

PI Tag Tuning At The Savannah River Site



OSisoft 2003 Conference

Background- SRS

- WWII- Concern about German A-bomb
- US development and use of A-bomb
- Plutonium production in Hanford, WA
- H-bomb discovery
- Construction of SRS in the early '50s to produce plutonium and tritium
- Shutdown of SRS reactors in '89



PI at SRS

- ❑ Originally purchased in '95
- ❑ Now collect ~8000 tags (most of HLW)
- ❑ DWPF conversion to PI ('01, ~3000 tags)
- ❑ PI2 to PI3 server migration ('01)
- ❑ PI-ML, Electronic Roundsheets ('02)
- ❑ License upgrade to 20,000 tags, Win2000 ('03)



What is “Tag Tuning”

- Setting tag collection parameters appropriately
- Collect enough data to show small process fluctuations without showing “noise”
- Default settings not tight enough
- Tuning = overcollecting data, analyzing results, and redefining tag parameters to optimize future collection

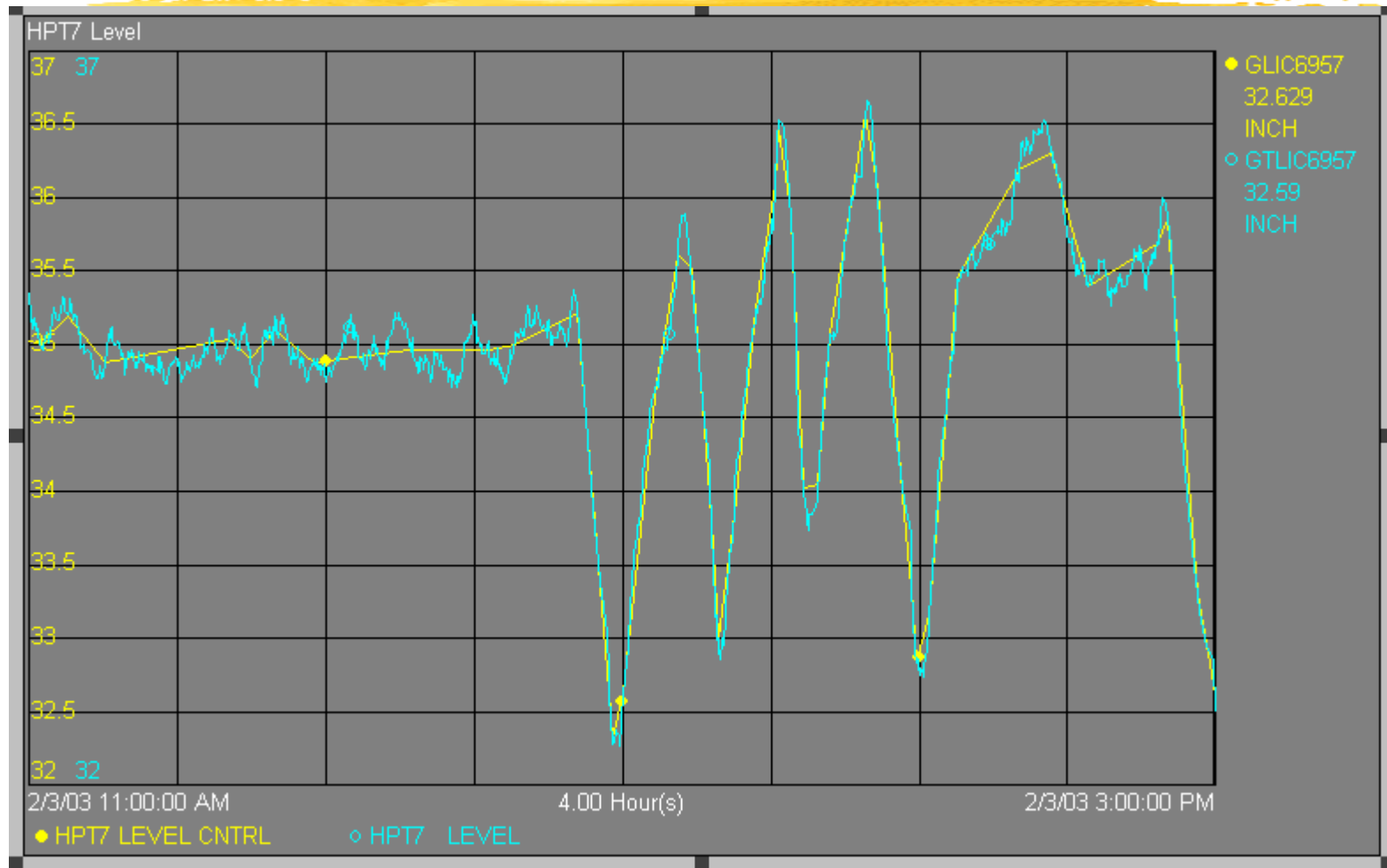


Tuning Problem Discovery

- Loop tuning work on level indicators
- Creation of high-resolution test tags
- Comparison, test tag to normal tag
- Small process fluctuations missed in PI because compression deviations were set uniformly at 1% span

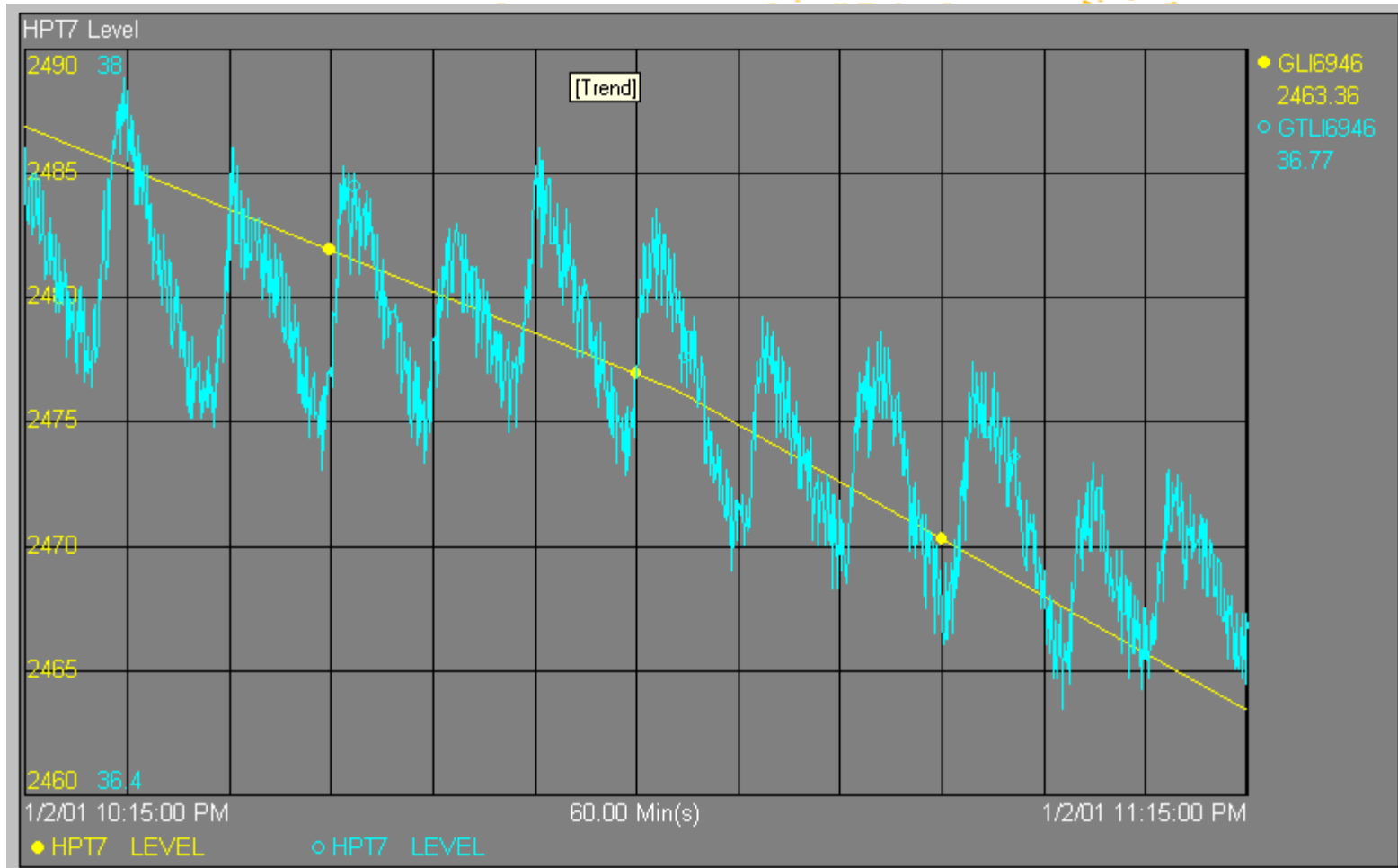


Example Trend 1



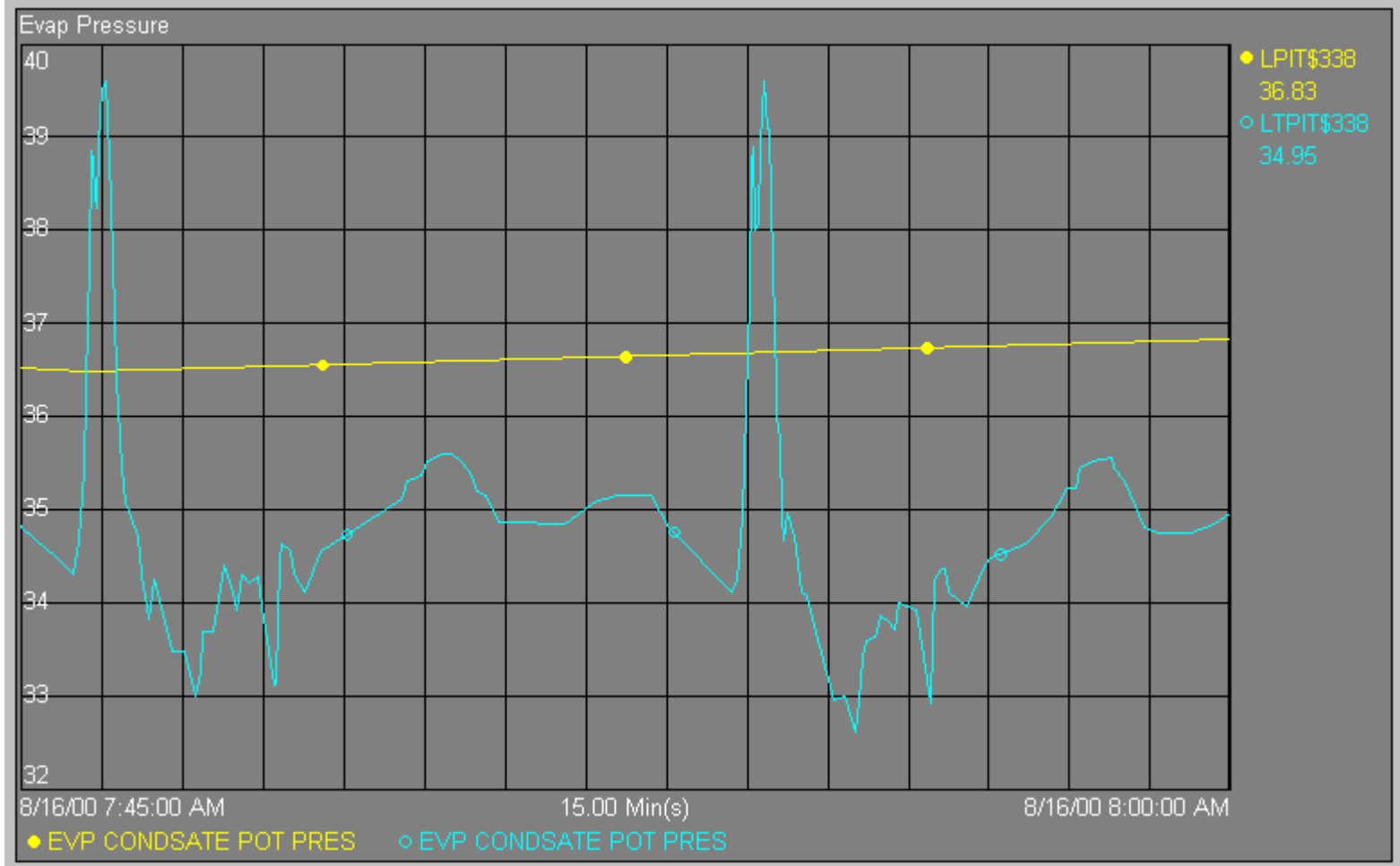
Tag	compdev	descriptor	engunits	excdev	span	zero
GLIC6957	0.25	HPT7 LEVEL CNTRL	INCH	0.125	100	0
GTLIC6957	0.027	HPT7 LEVEL	INCH	0.0135	135	0

Example Trend 2



Tag	compdev	descriptor	engunits	excdev	span	zero
GLI6946	62	HPT7 LEVEL	GAL	31	6200	0
GTLI6946	0.027	HPT7 LEVEL	INCH	0.0135	135	0

Example Trend 3



Tag	compdev	descriptor	engunits	excdev	span	zero
LPIT\$338	4	EVP CONDSATE POT PRES	PSIG	2	400	0
LTPIT\$338	0.08	EVP CONDSATE POT PRES	PSIG	0.04	400	0

Sample Archive Analysis

PI Archive Analysis

Tools Help

Archive Analysis ©2003 EXELE Information Systems, Inc. About...

Setup

PI Tag Search Criteria

PI Server: hlwpi3

Tag Mask: g*

Pt source: *

Start time: 03-feb-03 11:00

End time: 03-feb-03 15:00

☒ Sort results

Return the most active 15 tags

☐ Output results to a file

Output file: C:\Program Files\PI Tuning Tools\PIArcAn.csv ...

Start Analysis Abort

Results

Number of tags: 15 Avg # of events: 4214.80 View Output File

Rank	# Events	Tagname	PtType	PtSrc	Descriptor	Eng Units
1	13083	GTLI6946	Float16	H	HPT7 LEVEL ...	INCH
2	12974	GTLI6949	Float16	H	HPT7 LEVEL ...	INCH
3	12025	GLIC69570	Float16	H	HPT7 LEVEL C...	%
4	9863	GTJI6951	Float16	H	HPT7 PUMP ...	KW
5	5691	GTDI6946	Float16	H	HPT7 DENSIT...	SPGR
6	5596	GTDI6949	Float16	H	HPT7 DENSIT...	SPGR
7	1272	GLIC6957	Float16	H	HPT7 LEVEL ...	INCH
8	772	GLIC69570	Float16	H	HPT7 LVL CNT...	%
9	545	GVI6030	Float16	H	HPT7 PUMP 1 ...	IN/S
10	433	GPD16936	Float16	H	HPT7 PIT/TAN...	INWC
11	384	GFI7050	Float16	H	HPT 7,8,9,&10 ...	SCFM

Done



Sample Compression Analysis- Data Source

Compression Analysis ©2003 EXELE Information Systems, Inc. [About...](#)

Data Source | Compression Deviations | Analysis Chart | Error Chart | Compression Ratio Chart

Raw Data Source

☐ Retrieve values from a Compression Analysis data file

☒ Retrieve values from a PI tag

Data File Information

PI Server:

Data file: ...

PI Data

PI Server:

PI Tag: ...

Start time:

End time:

Raw Data Summary

Source:

PI Tag:

First data point:

Last data point:

of Raw Data Points:

Ready



Sample Compression Analysis- Comp. Deviation

Compression Analysis ©2003 EXELE Information Systems, Inc. About...

Data Source | **Compression Deviations** | Analysis Chart | Error Chart | Compression Ratio Chart

Compression Deviations (Engineering Units)

PI Tag: GTLIC6957
Zero: 0
Span: 135
CompDev: 0.0288

Enter new compression deviation

Add>>

Current compression deviations

0.04
0.08
0.1
0.2

Delete

Compression Summary

Number of raw values: 1272

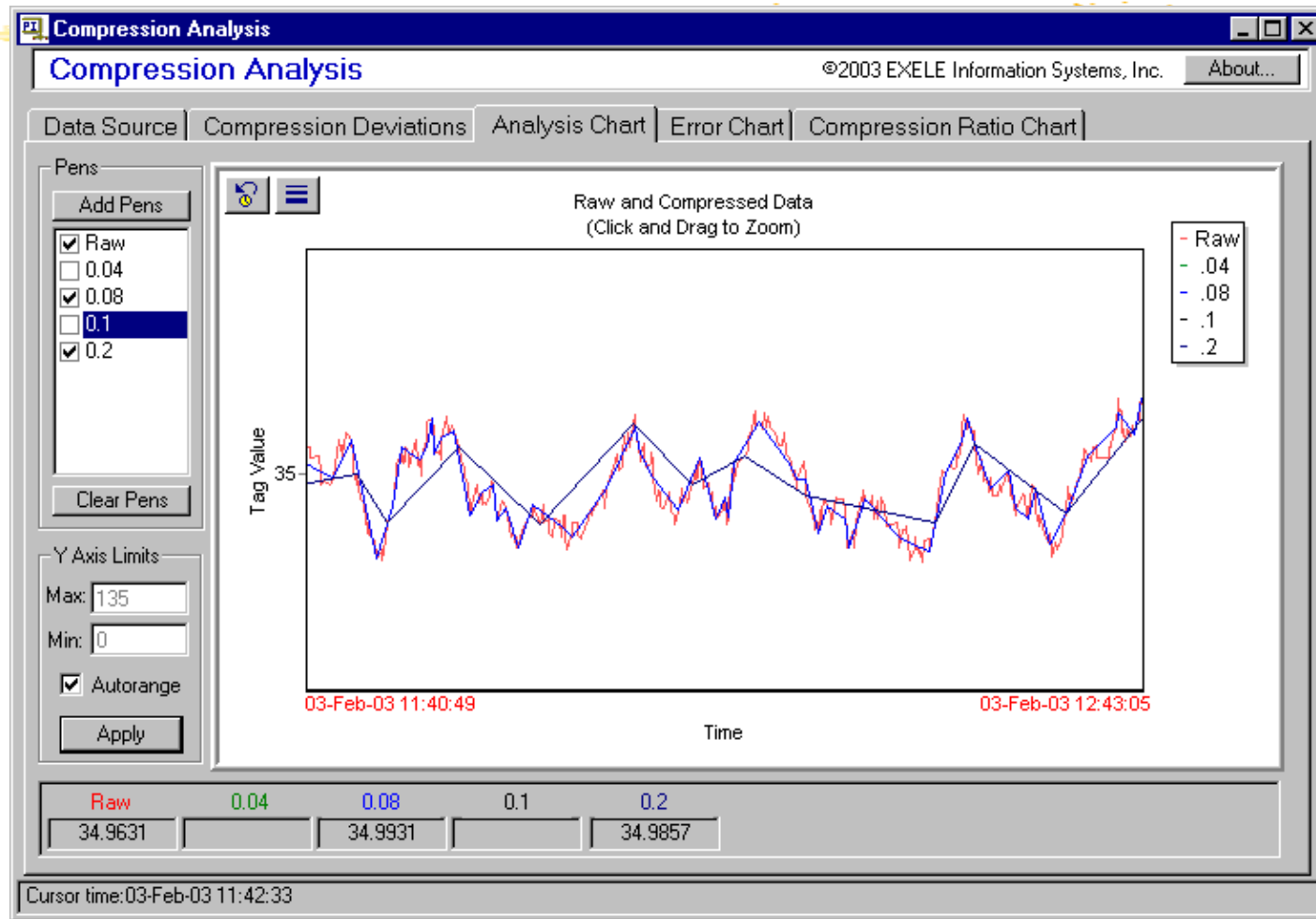
CompDev: Compression Deviation in engineering units
Values: # of compressed values for this CompDev
Ratio: Compression ratio: (# raw values) / (# Values)
Avg Err: Average difference between the raw and compressed values
Max Err: Maximum difference between the raw and compressed values.
Note: maximum error should be <= compression deviation

CompDev	# Values	Ratio (Y:1)	Avg Err	Max Error	Max Error Time
0.04	603	2.109	0.021	0.0399	03-Feb-03 13:02
0.08	202	6.297	0.033	0.0799	03-Feb-03 13:51
0.1	136	9.353	0.040	0.0996	03-Feb-03 11:52
0.2	57	22.316	0.081	0.1986	03-Feb-03 11:49

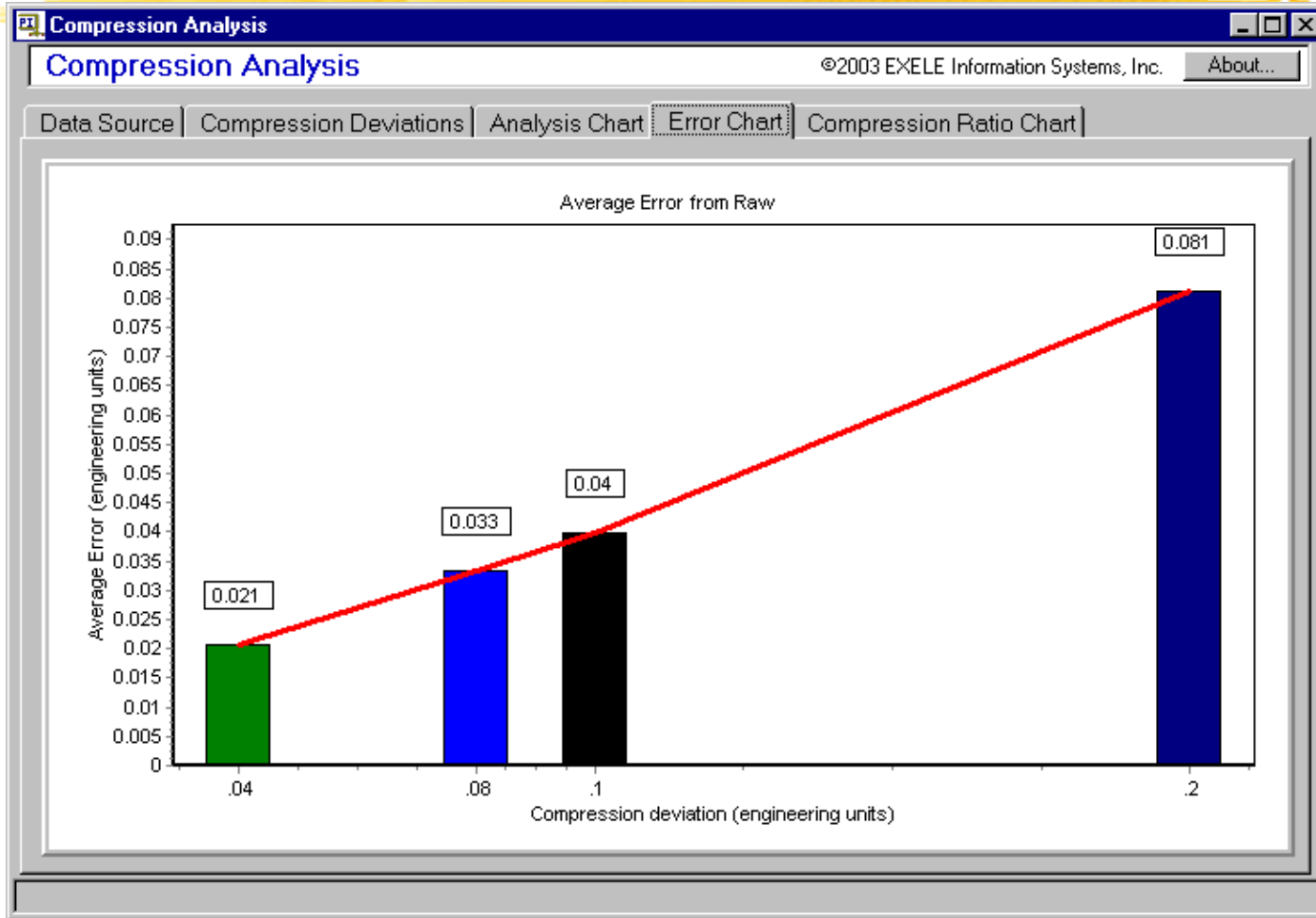
Ready



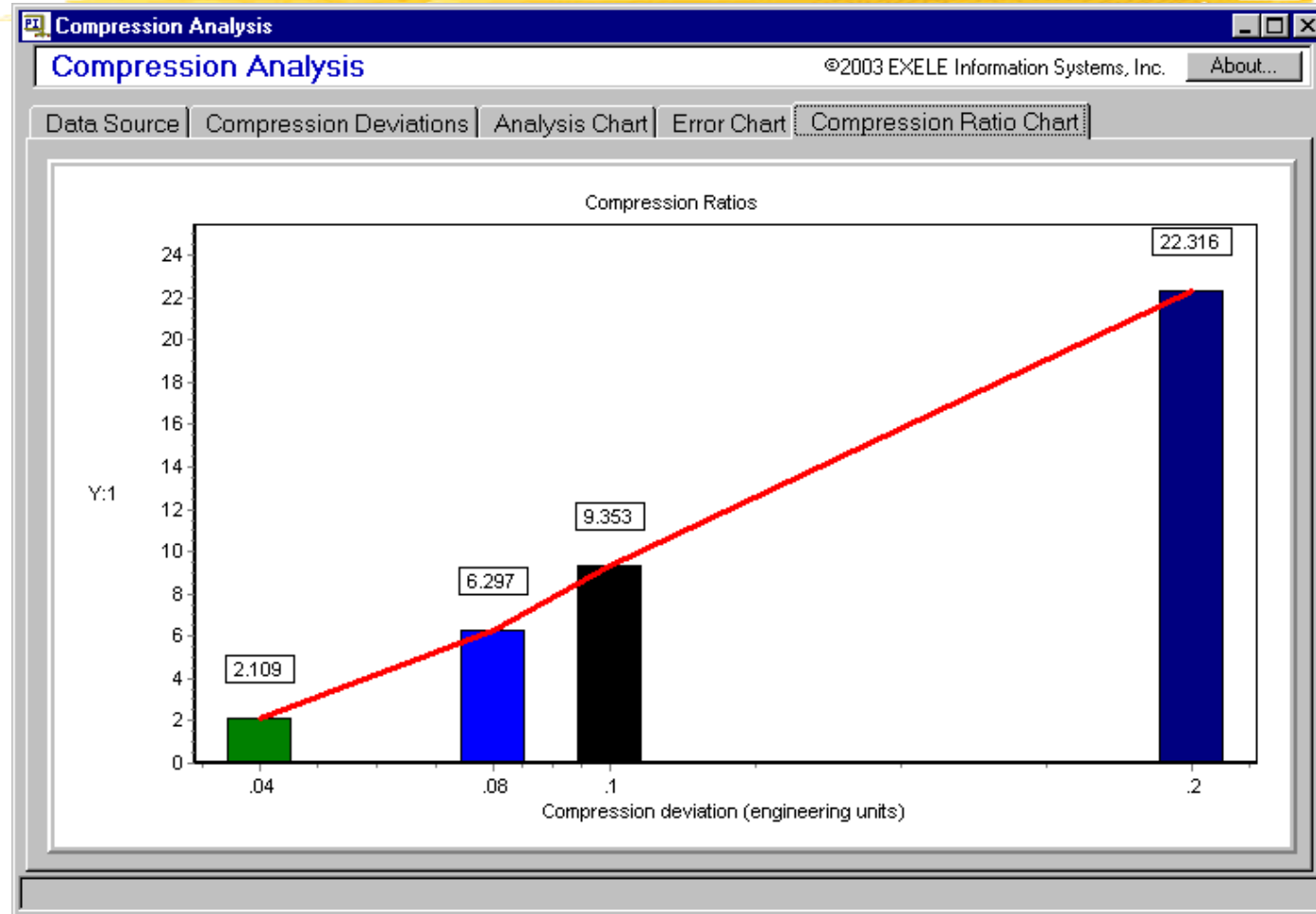
Sample Compression Analysis- Comp. Analysis



Sample Compression Analysis- Error Chart



Sample Compression Analysis- Comp. Ratios



Results, Tuning Program At SRS

- One small facility has been “tuned” - 4% (116) of floating point tags
- Changes in compression deviation- 5% to 200% existing value
- “Noisy” tags need most tuning
- Reduction in load on DCS network, moderate increase in PI data collection
- Extend program to other, larger facilities



Conclusions, Recommendations



- Tuning is essential to optimize data collection
- Break work into manageable chunks
- Do typical tags and generalize
- Tuning tools aid in evaluating different compression deviations

