Leveraging Cost Model Development via XML

Federal Remediation Technology Roundtable

Environmental Cost Engineering Committee (EC^2)

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Naval Facilities Engineering Command
Environmental Cleanup Program
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The Need

- Promote Sharing of Cost Items, Assemblies, Models, Data, & Other Cost Data
- Bridge Systems by Developing Models that are Independent of the Systems
- Foster Competition & Reduce Reliance on any one Model Builder

Objective

Maximize

- ✓ interoperability
- ✓ integration
- ✓ cost data availability
- ✓ cost leveraging
- ✓ consistency
- ✓ automation
- ✓ competition

Minimize

- ✓ development costs
- ✓ maintenance costs
- ✓ redundancy
- ✓ reliance upon any one model builder
- ✓ reliance on few compatible data sources

The Solution

Establish a Bridge - 3 Components

#1 Parametric Cost Model Standard Practice

- Parametric cost models
- Parametric design models

#2 Electronic Standard

- Data definition, transmission, & application

#3 Cost Model Library/ Repository/ Network

- Centralized
- Decentralized/distributed

Advantages of XML

- **Interface/Platform/Application/Network Independent:**
  - ✓ **Cross platform (Windows, NT, Unix)**
  - ✓ **Cross network (Internet, Intranet, LAN)**
  - ✓ **Cross application (CTC, RTET, & others)**
    - **consuming application can interpret the XML to model the estimate in many different ways**

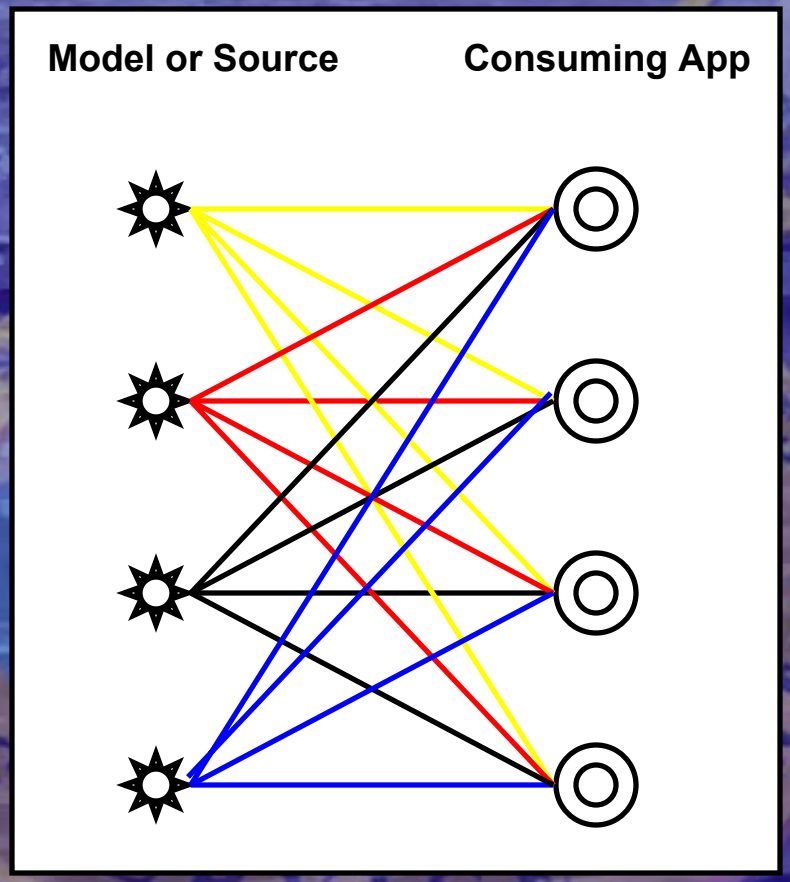
Advantages of XML

- Increases Consistency & Compatibility
- Leverages Existing Systems:
  - Minimizes development & maintenance costs
- Allows Multiple Systems to Leverage Existing Models & Extend Them to Meet Their Unique Needs
- Provides Common Ground for Bridging Agency Budgeting Systems

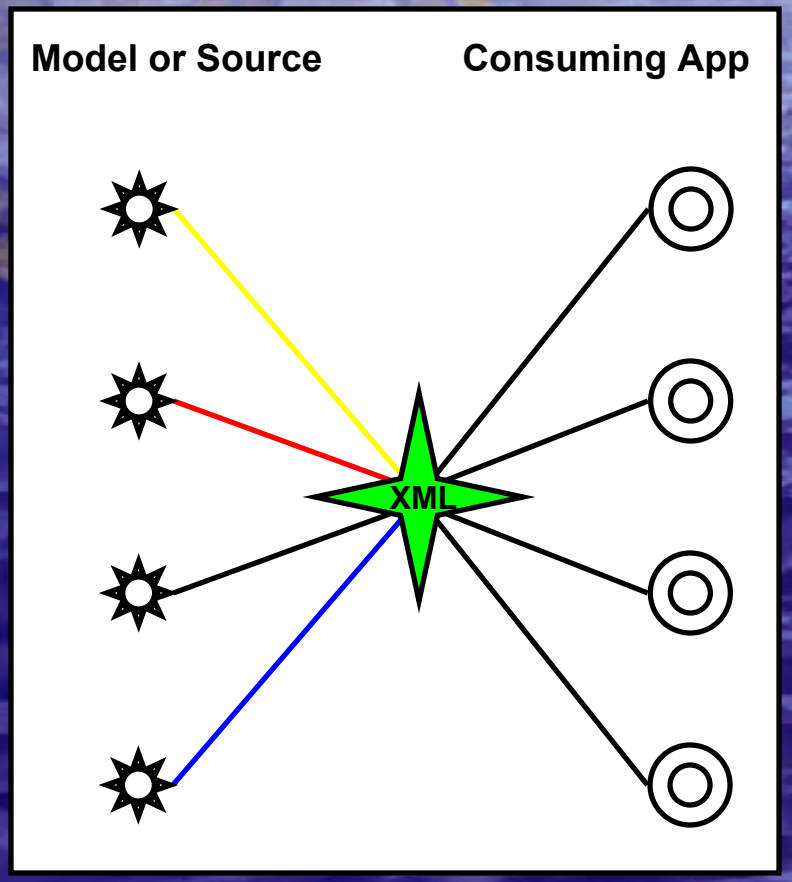
Electronic Standard - XML

One Source, Many Uses

Old Way: One-to-One



XML Way: One-to-Many



Electronic Standard - XML
Example

- **Consuming Application Can Interpret the XML to Model the Estimate in Different Ways:**
  - ✓ **CTC: a relational database implements the XML standard as a translation of the XML into a relational-based cost model**
  - ✓ **RTET: an object-oriented internet-architected application consumes the data as modeled in XML**

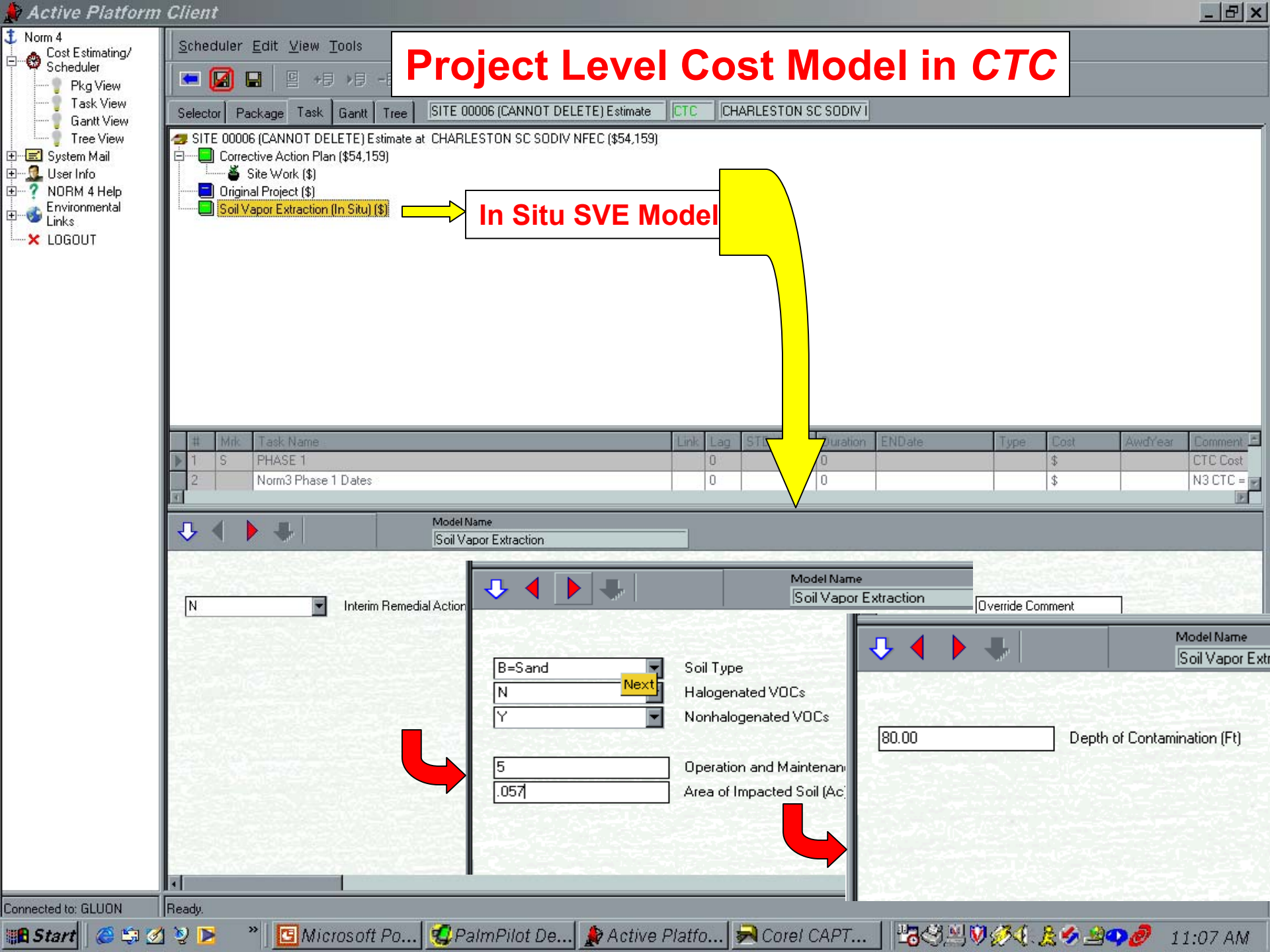
- NORM
  - Activity Editor
  - Site Editor
  - Relative Risk
  - Cost Estimating/Scheduler
  - MRP Module
  - Budget Module
  - Budget Guidance
  - Batch Procedures
  - Report Writer
  - Library
  - User Info
  - NORM 4 Help
  - Tutorial
  - Tutorial (Refresher)
  - Tutorial (Execution)
  - Tutorial (Analyst)
  - Knowledge Base
  - LOGOUT
  - EXIT

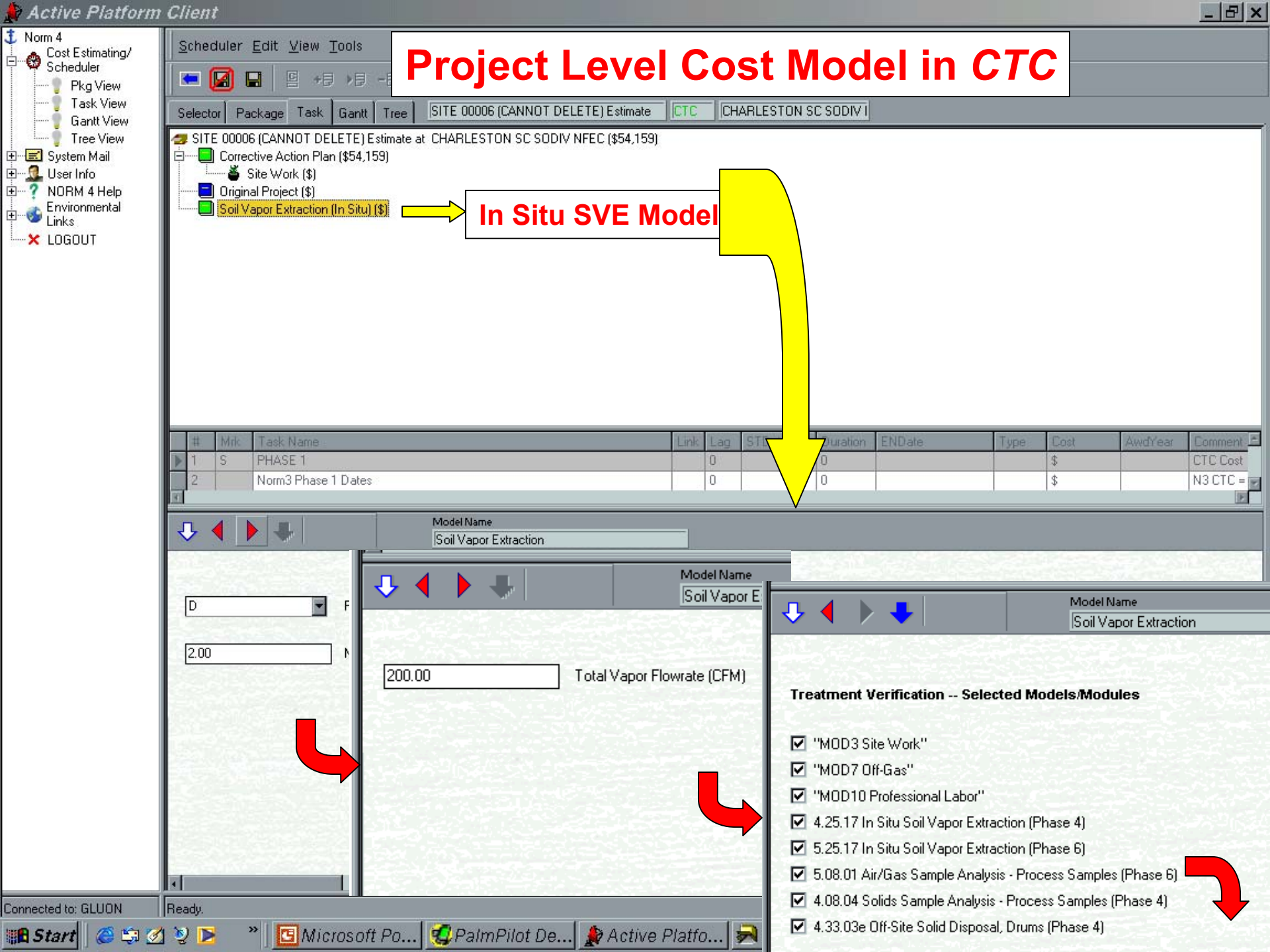
WARNING - WARNING - WARNING - WARNING - WARNING

You have just connected to an Official Department Of The Navy Web Information Service

Department of the Navy automated information systems and related equipment are intended for the communication, transmission, processing and storage of U.S. Government information. These systems and equipment are subject to monitoring to ensure proper functioning, to protect against improper or unauthorized use or access, and to verify the presence or performance of applicable security features or procedures, and for other like purposes. Such monitoring may result in the acquisition, recording, and analysis of all data being communicated, transmitted, processed or stored in this system by a user. If monitoring reveals evidence of possible criminal activity, such evidence may be provided to law enforcement personnel.

To Get Started ... In the 'Application Explorer' tree view on the left side of your screen, double-click the component you wish to run. You may also single click on the plus sign (+) next to the component.


Active Platform Client
Norm 4
Cost Estimating/ Scheduler
Pkg View
Task View
Gantt View
Tree View
System Mail
User Info
NORM 4 Help
Environmental Links
LOGOUT
Scheduler Edit View Tools
Project Level Cost Model in CTC
Selector Package Task Gantt Tree
SITE 00006 (CANNOT DELETE) Estimate
CTC
CHARLESTON SC SODIV I
SITE 00006 (CANNOT DELETE) Estimate at CHARLESTON SC SODIV NFEC ($54,159)
Corrective Action Plan ($54,159)
Site Work ($)
Original Project ($)
Soil Vapor Extraction (In Situ) ($)
In Situ SVE Model
Mrk Task Name Link Lag ST Duration ENDate Type Cost AwdYear Comment
1 S PHASE 1 0 0 $ CTC Cost
2 Norm3 Phase 1 Dates 0 0 $ N3 CTC =
Model Name
Soil Vapor Extraction
N
Interim Remedial Action
Override Comment
B=Sand
Soil Type
Next
N
Halogenated VOCs
Y
Nonhalogenated VOCs
5
Operation and Maintenan
.057
Area of Impacted Soil (Ac
80.00
Depth of Contamination (Ft)
Connected to: GLUON
Ready.
Start
Microsoft Po...
PalmPilot De...
Active Platfo...
Corel CAPT...
11:07 AM


Active Platform Client
Norm 4
Cost Estimating/ Scheduler
Pkg View
Task View
Gantt View
Tree View
System Mail
User Info
NORM 4 Help
Environmental Links
LOGOUT
Scheduler Edit View Tools
Project Level Cost Model in CTC
Selector Package Task Gantt Tree
SITE 00006 (CANNOT DELETE) Estimate
CTC
CHARLESTON SC SODIV I
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Corrective Action Plan ($54,159)
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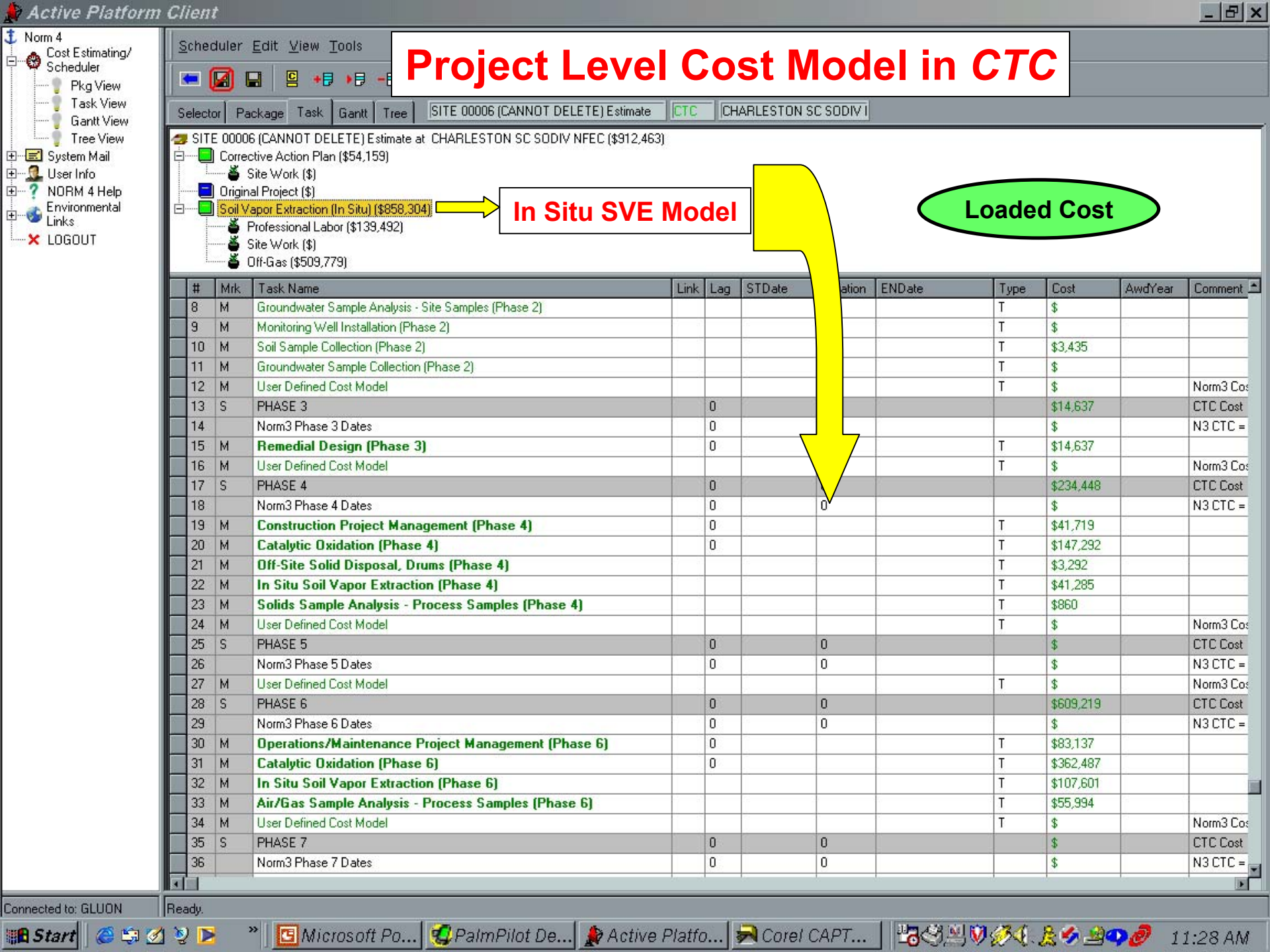
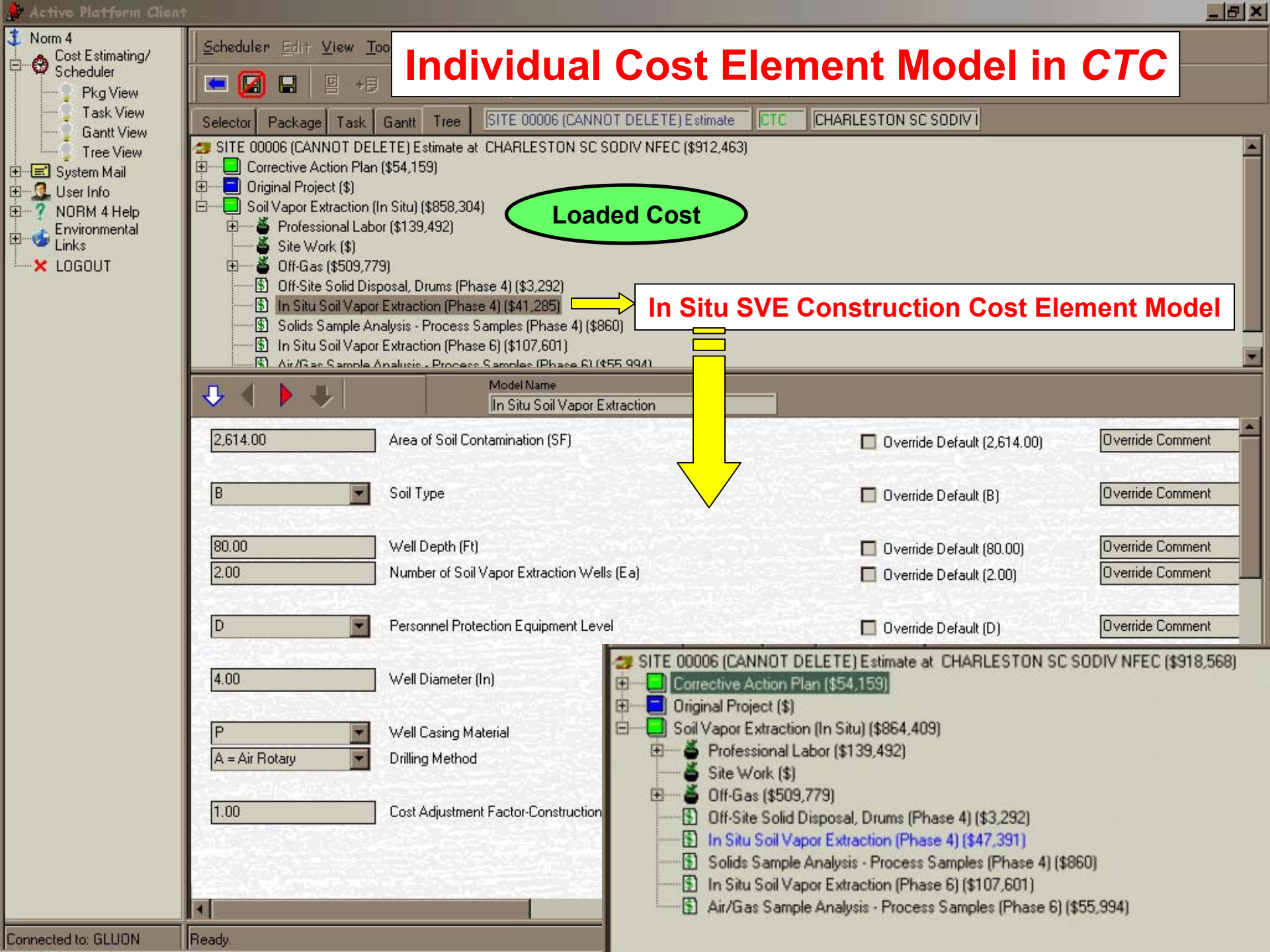
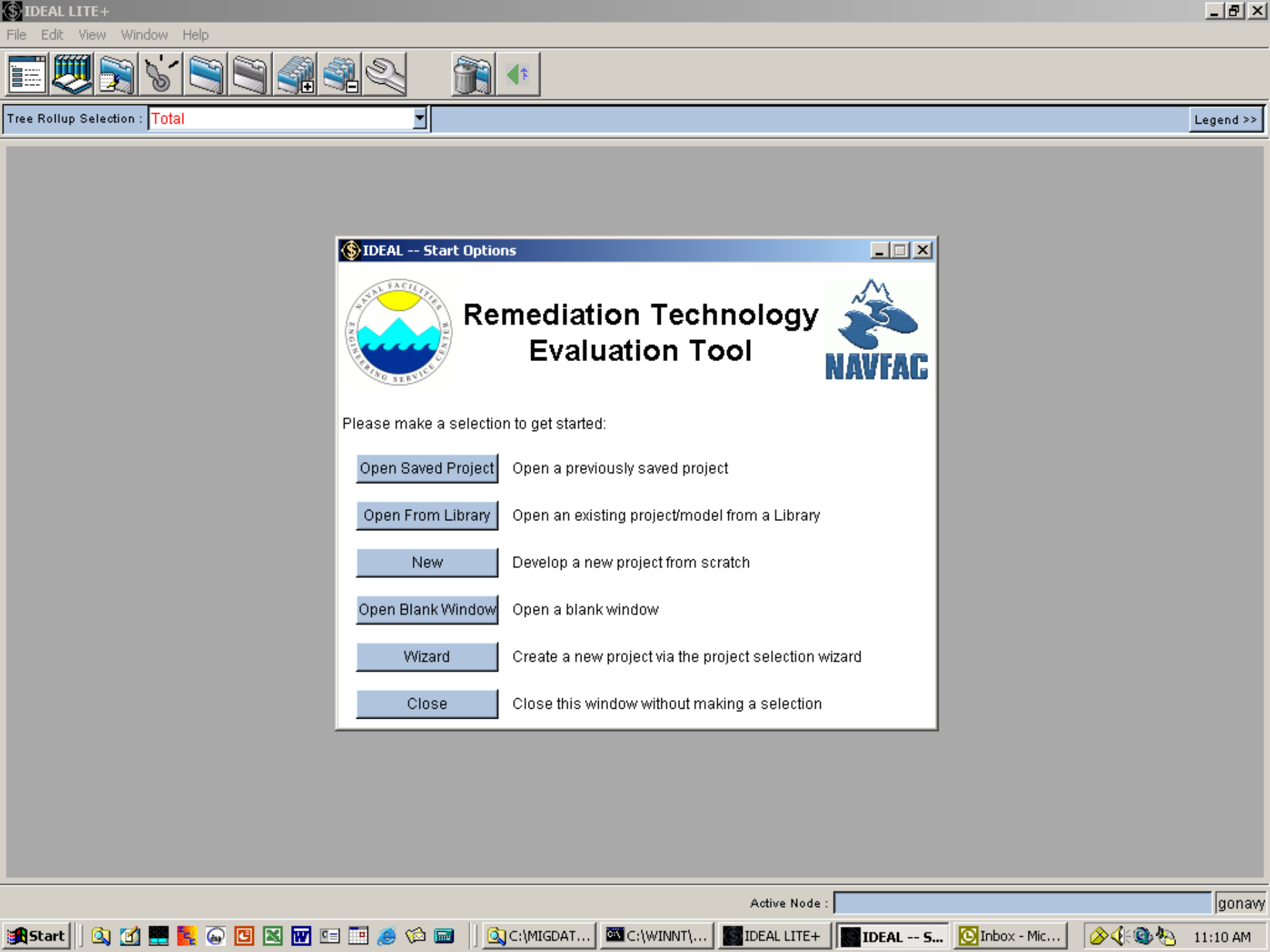
Original Project ($)
Soil Vapor Extraction (In Situ) ($)
In Situ SVE Model
Mrk Task Name Link Lag ST Duration ENDate Type Cost AwdYear Comment
1 S PHASE 1 0 0 $ CTC Cost
2 Norm3 Phase 1 Dates 0 0 $ N3 CTC =
Model Name
Soil Vapor Extraction
D
2.00
200.00
Total Vapor Flowrate (CFM)
Treatment Verification -- Selected Models/Modules
"MOD3 Site Work"
"MOD7 Off-Gas"
"MOD10 Professional Labor"
4.25.17 In Situ Soil Vapor Extraction (Phase 4)
5.25.17 In Situ Soil Vapor Extraction (Phase 6)
5.08.01 Air/Gas Sample Analysis - Process Samples (Phase 6)
4.08.04 Solids Sample Analysis - Process Samples (Phase 4)
4.33.03e Off-Site Solid Disposal, Drums (Phase 4)
Connected to: GLUON
Ready.
Start
Microsoft Po...
PalmPilot De...
Active Platfo...

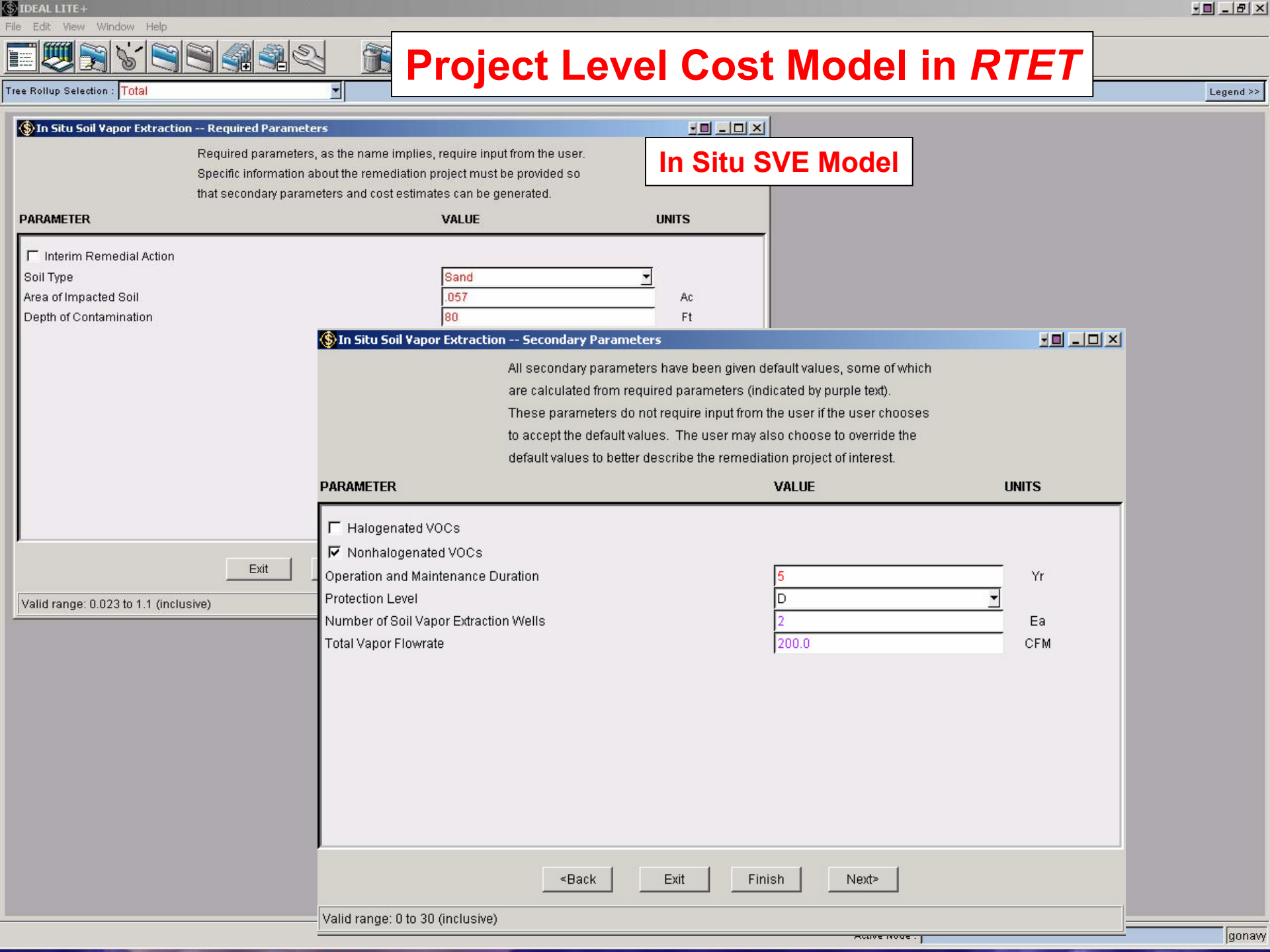
Project Level Cost Model in *CTC*

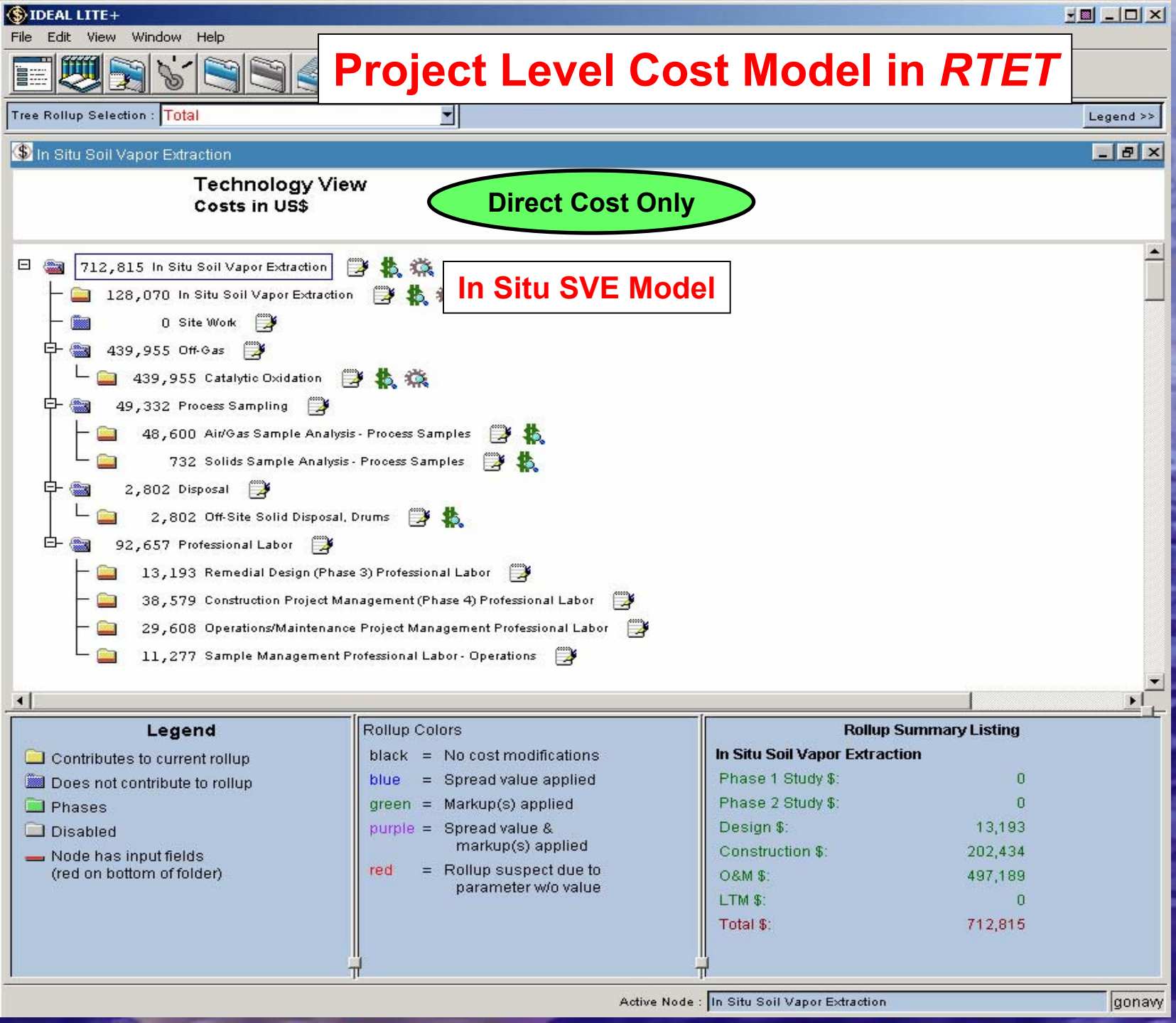


#	Mrk	Task Name	Link	Lag	STDate	ation	ENDate	Type	Cost	AwdYear	Comment
8	M	Groundwater Sample Analysis - Site Samples (Phase 2)						T	$		
9	M	Monitoring Well Installation (Phase 2)						T	$		
10	M	Soil Sample Collection (Phase 2)						T	$3,435		
11	M	Groundwater Sample Collection (Phase 2)						T	$		
12	M	User Defined Cost Model						T	$		Norm3 Cos
13	S	PHASE 3		0					$14,637		CTC Cost
14		Norm3 Phase 3 Dates		0					$		N3 CTC =
15	M	**Remedial Design (Phase 3)**		0				T	$14,637		
16	M	User Defined Cost Model						T	$		Norm3 Cos
17	S	PHASE 4		0					$234,448		CTC Cost
18		Norm3 Phase 4 Dates		0		0			$		N3 CTC =
19	M	**Construction Project Management (Phase 4)**		0				T	$41,719		
20	M	**Catalytic Oxidation (Phase 4)**		0				T	$147,292		
21	M	**Off-Site Solid Disposal, Drums (Phase 4)**						T	$3,292		
22	M	**In Situ Soil Vapor Extraction (Phase 4)**						T	$41,285		
23	M	**Solids Sample Analysis - Process Samples (Phase 4)**						T	$860		
24	M	User Defined Cost Model						T	$		Norm3 Cos
25	S	PHASE 5		0		0			$		CTC Cost
26		Norm3 Phase 5 Dates		0		0			$		N3 CTC =
27	M	User Defined Cost Model						T	$		Norm3 Cos
28	S	PHASE 6		0		0			$609,219		CTC Cost
29		Norm3 Phase 6 Dates		0		0			$		N3 CTC =
30	M	**Operations/Maintenance Project Management (Phase 6)**		0				T	$83,137		
31	M	**Catalytic Oxidation (Phase 6)**		0				T	$362,487		
32	M	**In Situ Soil Vapor Extraction (Phase 6)**						T	$107,601		
33	M	**Air/Gas Sample Analysis - Process Samples (Phase 6)**						T	$55,994		
34	M	User Defined Cost Model						T	$		Norm3 Cos
35	S	PHASE 7		0		0			$		CTC Cost
36		Norm3 Phase 7 Dates		0		0			$		N3 CTC =

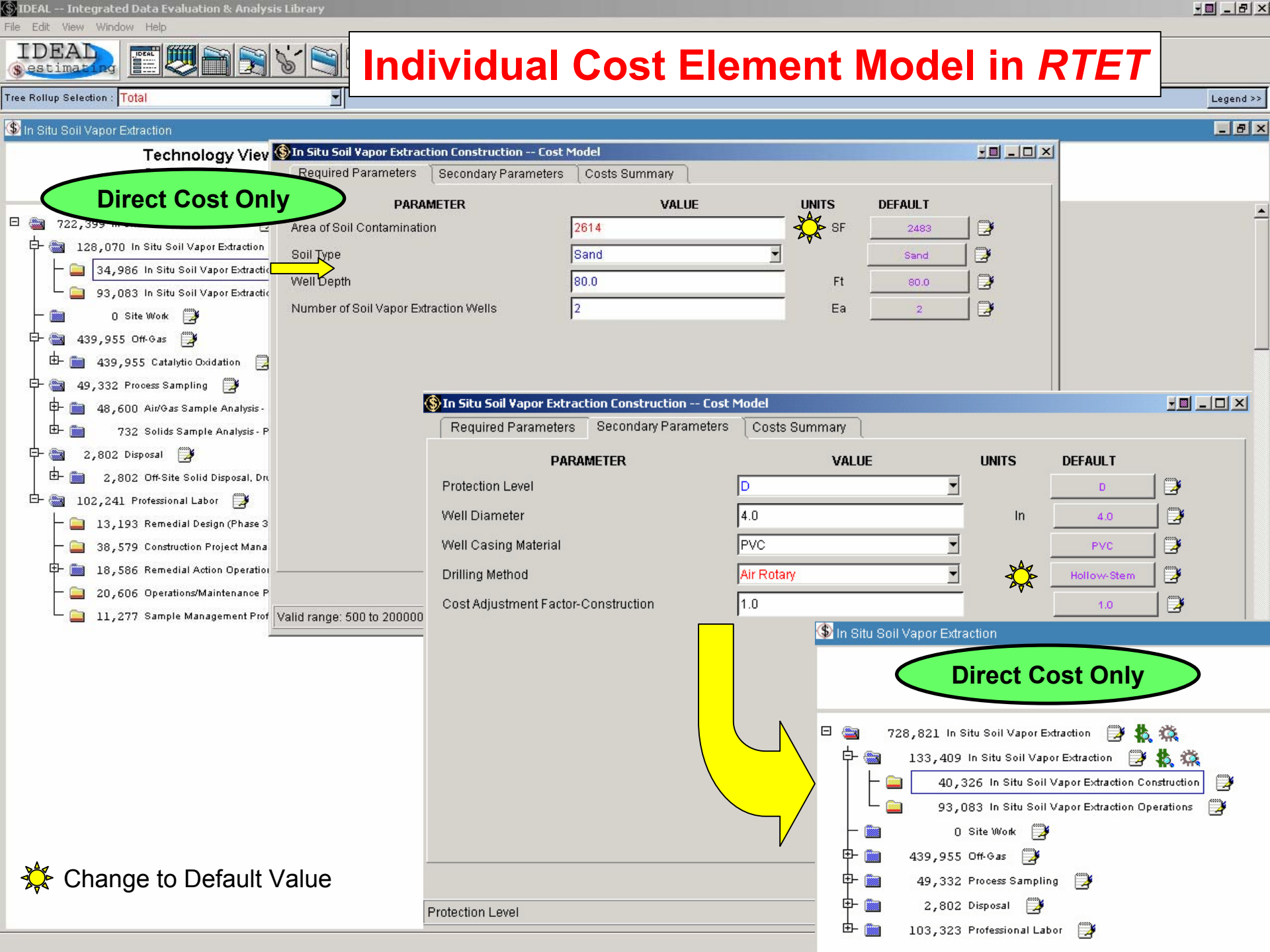

Active Platform Client
Norm 4
Cost Estimating/ Scheduler
Pkg View
Task View
Gantt View
Tree View
System Mail
User Info
NORM 4 Help
Environmental Links
LOGOUT
Scheduler Edit View Too
Individual Cost Element Model in CTC
Selector Package Task Gantt Tree
SITE 00006 (CANNOT DELETE) Estimate
CTC
CHARLESTON SC SODIV I
SITE 00006 (CANNOT DELETE) Estimate at CHARLESTON SC SODIV NFEC ($912,463)
Corrective Action Plan ($54,159)
Original Project ($)
Soil Vapor Extraction (In Situ) ($858,304)
Loaded Cost
Professional Labor ($139,492)
Site Work ($)
Off-Gas ($509,779)
Off-Site Solid Disposal, Drums (Phase 4) ($3,292)
In Situ Soil Vapor Extraction (Phase 4) ($41,285)
In Situ SVE Construction Cost Element Model
Solids Sample Analysis - Process Samples (Phase 4) ($860)
In Situ Soil Vapor Extraction (Phase 6) ($107,601)
Model Name
In Situ Soil Vapor Extraction
2,614.00
Area of Soil Contamination (SF)
Override Default (2,614.00)
Override Comment
B
Soil Type
Override Default (B)
Override Comment
80.00
Well Depth (Ft)
Override Default (80.00)
Override Comment
2.00
Number of Soil Vapor Extraction Wells (Ea)
Override Default (2.00)
Override Comment
D
Personnel Protection Equipment Level
Override Default (D)
Override Comment
4.00
Well Diameter (In)
P
Well Casing Material
A = Air Rotary
Drilling Method
1.00
Cost Adjustment Factor-Construction
SITE 00006 (CANNOT DELETE) Estimate at CHARLESTON SC SODIV NFEC ($918,568)
Corrective Action Plan ($54,159)
Original Project ($)
Soil Vapor Extraction (In Situ) ($864,409)
Professional Labor ($139,492)
Site Work ($)
Off-Gas ($509,779)
Off-Site Solid Disposal, Drums (Phase 4) ($3,292)
In Situ Soil Vapor Extraction (Phase 4) ($47,391)
Solids Sample Analysis - Process Samples (Phase 4) ($860)
In Situ Soil Vapor Extraction (Phase 6) ($107,601)
Air/Gas Sample Analysis - Process Samples (Phase 6) ($55,994)
Connected to: GLUON
Ready


IDEAL LITE+
File Edit View Window Help
Tree Rollup Selection : Total
Legend >>
IDEAL -- Start Options
Remediation Technology Evaluation Tool
NAVFAC
Please make a selection to get started:
Open Saved Project
Open a previously saved project
Open From Library
Open an existing project/model from a Library
New
Develop a new project from scratch
Open Blank Window
Open a blank window
Wizard
Create a new project via the project selection wizard
Close
Close this window without making a selection
Active Node :
gonavy
Start
C:\MIGDAT...
C:\WINNT\...
IDEAL LITE+
IDEAL -- S...
Inbox - Mic...
11:10 AM


IDEAL LITE+
File Edit View Window Help
Tree Rollup Selection : Total
Legend >>
Project Level Cost Model in RTET
In Situ Soil Vapor Extraction -- Required Parameters
Required parameters, as the name implies, require input from the user.
Specific information about the remediation project must be provided so
that secondary parameters and cost estimates can be generated.
In Situ SVE Model
PARAMETER
VALUE
UNITS
Interim Remedial Action
Soil Type
Sand
Area of Impacted Soil
.057
Ac
Depth of Contamination
80
Ft
Exit
Valid range: 0.023 to 1.1 (inclusive)
In Situ Soil Vapor Extraction -- Secondary Parameters
All secondary parameters have been given default values, some of which
are calculated from required parameters (indicated by purple text).
These parameters do not require input from the user if the user chooses
to accept the default values. The user may also choose to override the
default values to better describe the remediation project of interest.
PARAMETER
VALUE
UNITS
Halogenated VOCs
Nonhalogenated VOCs
Operation and Maintenance Duration
5
Yr
Protection Level
D
Number of Soil Vapor Extraction Wells
2
Ea
Total Vapor Flowrate
200.0
CFM
<Back
Exit
Finish
Next>
Valid range: 0 to 30 (inclusive)
gonavy


IDEAL LITE+
File Edit View Window Help
Project Level Cost Model in RTET
Tree Rollup Selection : Total
Legend >>
In Situ Soil Vapor Extraction
Technology View
Costs in US$
Direct Cost Only
712,815 In Situ Soil Vapor Extraction
In Situ SVE Model
128,070 In Situ Soil Vapor Extraction
0 Site Work
439,955 Off-Gas
439,955 Catalytic Oxidation
49,332 Process Sampling
48,600 Air/Gas Sample Analysis - Process Samples
732 Solids Sample Analysis - Process Samples
2,802 Disposal
2,802 Off-Site Solid Disposal, Drums
92,657 Professional Labor
13,193 Remedial Design (Phase 3) Professional Labor
38,579 Construction Project Management (Phase 4) Professional Labor
29,608 Operations/Maintenance Project Management Professional Labor
11,277 Sample Management Professional Labor - Operations
Legend
Contributes to current rollup
Does not contribute to rollup
Phases
Disabled
Node has input fields (red on bottom of folder)
Rollup Colors
black = No cost modifications
blue = Spread value applied
green = Markup(s) applied
purple = Spread value & markup(s) applied
red = Rollup suspect due to parameter w/o value
Rollup Summary Listing
In Situ Soil Vapor Extraction
Phase 1 Study $: 0
Phase 2 Study $: 0
Design $: 13,193
Construction $: 202,434
O&M $: 497,189
LTM $: 0
Total $: 712,815
Active Node : In Situ Soil Vapor Extraction
gonawy

Individual Cost Element Model in *RTET*



Change to Default Value

Conclusion

- XML Standardization is a Viable Means for Sharing & Leveraging Cost Model Development
- EC^2 is Working to Support Development of the Standards
- Soliciting Input on the *Parametric Cost Modeling Manual* & XML Definitions/ Schema from:
  - ✓ AACE International
  - ✓ NIBS - IAI
- Develop ASTM Standards as a Derivative of the Manual