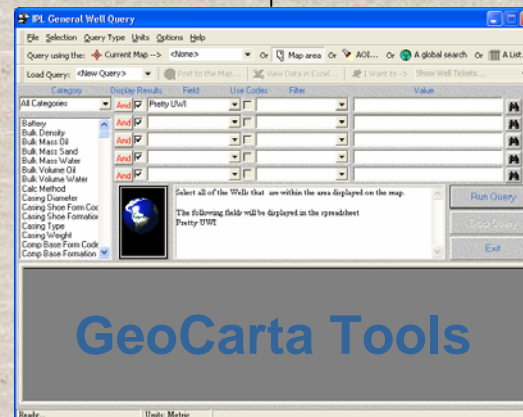
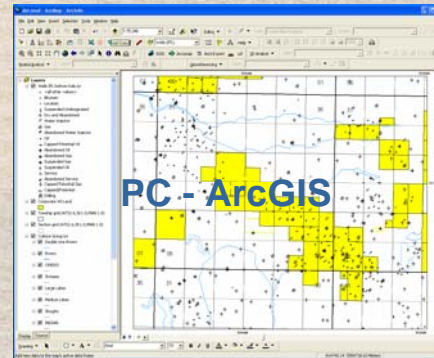


## Limitations of The Initial System

- We could provide some layers but not all combinations of geometry types and attributes.
- No straightforward way of working with one to many datasets.
- No easy way to let users choose their own attributes.
- Needed to manage and share common queries.
- We also required preformatted reports e.g. well, land and pipe tickets.



## Geocarta Tools Extension was Selected to Fix Short Comings





## Relational Data Modeling Work Flow

- 1.6 GHz Pentium with 256 MB RAM. SQL Server PPDM database onboard.
- Illustrate adding a data source,
- Working with table joins
- Adding/modifying columns from a table.





## Building The MetaModel

- Slides 9-14 are screen captures of a live demonstration of building the MetaModel.



## Add Connection to Data Source

Microsoft Access - [Databases\_Master : Table]

File Edit View Insert Format Records Tools Window Help

DATABASE_ID	DATAVENDOR	Description	SITE	ACTIVE	DATA_SOURCE	OPTIONS	DATA_PROVIDER
	Canex		MSI	Yes	IPL	Persist Security Info=True;	OraOLEDB.Oracle.1 msi
5	Canex Pipelines		MSI	Yes	IPL	Persist Security Info=True;	OraOLEDB.Oracle.1 msi
	CS_Explorer		MSI	Yes	Dev2	Persist Security Info=True;	OraOLEDB.Oracle.1 hawki
	CS_Explorer_6		MSI	Yes	DEVIDC	Persist Security Info=True;	OraOLEDB.Oracle.1 hawki
11	Digitech	IHS Well Data	MSI	Yes	IHS	Persist Security Info=True;	OraOLEDB.Oracle.1 msi
19	EDM	EnCana Seismi	MSI	Yes	oraprd20	Persist Security Info=True;	OraOLEDB.Oracle.1 edmb
13	Ensignt	Ensignt Pipeline	MSI	Yes	div-dbsql04	Persist Security Info=True;	SQLOLEDB.1 Ensig
18	EUB_ResProd		MSI	Yes	RESProdSQL	Integrated Security=SSPI;Persi	SQLOLEDB.1
17	EUB_WELLS		MSI	Yes	IDMSPProdSQL	Integrated Security=SSPI;Persi	SQLOLEDB.1
16	Express		MSI	Yes	Express1	Persist Security Info=True;	OraOLEDB.Oracle.1 expre
15	Hydrofax	Hydrofax DST C	MSI	Yes	div-dbsql02	Persist Security Info=True;	SQLOLEDB.1 Hydr
	IDC		MSI	Yes	x:\PennPoint\moMap.mdb	Persist Security Info=False;	Microsoft.Jet.OLEDB.4.0
14	IDC_Land	IDC Land Datab	MSI	Yes	div-dbsql04	Persist Security Info=True;	SQLOLEDB.1 DVT_
6	IDC_WELLS	iDc Well Datab	MSI	Yes	div-dbsql04	Persist Security Info=True;	SQLOLEDB.1 DVT_
10	idc_Wells_Oracle			No	gold	Persist Security Info=True;	OraOLEDB.Oracle.1 idc_w
8	IHS		MSI	Yes	ihs	Persist Security Info=True;	OraOLEDB.Oracle.1 msi
1	ipl32	IPL Well Datab	MSI	Yes	v80c	Persist Security Info=True;	OraOLEDB.Oracle.1 msi
	Landrite	EnCana Landrit	MSI	Yes	oraprd26	Persist Security Info=True;	OraOLEDB.Oracle.1 angis
12	MRDB_Land	IHS Well Data	MSI	Yes	IHS	Persist Security Info=True;	OraOLEDB.Oracle.1 msi
7	PiLand	IHS Land Datab	MSI	Yes	ihs	Persist Security Info=True;	OraOLEDB.Oracle.1 msi
	Probe	IHS Internationa	MSI	Yes	d:\Data\probe.mdb	Persist Security Info=False;	Microsoft.Jet.OLEDB.4.0
	Rakhit		MSI	Yes	\\xenon\momapdev\moMap\C	Persist Security Info=False;	Microsoft.Jet.OLEDB.4.0
	Rakhit 97		MSI	No	\\xenon\momapdev\moMap\C	Persist Security Info=False;	Microsoft.Jet.OLEDB.4.0
	Test		MSI	Yes	Scandium	Integrated Security=SSPI;Persi	SQLOLEDB.1
*				No			

Record: 2 of 24

Datasheet View



## Set Up The Master Table

GeoCarta-Modeler - C:\Program Files\Divestco Inc\GeoCarta Tools\ibase\GeoCarta.mdb

File External Table

Import Export Defs Joins Columns Nodes

Adhoc\_Defs\_Master: Template = 'Pipeline' Vendor = 'Canex\_Pipelines'

Source Table: PL\_APPROVAL\_NUMBER Map Table: Pipelines

Source Key: AGENT\_COMPANY\_CODE Map Key: License\_No

Menu ID: 403 Source Field:

Hints: Def Source Prefs:

Test Data: 24023,12917,19343 Source Order By:

Default Sorting: Source Units:

Flags: 1

Post Process:

Allow Spreadsheet  Allow Map Link Query Mode:  0 = Jet Engine

Allow Map  Filter Only  64 = SQL Passthrough

Allow Special Options

Cancel OK

Adhoc\_Defs\_Master: Template = 'Pipeline' Vendor = 'Canex\_Pipelines'



## Graphical Representation of Data Model

GeoCarta-Modeler - C:\Program Files\Divestco Inc\GeoCarta Tools\ibase\GeoCarta.mdb - [Adhoc\_Joins: T...

File External Table Joins

Import Export Defs Joins Columns Nodes

PL\_APPROVAL\_NUMBER  
PIPE\_APPROVAL\_NO

PL\_GRAPHICS\_LINES  
PIPE\_APPROVAL\_NO

PL\_LINE\_NUMBER  
Pipe\_Approval\_No  
letter\_code

pl\_lookup as zSubstance  
SUBSTANCE\_CODE)  
Code\_Type='SUBSTANCE\_CODE'

pl\_company\_code  
Company\_code

pl\_lookup as zArea  
numeric\_code  
Code\_Type='AREA\_OFFICE\_CODE'

PL\_SPECIFICATIONS  
PIPE\_APPROVAL\_NO  
letter\_code

pl\_lookup as zTo  
PIPELINE\_TO\_FACILITY)  
Code\_Type='PL\_LN\_FACILITY\_TYPE'

pl\_lookup as zFrom  
PIPELINE\_FROM\_FACILITY)  
Code\_Type='PL\_LN\_FACILITY\_TYPE'

pl\_lookup as zStatus  
PIPELINE\_STATUS)  
Code\_Type='PIPELINE\_STATUS\_CODE'

pl\_lookup as zMaterial  
PIPE\_MATERIAL\_CODE)  
Code\_Type='PIPE\_MATERIAL\_CODE'

pl\_lookup as zJoints  
PIPE\_JOINTS\_CODE)  
Code\_Type='PIPE\_JOINTS\_CODE'

pl\_lookup as zProtect  
INTERNAL\_PROTECT)  
Code\_Type='INTERNAL\_PROTECT'

Adhoc\_Joins: Template = 'Pipeline' Vendor = 'Canex\_Pipelines'



## Add Columns To the Model

GeoCarta-Modeler - C:\Program Files\Divestco Inc\GeoCarta Tools\ibase\GeoCarta.mdb

File External Table Columns Conversion

Import Export Defs Joins Columns Nodes

Adhoc\_Columns: Template = 'Pipeline' Vendor = 'Canex\_Pipelines'

Source Column	Display	Title	Source System	Source Units
PL_GRAPHICS_LINES.STOP_Y as Stop_Y		Stop Y		
PL_LINE_NUMBER.LICENCE_APPROVAL_DATE	X	Licence Apprv. Date		
PL_LINE_NUMBER.PERMIT_APPROVAL_DATE	X	Permit Date		
PL_LINE_NUMBER.PERMIT_EXPIRY_DATE	X	Permit Expiry Date		
PL_LINE_NUMBER.PIPE_APPROVAL_NO as I		Pipe Approval No		
PL_LINE_NUMBER.PIPELINE_ENVIRON_CODE	X	Environmental Code		
PL_LINE_NUMBER.PIPELINE_FROM_FACILITY		Pipeline From Facility		
PL_LINE_NUMBER.PIPELINE_FROM_LOCATION	X	From Location		
PL_LINE_NUMBER.PIPELINE_LENGTH	X	Length	Metric	
PL_LINE_NUMBER.PIPELINE_NO as Pipeline_		Pipeline No		KG/M
PL_LINE_NUMBER.PIPELINE_STATUS as Pip		Pipeline Status		KG/M3
PL_LINE_NUMBER.PIPELINE_TO_FACILITY		Pipeline To Facility		KM
PL_LINE_NUMBER.PIPELINE_TO_LOCATION	X	To Location		KPA
zFrom.CODE_TYPE		CODE_TYPE		KPA/M
zFrom.DESCRPTION		DESCRIPTION		M
zFrom.LETTER_CODE		LETTER_CODE		M3
zFrom.NUMERIC_CODE as NUMERIC_CODE		NUMERIC_CODE		M3 / M3
zTo.CODE_TYPE		CODE_TYPE		M3 / D
zTo.DESCRPTION		DESCRIPTION		M3 / M3

Sort

Preview

Cancel OK

Adhoc\_Columns: Template = 'Pipeline' Vendor = 'Canex\_Pipelines'



## Location Information

GeoCarta-Modeler - C:\Program Files\Divestco Inc\GeoCarta Tools\ibase\GeoCarta.mdb

File External Table

Import Export Defs Joins Columns Nodes

Adhoc\_Nodes: Template = 'Pipelin...'

Nodes Available

Nodes Table: PL\_GRAPHICS\_LINES

Max Lat Column: STOP\_Y

Min Lat Column: START\_Y

Max Long Column: STOP\_X

Min Long Column: START\_X

Reverse Long

Restrictions:

Restriction Fields:

PIPE\_APPROVAL\_NO

Add Quotes

Add Remove Modify

Cancel OK

Adhoc\_Nodes: Template = 'Pipeline' Vendor = 'Canex\_Pipelines'



# Query Tool

**GDM Pipelines Query**

File Selection Query Type Units Options Help

Query using the: Current Map --> <None> Or Map area Or AOI... Or A global search Or A List...

Load Query: <New Query> Post to the Map... Send To Excel... I Want to -> No Exports are Available

Category	Display Results	Field	Use Codes	Filter	Value
All Categories	And <input checked="" type="checkbox"/>	License_No	<input type="checkbox"/>		
Area Office	And <input checked="" type="checkbox"/>	Pipeline No.	<input type="checkbox"/>		
Company Address					
Company City	And <input checked="" type="checkbox"/>	Pipeline Type	<input type="checkbox"/>		
Company Code					
Company Name	And <input checked="" type="checkbox"/>	Company Name	<input type="checkbox"/>		
Environmental Code					
From Facility	And <input checked="" type="checkbox"/>		<input type="checkbox"/>		
From Location					
H2S Content					
Internal Protection					
Internal Protection Coc					
Joint Code					
Joint Description					
Length					
Licence Apprv. Date					

Select all of the AGENT\_COMPANY\_CODE that are within the area displayed on the map.

The following fields will be displayed in the spreadsheet  
License\_No, Pipeline No., Pipeline Type, Company Name

Run Query

Stop Query

Exit

Ready... Units: Metric



# Query Tool Data Flow

IPL General Well Query

File Selection Query Type Units Options Help

Query using this: Current Map --> <None> Or Map area Or AOL... Or A global search Or A List...

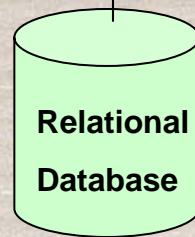
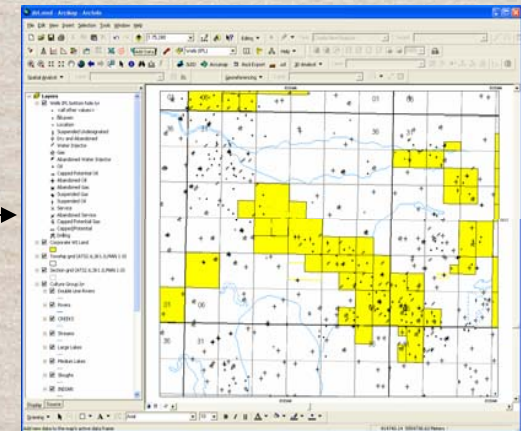
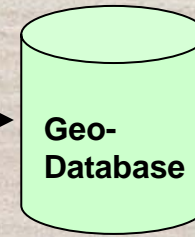
Load Query: Post to the Map... Send To Excel... I Want to -> Show Well Tickets...

Category	Display Results	Field	Use Codes	Filter	Value
Well Header	<input checked="" type="checkbox"/>	Pretty UWI			
Oldest Formation Code	<input checked="" type="checkbox"/>	Licensee			
Operator	<input checked="" type="checkbox"/>	Operator			
Original Units	<input checked="" type="checkbox"/>	Well Name			
Pretty UWI	<input checked="" type="checkbox"/>				
Province	<input checked="" type="checkbox"/>				

Run Query Single Query Exit

Sort UWI	Pretty UWI	Licensee	Operator
<input checked="" type="checkbox"/> 1W40131601010000	10061-01-013-16 W400	ANADARKO CANADA CORPORATION	ANADARKO CANADA CORPORATI
<input checked="" type="checkbox"/> 1W40141701010000	10061-01-014-17 W400	TRILCH RESOURCES INC.	UNKNOWN
<input checked="" type="checkbox"/> 1W40141701010002	10061-01-014-17 W402	TRILCH RESOURCES INC.	UNKNOWN
<input checked="" type="checkbox"/> 1W40141701010003	10061-01-014-17 W400	TRILCH RESOURCES INC.	HUNT OIL COMPANY OF CANADA
<input checked="" type="checkbox"/> 1W40131602010000	10061-02-013-16 W400	ANADARKO CANADA CORPORATION	ANADARKO CANADA CORPORATI
<input checked="" type="checkbox"/> 1W40131702010000	10061-02-013-17 W400	TRILCH RESOURCES INC.	TRILCH RESOURCES INC.
<input checked="" type="checkbox"/> 1W40131506010000	10061-06-013-15 W400	ANADARKO CANADA CORPORATION	ANADARKO CANADA CORPORATI
<input checked="" type="checkbox"/> 1W40131506010002	10061-06-013-15 W402	ANADARKO CANADA CORPORATION	ANADARKO CANADA CORPORATI

595 of 595 Records Selected Units: Metric Server Processing Time: 0.98 -- Data Download Time: 0.45 -- Client Processing Time 1.21



Show Live Example





## Live Examples Using the Query Tool

- Basic workflow & user controlling attributes on a layer.
- Different types of geographic bounding for the queries.
- Cascading lookups in query building.
- Query against logs (one to many).
- Show how to use map selection w.r.t. the query tool.
- Well Tickets.
- Slides 17-21 are screen captures of live examples of using the query tool.



# Post Data to Map from Geocarta Tools

dst.mxd - ArcMap - ArcInfo

File Edit View Insert Selection Tools Window Help

1:58,772

Task: Create New Feature Target:

Wells (IPL)

Spatial Analyst Georeferencing

**Layers**

- wells\_reserv\_pr
- Wells IPL bottom hole.lyr
  - <all other values>
  - Bitumen
  - Location
  - Suspended Undesignated
  - Dry and Abandoned
  - Water Injector
  - Gas
  - Abandoned Water Injector
  - Oil
  - Capped Potential Oil
  - Abandoned Oil
  - Abandoned Gas
  - Suspended Gas
  - Suspended Oil
  - Service
  - Abandoned Service
  - Capped Potential Gas
  - Capped/Potential

**Attributes of wells\_reserv\_pr**

XPRETTYUWI	XPRODZONE	RES_PRESS	GeoCarta_Row_Number
100/01-01-014-17 W4/00	LIVINGSTONE	10966	1
100/01-01-014-17 W4/00	LIVINGSTONE	11106	2
100/01-01-014-17 W4/00	LIVINGSTONE	<Null>	3
100/01-06-013-15 W4/00	SAWTOOTH	1350	4
100/01-06-013-15 W4/00	SAWTOOTH	<Null>	5
100/02-07-013-15 W4/00	NISKU	<Null>	6
100/02-13-013-17 W4/00	MADISON GROUP	9244	7
100/02-13-013-17 W4/00	MADISON GROUP	10003	8
100/02-13-013-17 W4/00	MADISON GROUP	<Null>	9
100/03-19-013-16 W4/00	UPPER MANNVILLE	9413	10
100/03-19-013-16 W4/00	UPPER MANNVILLE	<Null>	11
100/04-01-013-17 W4/00	BOW ISLAND	2161	12
100/04-06-014-16 W4/00	ARCS	<Null>	13
100/04-24-013-17 W4/00	<Null>	5190	14
100/04-24-013-17 W4/00	<Null>	51290	15
100/04-24-013-17 W4/00	<Null>	<Null>	16
100/05-19-013-16 W4/00	SUNBURST	10471	17
100/05-19-013-16 W4/00	SUNBURST	<Null>	18
100/06-06-013-15 W4/00	BOW ISLAND	6419	19
100/06-13-013-17 W4/02	BOW ISLAND	3561	20
100/06-13-013-17 W4/03	MANNVILLE	9820	21
100/06-18-013-15 W4/00	BOW ISLAND	1871	22
100/06-18-013-15 W4/00	BOW ISLAND	2310	23
100/06-18-013-15 W4/00	BOW ISLAND	5271	24
100/06-21-013-16 W4/00	BOW ISLAND	3236	25
100/06-21-013-16 W4/00	BOW ISLAND	3737	26
100/06-21-013-16 W4/00	BOW ISLAND	4894	27
100/06-21-013-16 W4/00	BOW ISLAND	5715	28
100/06-21-013-16 W4/00	BOW ISLAND	5936	29
100/06-21-013-16 W4/00	BOW ISLAND	5943	30
100/06-21-013-16 W4/00	BOW ISLAND	5984	31
100/06-21-013-16 W4/00	BOW ISLAND	6474	32
100/06-21-013-16 W4/00	BOW ISLAND	6536	33

**IPL General Well Query**

Query using the: Current Map -> <None>

Load Query: Post to the Map... Send To Excel... I Want to -> Show Well Tickets...

Category: All Categories

Display Results: Pretty Uwi

Field: Producing Zone

Value: <None>

Use Codes: <None>

Filter: <None>

Run Query

Drop Query

Exit

Select all of the Wells that are within the area displayed on the map.

The following fields will be displayed in the spreadsheet  
Pretty UWI, Producing Zone, Reservoir Pressure

Sort UWI	Pretty UWI	Producing Zone	Reservoir Pressure kPa
<input checked="" type="checkbox"/> W40141701010000	100/01-01-014-17 W400	LIVINGSTONE	10966.0000
<input checked="" type="checkbox"/> W40141701010000	100/01-01-014-17 W400	LIVINGSTONE	11106.0000
<input checked="" type="checkbox"/> W40141701010000	100/01-01-014-17 W400	LIVINGSTONE	
<input checked="" type="checkbox"/> W40131506010000	100/01-06-013-15 W400	SAWTOOTH	1350.0000
<input checked="" type="checkbox"/> W40131506010000	100/01-06-013-15 W400	SAWTOOTH	
<input checked="" type="checkbox"/> W40131507020000	100/02-07-013-15 W400	NISKU	
<input checked="" type="checkbox"/> W40131713020000	100/02-13-013-17 W400	MADISON GROUP	9244.0000
<input checked="" type="checkbox"/> W40131713020000	100/02-13-013-17 W400	MADISON GROUP	10003.0000
<input checked="" type="checkbox"/> W40131713020000	100/02-13-013-17 W400	MADISON GROUP	

110 of 110 Records Selected Units: Metric Server Processing Time: 1.94 -- Data Download Time: 0.11 -- Client Processing Time: 1.06

Record: 1 | Show: All Selected Records (0 out of 110 Selected) Options

412582.87 5553590.09 Meters

3:11 PM



## Query Bounding Options

IPL General Well Query

File Selection Query Type Units Options Help

Query using the: **Map -->** <None> Or Map area Or AOI... Or A global search Or A List...

Load Query: Post to the Map... Send To Excel... I Want to -> Show Well Tickets...

Category	Display Results	Field	Use Codes	Filter	Value
All Categories	And <input checked="" type="checkbox"/>	Pretty UWI	<input type="checkbox"/>		
Licensed Form Age	And <input checked="" type="checkbox"/>	Log No	<input type="checkbox"/>		
Licensed Formation					
Licensed Product	And <input checked="" type="checkbox"/>	Log Type	<input type="checkbox"/>		
Licensee					
Licensee Code	And <input checked="" type="checkbox"/>	Log Top Formation	<input checked="" type="checkbox"/>		
Log Base					
Log Base Form Code	And <input checked="" type="checkbox"/>	Log Base Formation	<input checked="" type="checkbox"/>		
Log Base Formation					
Log No					
Log Top					
Log Top Form Code					
Log Top Formation					
Log Type					
Longitude					
Max Cond					

Select all of the Wells that are within the area displayed on the map.

The following fields will be displayed in the spreadsheet  
Pretty UWI, Log No, Log Type, Log Top Formation, Log Base Formation

Run Query  
Stop Query  
Exit

	Sort UWI	Pretty UWI	Log	Log Type	Log Top Formation	
<input checked="" type="checkbox"/>	1W40131601010000	100/01-01-013-16 W4/00	1	SONIC		LEDUC
<input checked="" type="checkbox"/>	1W40131601010000	100/01-01-013-16 W4/00	2	CALIPER		LEDUC
<input checked="" type="checkbox"/>	1W40131601010000	100/01-01-013-16 W4/00	3	GAMMA RAY		LEDUC
<input checked="" type="checkbox"/>	1W40131601010000	100/01-01-013-16 W4/00	4	COMP		LEDUC
<input checked="" type="checkbox"/>	1W40131601010000	100/01-01-013-16 W4/00	5	FMN		LEDUC
<input checked="" type="checkbox"/>	1W40131601010000	100/01-01-013-16 W4/00	6	INDUCTION		LEDUC
<input checked="" type="checkbox"/>	1W40131601010000	100/01-01-013-16 W4/00	7	CEMENT	MADISON GROUP	IRETON
<input checked="" type="checkbox"/>	1W40131601010000	100/01-01-013-16 W4/00	8	DUAL		LEDUC

2841 of 2841 Records Selected Units: Metric Server Processing Time: 9.47 -- Data Download Time: 1.90 -- Client Processing Time 1.84



## Lookups Cascading or Not.

**IPL General Well Query**

File Selection Query Type Units Options Help

Query using the: Current Map --> <None> Or Map area Or AOI... Or A global search Or A List...

Load Query: Post to the Map... Send To Excel... I Want to -> Show Well Tickets...

Category	Display Results	Field	Use Codes	Filter	Value
All Categories	And <input checked="" type="checkbox"/>	Pretty UWI	<input type="checkbox"/>		
Analysis Co	And <input checked="" type="checkbox"/>	Field	<input checked="" type="checkbox"/>		
Analysis Date					
ADF Date	And <input checked="" type="checkbox"/>	Pool	<input checked="" type="checkbox"/>		
ADF Obs No					
ADF Potential	And <input checked="" type="checkbox"/>	Operator	<input checked="" type="checkbox"/>	Equal to	ANADARKO CANADA CORPORATION
API					
Battery					
BHFP Press	And <input checked="" type="checkbox"/>	Current Status	<input type="checkbox"/>		Performing Lookup
BHP Date					
BHP Obs No					
Bulk Density					
Bulk Mass Oil					
Bulk Mass Sand					
Bulk Mass Water					
Bulk Volume Oil					

Select all of the Wells that are within the area displayed on the map where Operator is Equal to ANADARKO CANADA CORPORATION (A031)

The following fields will be displayed in the spreadsheet  
Pretty UWI,Field,Pool,Operator,Current Status

Run Query  
Stop Query  
Exit

Ready... Units: Metric

**Database Lookup**

Retrieval Completed

Sort by Name

- DRY
- FLOW OIL
- GAS
- LICENCED
- PUMP OIL
- STANDING
- SUS OIL
- SWD
- WATER
- WTR INJ

Use Codes (ie Age Codes) Show Codes

OK Cancel



# One To Many Query – Logs.

IPL General Well Query

Query using the: Current Map --> <None> Or Map area Or AOI... Or A global search Or A List...

Load Query: Post to the Map... Send To Excel... I Want to --> Show Well Tickets...

Category	Display Results	Field	Use Codes	Filter	Value
All Categories	<input checked="" type="checkbox"/>	Pretty UWI	<input type="checkbox"/>		
Analysis Co	<input checked="" type="checkbox"/>	Log Type	<input type="checkbox"/>	Equal to	GAMMA RAY
Analysis Date	<input checked="" type="checkbox"/>	Log No	<input type="checkbox"/>		
ADF Date	<input checked="" type="checkbox"/>	Log Top Formation	<input checked="" type="checkbox"/>		
ADF Obs No	<input checked="" type="checkbox"/>	Log Base Formation	<input checked="" type="checkbox"/>		
ADF Potential	<input checked="" type="checkbox"/>				
API	<input checked="" type="checkbox"/>				
Battery	<input checked="" type="checkbox"/>				
BHPF Press	<input checked="" type="checkbox"/>				
BHP Date	<input checked="" type="checkbox"/>				
BHP Obs No	<input checked="" type="checkbox"/>				
Bulk Density	<input checked="" type="checkbox"/>				
Bulk Mass OI	<input checked="" type="checkbox"/>				
Bulk Mass Sand	<input checked="" type="checkbox"/>				
Bulk Mass Water	<input checked="" type="checkbox"/>				
Bulk Volume OI	<input checked="" type="checkbox"/>				

Select all of the Wells that are within the area displayed on the map where Log Type is Equal to GAMMA RAY

The following fields will be displayed in the spreadsheet  
Pretty UWI,Log Type,Log No,Log Top Formation,Log Base Formation

	Pretty UWI	Log Type	Log No	Log Top Formation	Log Base Format
<input checked="" type="checkbox"/>	10008-01-014-17 W400	GAMMA RAY	6	BANFF SS.	LEDUC
<input checked="" type="checkbox"/>	10007-01-014-17 W400	GAMMA RAY	2	BASE FISH SCALES	ELLERSLIE
<input checked="" type="checkbox"/>	10001-01-014-17 W400	GAMMA RAY	5		
<input checked="" type="checkbox"/>	10008-06-014-16 W400	GAMMA RAY	4	PAKOWKI	LEDUC
<input checked="" type="checkbox"/>	10006-06-014-16 W400	GAMMA RAY	6	COLORADO	NEKUJ
<input checked="" type="checkbox"/>	10005-06-014-16 W400	GAMMA RAY	3	PAKOWKI	LEDUC
<input checked="" type="checkbox"/>	10004-06-014-16 W400	GAMMA RAY	7	PAKOWKI	ARCS
<input checked="" type="checkbox"/>	10003-06-014-16 W400	GAMMA RAY	4	PAKOWKI	BRETTON

416 of 416 Records Selected Units: Metric Server Processing Time: 0.73 -- Data Download Time: 0.50 -- Client Processing Time: 1.12



# Querying Using Map Selection

The screenshot shows the ArcMap interface with a map of well locations. A black circle highlights a specific area on the map. The 'IPL General Well Query' dialog box is open, showing the following query criteria:

- Log Type: Equal to GAMMA RAY
- Log No: (blank)
- Log Top Formation: (blank)
- Log Base Formation: (blank)

The dialog box also shows the following fields will be displayed in the spreadsheet:

Pretty UWI, Log Type, Log No, Log Top Formation, Log Base Formation

The resulting table shows 7 records:

UWI	Pretty UWI	Log Type	Log No	Log Top Formation
1W40011701010000	100001-01-014-17 W400	GAMMA RAY	5	
1W40011306010000	100001-06-013-15 W400	GAMMA RAY	1	PAKOWKI
1W40010300010000	100001-06-013-15 W400	GAMMA RAY	4	MADISON (
1W40013070200000	100002-07-013-15 W400	GAMMA RAY	2	BASE FISH SCALES
1W40013103020000	100002-13-013-17 W400	GAMMA RAY	1	LEDUC
1W40013103020000	100002-13-013-17 W400	GAMMA RAY	1	
1W40013103020000	100003-19-013-16 W400	GAMMA RAY	5	
1W40013103020000	100004-01-013-17 W400	GAMMA RAY	1	JUDITH RIVER
1W40013103020000	100004-06-014-16 W400	GAMMA RAY	7	MADISON (
				ARCS

47 of 47 Records Selected



## Specific User Problem

- Sample uses DST, Acquisition & Divestiture work.
- Demonstrate the competitor well example (Slides 23-26).



## Competitor Analysis

- The only well AFE raised by ITS at Anadarko Canada was initiated by GIS.
- Has a new well discovery occurred in the last year that is adjacent to an Anadarko lease that will expire soon.?
- Query 1. Find all new discoveries since 2004 initial rate > 20 m<sup>3</sup>/day oil.
- Query 2. Find all Anadarko land Expiring before end of 2006.
- Query 3. Spatial Analysis to find all wells within 5 miles of Anadarko Land.





# Add New Oil Discoveries to Map

The screenshot shows the ArcMap interface with a map of a region overlaid with a grid. Numerous green circles of varying sizes are scattered across the grid, representing oil discoveries. The 'Layers' panel on the left shows several layers, including 'new\_disc', 'INIT\_AVG\_OIL\_RATE', 'Towship grid (ATSZ\_6,SK1.C', and 'canada'. The 'IPL General Well Query' dialog box is open, showing a query using the 'Current Map' and a table of results. The table has columns for 'Sort UWI', 'Pretty UWI', 'Operator', 'On Production Date', and 'Init Avg Oil Rate'. The status bar at the bottom indicates '510 of 510 Records Selected'.

Sort UWI	Pretty UWI	Operator	On Production Date	Init Avg Oil Rate
1W40382201010002	10001-01-038-22 W402	ADVANTAGE OIL & GAS LTD.	12/24/2004	45
1W50870816010000	10001-16-087-08 W500	STORM EXPLORATION INC.	07/12/2004	21
1W40620418010000	10001-18-062-04 W400	BAYTEX ENERGY LTD.	07/01/2004	25
1W61170424010002	10001-24-117-04 W602	APACHE CANADA LTD.	10/30/2004	20
1W50831523010000	10001-25-083-15 W500	BLACKROCK VENTURES INC.	04/01/2004	32
1W50380430010000	10001-30-038-04 W500	MUSTANG RESOURCES INC.	09/17/2004	62
1W50831522020000	10002-22-083-15 W500	BLACKROCK VENTURES INC.	11/01/2004	22
1W60970911030000	10003-11-097-09 W600	DEVON CANADA	03/08/2004	20

Also add a layer of Anadarko Land expiring before 2006



## Select leases that are within 5 miles of Anadarko Land

Untitled - ArcMap - ArcInfo

File Edit View Insert Selection Tools Window Help

1:12,675,846

Crown Land (MRDB)

Spatial Analyst Layer Georeferencing Layer

Layers

- new\_disc
- INIT\_AVG\_OIL\_RATE
- 170
- INIT\_AVG\_OIL\_RATE
- Anadarko Public Crown Land
- Township grid (ATS2,6,SK1,0,MAN 1.0)
- canada

Select By Location

Lets you select features from one or more layers based on where they are located in relation to the features in another layer.

I want to:

select features from

the following layers:

- new\_disc
- the\_crown\_disposed\_land
- Township grid (ATS2,6,SK1,0,MAN 1.0)

that:

are within a distance of

the features in this layer:

new\_disc

Use selected features (0 features selected)

Apply a buffer to the features in new\_disc

of: 5.000000 Miles

Preview

The red features represent the features in new\_disc. The highlighted cyan features are selected because they are within a distance of the red features.

Points Lines Polygons

Apply Close

Number of Features selected: 6

start

Trinbox - Microsoft Out...

RE: arc 3.2 - Messag...

esripug\_mar\_20052.ppt

esripug\_mar\_20051.ppt

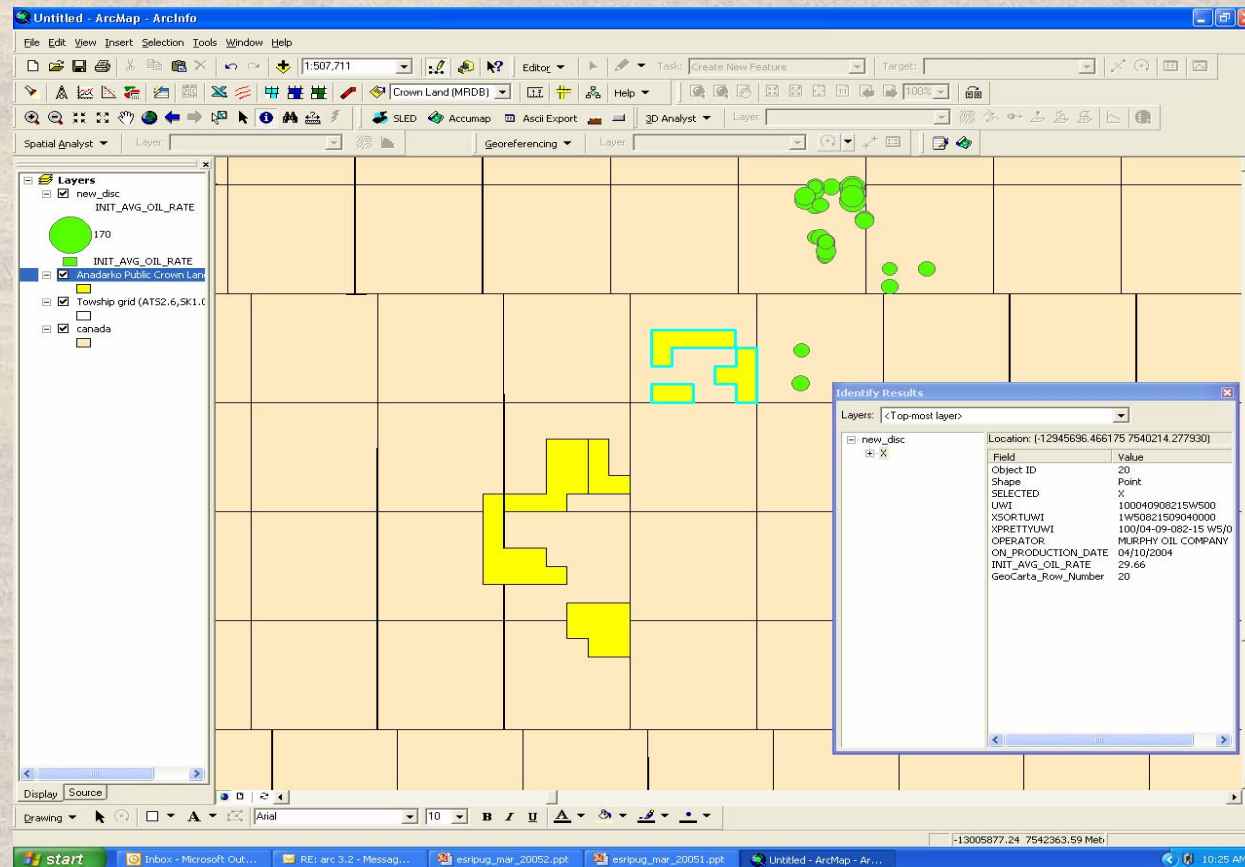
Untitled - ArcMap - Ar...

-13710314.65 8146499.72 Met

10:23 AM



# Land Selected Close to a New Discovery





## Summary

- Using the Geocarta Tools extension, Anadarko Canada ArcGIS users have access to multiple online relational data stores through a single easy to use interface
- Users can work with one to many datasets
- Users can build their own layers/attributes in ArcGIS.
- Users can access preformatted reports.



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## Author Information

- John Gillatt is an IT professional and the GIS specialist for Anadarko Canada.
- Chuck Smith is VP Geomatics for Divestco Inc. leading a team of developers building software applications for the oil and gas industry using ArcGIS.