ILMS Redevelopment to HP-UX

(A Real Time Production Conversion)

Kenneth W. Porter

Must replace the legacy application? Why?

City of Houston, Planning Development Department, iTEAM

This journey starts with a transmission that was retrieved from old media between an incoming HP3000 mainframe class server and the outgoing Cobol application program, circa 01.01.2001

must replace the legacy application ? ? ? ?

huh?

Why?

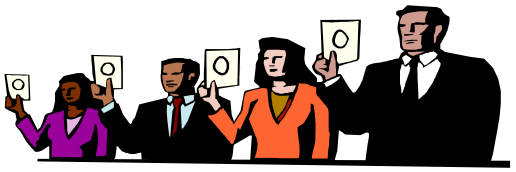
let me show you how in four clicks

begin new transmission . . . . so begins the redesign of a classic MPE/iX application into a multi-tier environment

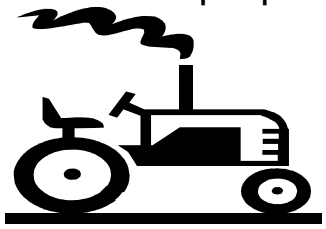
The Cobol program starts to explain to the host that adding a graphical client and middle ware will not mean the lost of any functionality but simply an extension of the **application** to another **environment** . . .

click 1 - add a graphical client interface

click 2 – provide browser based reporting



click 3 – sunset the 9xx servers, use N or A class servers and prepare for Itanium/Unix environment



click 4 – load data from Image to Oracle

What is the Integrated Land Management System?

WHAT IS THE INTEGRATED LAND MANAGEMENT SYSTEMS (ILMS)? IN A WORD IT IS USERS ! ! The Integrated Land Management System (ILMS) was purchase by the City of Houston Building Inspections Division in 1987 to automate building inspection's permitting process. Since that time, several divisions dealing with various codes related to construction, signs, building standard or neighborhood standard codes are using the system. ILMS was designed to primarily handle **plan tracking, permitting, and inspection tracking**. Over the years the users have found many ways to use this application to solve their business problems and challenges. The ILMS environment up time is at 99%. There are over 1000 internal and external clients of the application and its support environment.

Senior Stake Holders and Supporters

- Gary Bridges, Building Inspections
- Shelia Blake, Building Inspections
- Allen Largent, Building Inspections
- Ken Lorton, Building Inspections
- Chief Daniel Pruitt, HFD
- Charles Key, HFD
- Gracia Rosslow, HFD
- Nick Toparcean, Planning and Development
- Brian Sedberry, Planning and Development

iTEAM Concept – Resource Management

- internet, innovative, ingenuity,initiative, in site, instructions, input, intellectual capital, individuals . . .

- Together
- Everyone
- Achieve
- More

iTEAM Members: Ken Porter, Jack Griffin, Niki Patel, Phuong Nguyen, Steve Craig, Willie Gause, Keith Martin, Robert Hooper, Neal Gittleman, John Galinski, Richard Klimitchek, Les Anderson, Bernard Doarks, Cathy Aulds, support assistants and the customers and clients we serve .

Project OverLord

A Real Time Production Conversion

- Project OverLord is a joint public + private venture to redesign a ‘Classic’ propriety MPE/iX, HP View & Image database one/two tier application with its sub-applications and their operating systems into a Open Platform multi-tier, graphical client based application ;
- The primary challenge, the conversion is being done concurrently within the daily ILMS production environment…

Overview of Project Overlord

Transition from a Propriety Platform to an Open Platform

Challenges

- Transition from a propriety platform Operating System (OS) to a more open platform OS by 2006
- Provide a realistic approach to move from MPE/iX OS with a Image/SQL database to a Unix OS with Oracle database environment
- To have 85% of the Application and Support systems redesigned before Hewlett Packard is retires the MPE/iX OS in 2006
- All vendors that develop and support the MPE/iX will in theory scale back or stop support in 2006
- Design, develop, install, and test the open environments and platforms while utilizing better business concepts as we deliver information to the public, internal and external clients in an efficient and timely manner
- Integrate Fire Marshal Permitting and Field Inspections into ILMS

Why do OverLord?

What is the Cost of Inefficient Information Management Systems?

According to IDC, for every 1,000 knowledge workers, your enterprise wastes $7.5 million a year looking for and reworking information that already exists . . .

Moreover, total replacement cost is estimated at over $10 million.

Goals for Project Overlord

- The iTEAM will provide improved services and access to the Code Enforcement Information Applications and Systems, while minimizing interruptions to the public, and internal and external clients during the transition phases.

- Not to exceed the old MPE/iX classic goal of having any application off line for more than 4 hours during normal business hours . . . with 99% uptime

Implementation Concept

- Phased approach will help maintain project scope
- Phased approach identifies mile stones
- Phased approach reduces total system unavailability
- Limited personnel resources requires a phased approach
- Phased approach augments the ability to design, develop, and deploy applications and systems in a safe and timely manner

Phases of Project OverLord

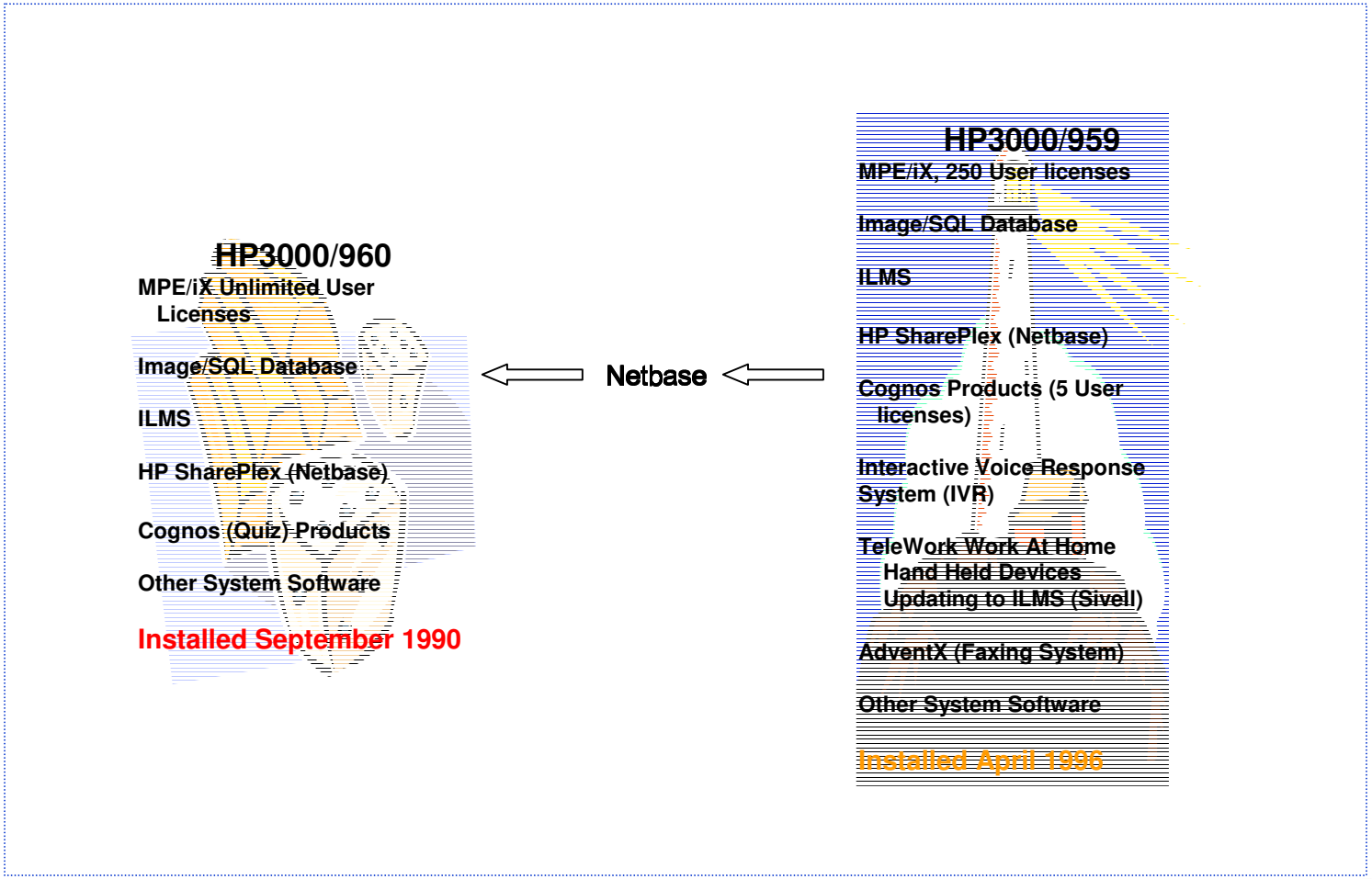
- Phase I - Replace of aging mainframes with current hardware, software, initial redevelopment effort to integrate the Fire Marshal Office Permitting and Field Inspections operations into ILMS
- Phase II – Install a HP9000 Unix server, develop a data warehouse for reporting, and use browser based business intelligence tools for the reporting
- Phase III – Replace the HP3000/959 with an e3000 server move all production and applications, redesign ILMS database from Image to Oracle, modify ILMS application to take advantage of the new database design
- Phase IV – Implement redesigned ILMS application and database into production

Classic HP3000 MPE/iX Configuration Terminal to Host

Terminal Client

Host Client

Classic ILMS Hardware Configuration



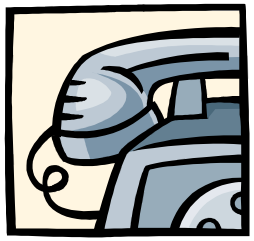
Phase I – Client Application Interfaces + Fire Marshal Project

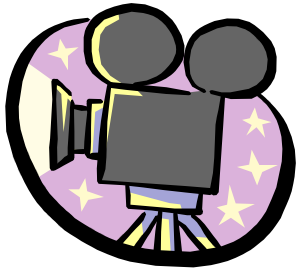
Scope

- Modify existing ILMS application to handle Fire Marshal permitting and field inspections
- Replace the oldest of the aging and out of production mainframe computers
- Increase hardware reliability for daily operations
- Provide improved/corrected business functionality
- Normalize Image database for new report application
- Minimize disruptions to users and clients by phasing in the changes and replacement of the HP3000/960 Online Production Server(s)
- Have the Class A to become the test/development system while the HP3000/960 continues to function.

New ILMS Multi-Tier structure

Clients

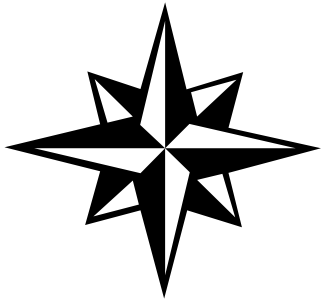




New
Middle Tier

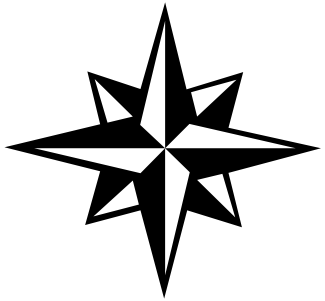
Host
Client

OverLord Design & Development Philosophy



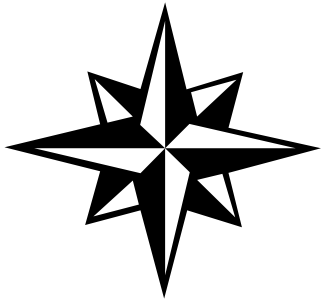
The design and development begins with the custom middleware program developed by one of our development partners. This is the centre point that enabled the iTEAM to reengineer the application based on a three tier model with in record time of 4 ½ months. The end-result is a high-performance environment that can publish as well as perform transaction processing services based on Microsoft IIS hosted web-pages/Web-services. Application state is handled at the middle-tier level and all user requests are based on HTTP-port-80. This is regardless of request's source. Specifically, the newly developed ILMS Graphical Client, Intranet/Internet Web Pages, or Cell phone (WML). This should equate to huge savings over the life of the application. The City's business continues to evolve and we have to be in a position to share and respond to a wide array of business issues in a timely, cost effective manner. The importance of standardizing on stateless Port 80 request cannot be over emphasized. We feel that Applications must be Firewall/Wireless-Internet friendly to stand the test of time. Our customers, the Mayor, City Administration, the building-contractors and the public-at-large expect if not demand value for money and constantly improving services. We are now able to respond more quickly and avoid reinventing the wheel as new technologies/requirements emerge.

Design and Development



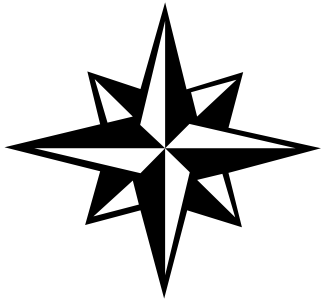
New Multi-Tier design is a key feature for handling external processes and clients. The potential outsourcing of services, projects and field inspection exist as all organizations both private and public seek to improve services and reduce costs. New ILMS will handle future external processes without major rewrites or enhancement to programs.

Design and Development



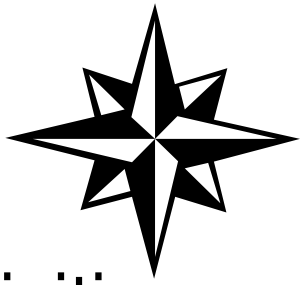
Redevelop the thirty (30) Core Business screens in a three tier model to provide the same basic functionality as the legacy COBOL/IMAGE/VIEW Application. Refine and extend the application's functionality as to take advantage of the Graphical environment.

Design and Development



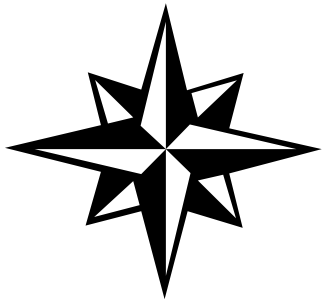
Great care was exercised in the new ILMS graphical environment to make the screens easier to learn and navigate than the classic ILMS character based screens. A client can navigate in the new ILMS environment with little to no assistants.

Design and Development



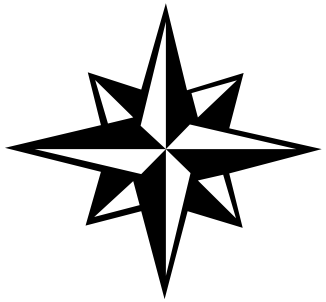
The COBOL and Image development activities and processes to date have required Thirty-Two DBGENERAL jobs to be developed and implemented to transform and extend the database content in the last 18 months. For examples, in many cases, the legacy screen displayed only the user specified code value. To make the system move intuitive we have tried to translate all codes and as a normal display with both the code and its description. Additional data elements (rows) were added to the image database to carry the descriptive info.

Design and Development



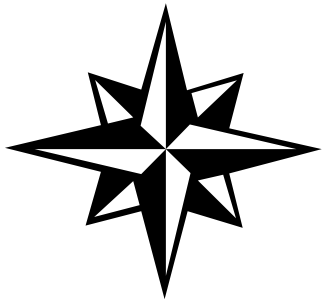
This also effects the QUIZ conversion effort. The QUIZ reports contained a number of hard-coded application code value-description conversion tables. These tables are not being perpetuated in the WebFocus report development effort. Rather the WebFocus reports are being developed to retrieve the code's descriptions based on the improved database model. Basically addressing poor business and economic decisions of years gone by.

Design and Development



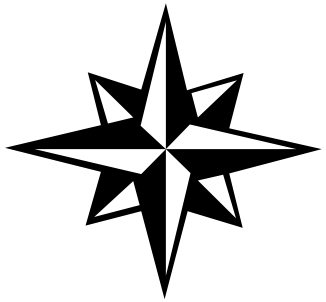
TRAINING and IN CORPORATING USER FEEDBACK!!! The process is the most under-estimated activity of any project. We recognized this need up front and have provide for improving training efforts and communicating with all clients that use the systems.

Design and Development



Challenges of running two applications (Legacy and reengineered Version) against the same production database. Luckily the Legacy system exclusively used IMAGE Item-Level-Locking so we only had to deal with the issue of the legacy system holding locks across terminal-reads. These were limited in number but took time to resolve. The larger challenge has been that when a transaction error was reported we did not necessarily know where to start our investigation. Green-Screen or GUI.

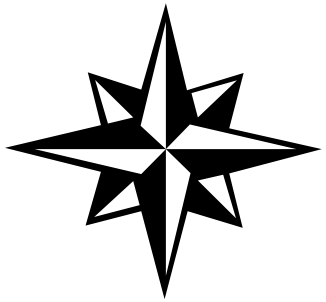
Design and Development



We envision the actual systems migration will require an additional Thirty-Six man-months. Most of which we be incurred in the data normalization and Extract, Transform, Load (ETL) process.

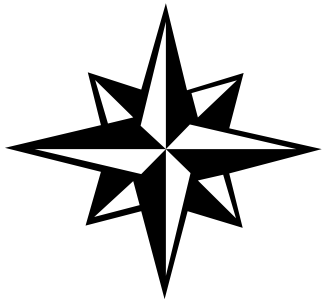
Develop Reporting database and OLAP support Data-Warehouse. The need to address historical information for reports. This does not include the Quiz to WebFocus redevelopment effort. In all probability this will be the critical path in the overall migration.

Design and Development



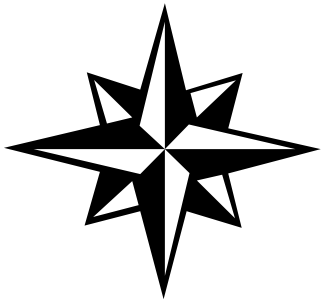
Integrate with other business systems. We added links to Harris County Appraisal District (HCAD) site for tax information and link to the Planning and Development MetaMap system for GIS map information. Soon we will integrate to the City's GIS system.

Design and Development



AIRLINE a external Interactive Voice Response system. This NT based IVR system uses a custom API to communicate with e3000. The back-end COBOL was developed by the iTEAM. Presently, the IVR system provider does not need to be involved with this phase of the migration. Moving forward this external application will be redeveloped to meet the standard profile for the new ILMS environment.

Design and Development



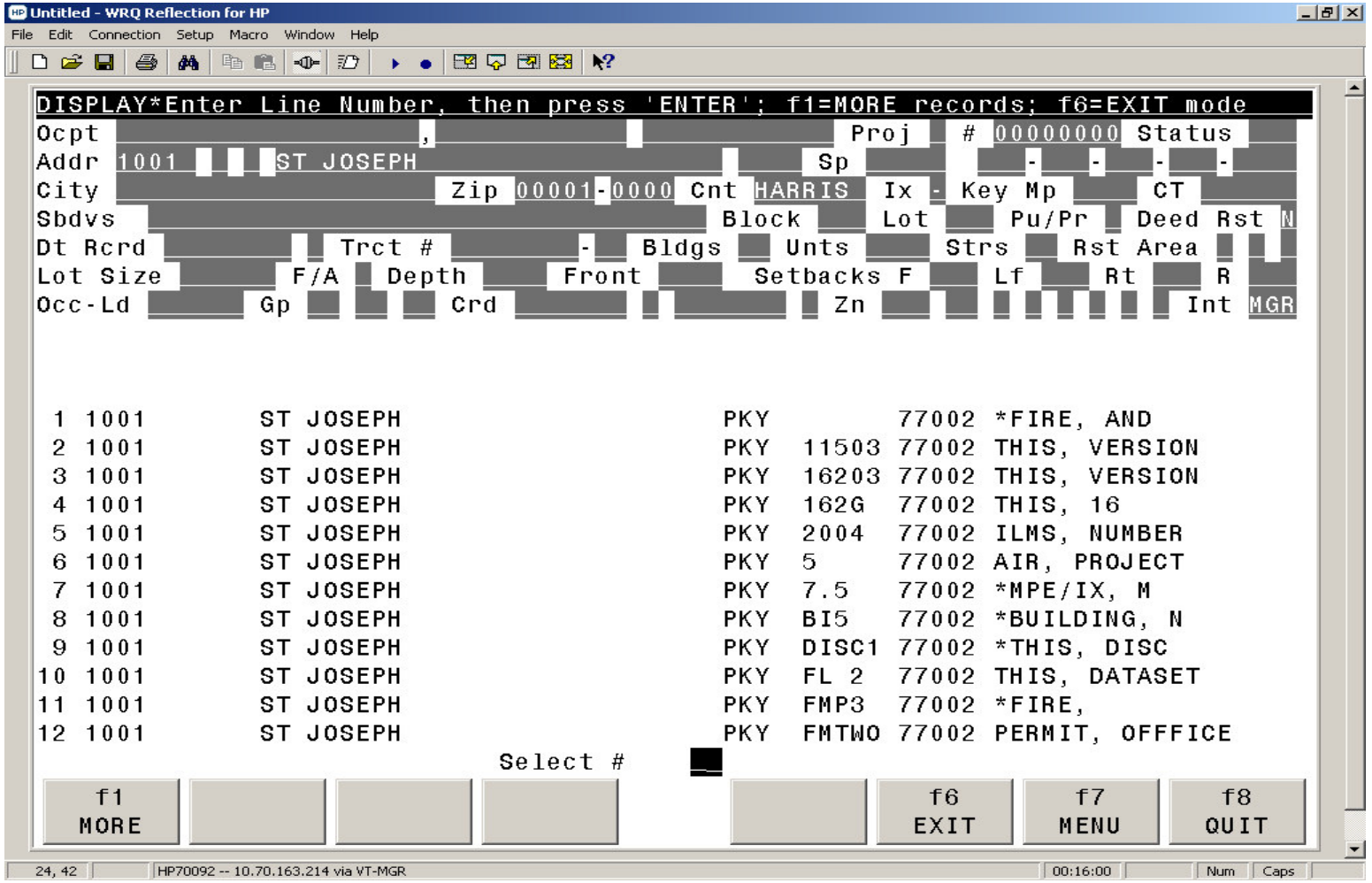
TeleWork a external Palm Based Field Data Collection System. Information is FTP'd from/to the Palm service provider and processed in batches on the e3000. We are currently reworking the e3000 COBOL program so that it is accessible via Middle-Tier server, which means the ftp process will be retired and Palm Service provider will issue near real-time XML request from his server to ours.

ILMS Enhance, Redeveloped Features

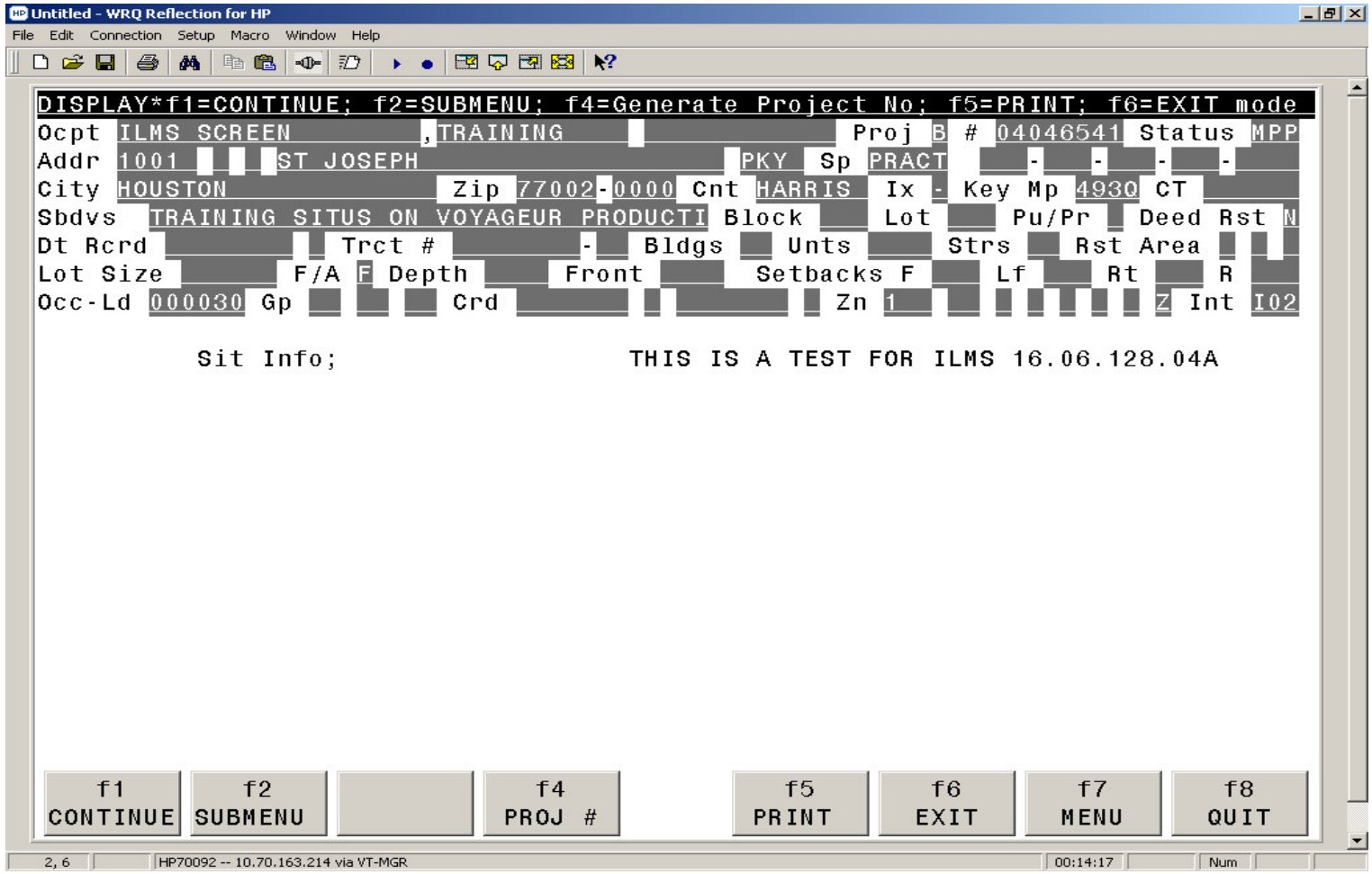
- Enhanced ability to deploy new features and modifications
- Links to Harris County Appraisal District (HCAD)
- Links to Planning + Development Mapping Service (MetaMap)
- New Developed Billing Systems
- Improved controls for Data Entry processing
- Improve integration of reporting applications
- Enhanced auditing features
- Enhanced security features

New ILMS Demonstration via Wireless Connection

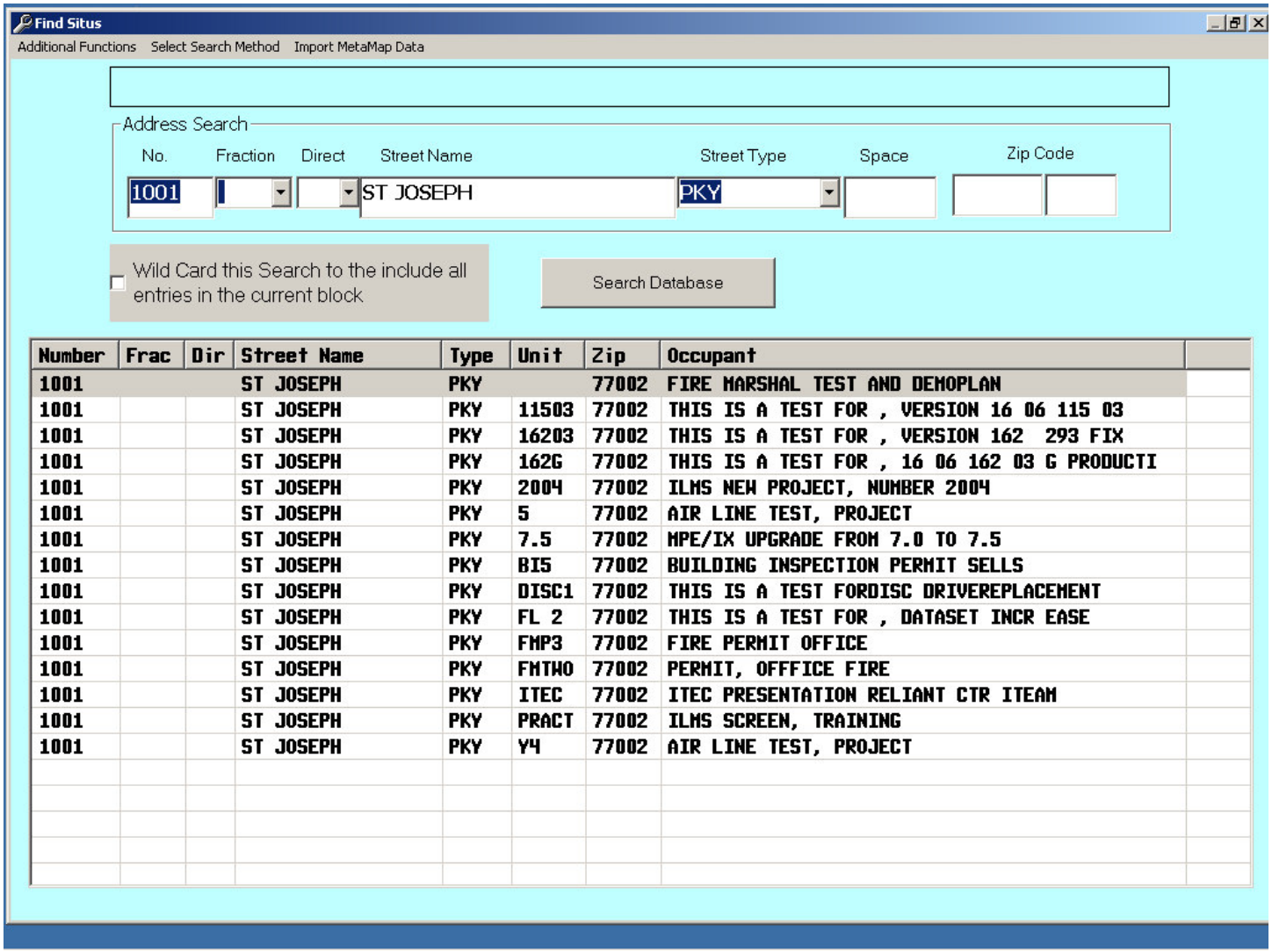
Street Search Classic ILMS



100 Screen Classic ILMS

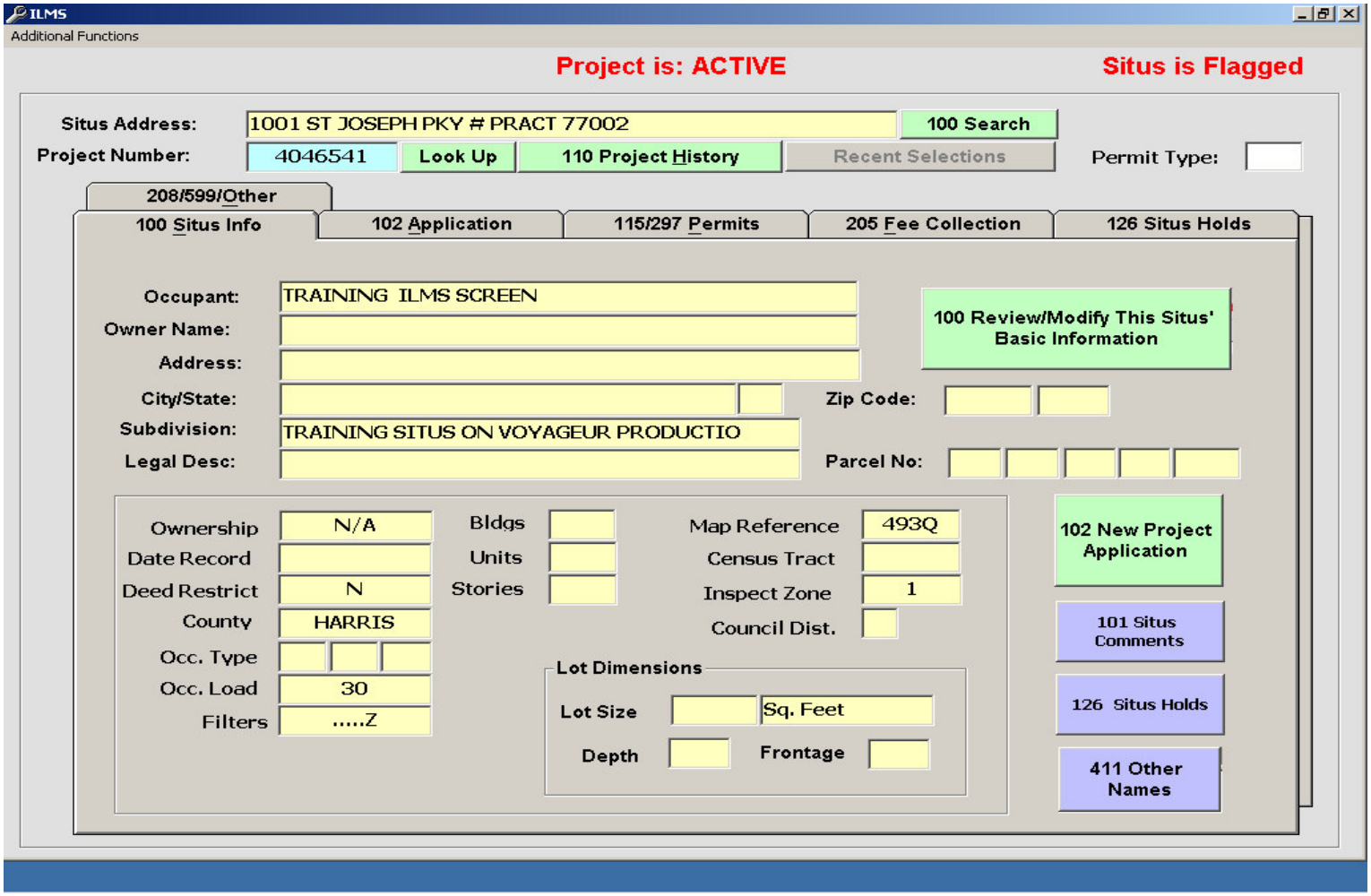


ILMS Street Search

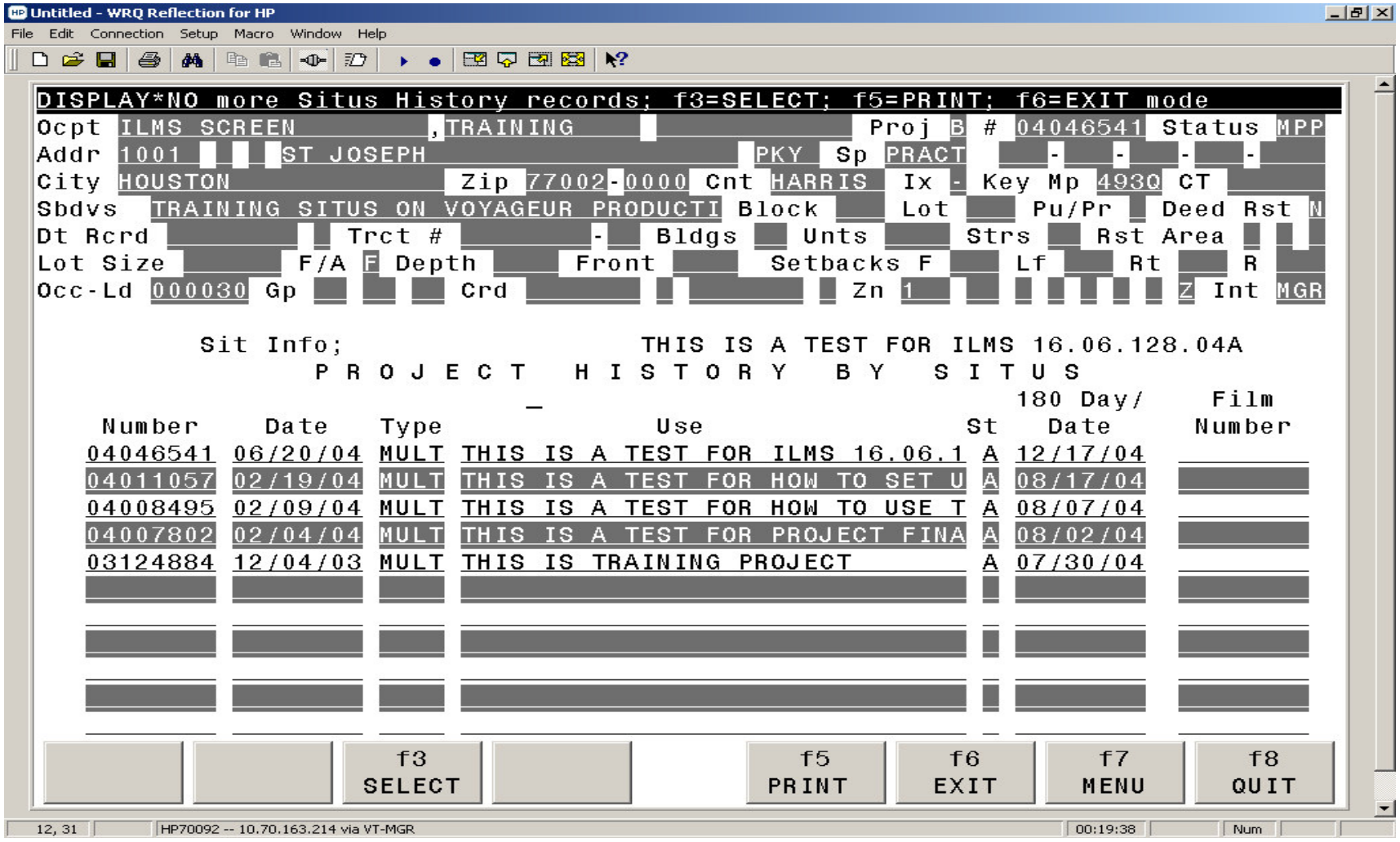


Number	Frac	Dir	Street Name	Type	Unit	Zip	Occupant
1001			ST JOSEPH	PKY		77002	FIRE MARSHAL TEST AND DEMOPLAN
1001			ST JOSEPH	PKY	11503	77002	THIS IS A TEST FOR , VERSION 16 06 115 03
1001			ST JOSEPH	PKY	16203	77002	THIS IS A TEST FOR , VERSION 162 293 FIX
1001			ST JOSEPH	PKY	162G	77002	THIS IS A TEST FOR , 16 06 162 03 G PRODUCTI
1001			ST JOSEPH	PKY	2004	77002	ILMS NEW PROJECT, NUMBER 2004
1001			ST JOSEPH	PKY	5	77002	AIR LINE TEST, PROJECT
1001			ST JOSEPH	PKY	7.5	77002	MPE/IX UPGRADE FROM 7.0 TO 7.5
1001			ST JOSEPH	PKY	BI5	77002	BUILDING INSPECTION PERMIT SELLS
1001			ST JOSEPH	PKY	DISC1	77002	THIS IS A TEST FORDISC DRIVEREPLACEMENT
1001			ST JOSEPH	PKY	FL 2	77002	THIS IS A TEST FOR , DATASET INCR EASE
1001			ST JOSEPH	PKY	FMP3	77002	FIRE PERMIT OFFICE
1001			ST JOSEPH	PKY	FMTWO	77002	PERMIT, OFFFICE FIRE
1001			ST JOSEPH	PKY	ITEC	77002	ITEC PRESENTATION RELIANT CTR ITEAM
1001			ST JOSEPH	PKY	PRACT	77002	ILMS SCREEN, TRAINING
1001			ST JOSEPH	PKY	Y4	77002	AIR LINE TEST, PROJECT

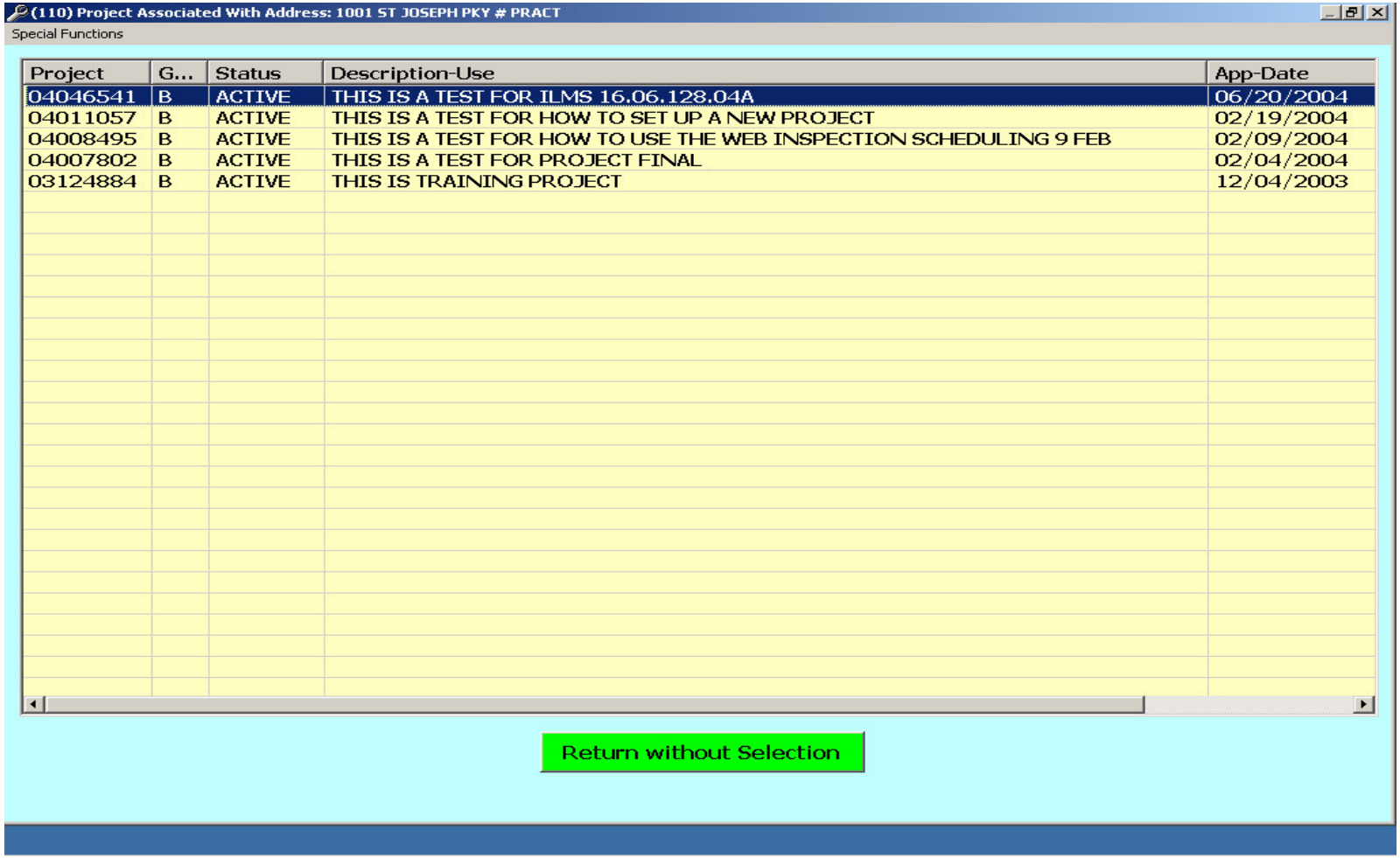
ILMS Situs


ILMS
Additional Functions
Project is: ACTIVE
Situs is Flagged
Situs Address:
1001 ST JOSEPH PKY # PRACT 77002
100 Search
Project Number:
4046541
Look Up
110 Project History
Recent Selections
Permit Type:
208/599/Other
100 Situs Info
102 Application
115/297 Permits
205 Fee Collection
126 Situs Holds
Occupant:
TRAINING ILMS SCREEN
Owner Name:
Address:
City/State:
Zip Code:
Subdivision:
TRAINING SITUS ON VOYAGEUR PRODUCTIO
Legal Desc:
Parcel No:
100 Review/Modify This Situs' Basic Information
Ownership
N/A
Date Record
Deed Restrict
N
County
HARRIS
Occ. Type
Occ. Load
30
Filters
.....Z
Bldgs
Units
Stories
Map Reference
493Q
Census Tract
Inspect Zone
1
Council Dist.
Lot Dimensions
Lot Size
Sq. Feet
Depth
Frontage
102 New Project Application
101 Situs Comments
126 Situs Holds
411 Other Names

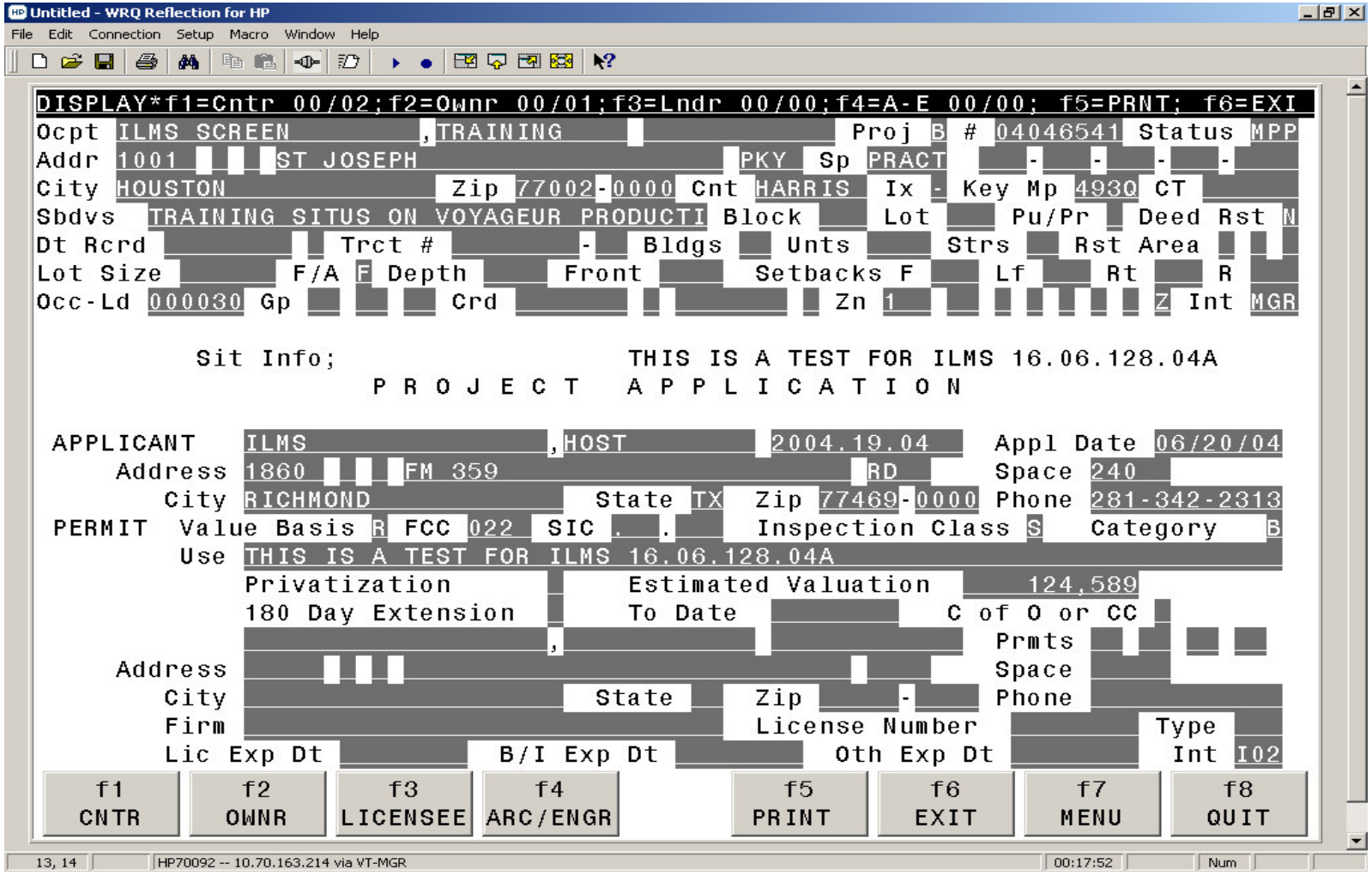
110 Screen Classic ILMS



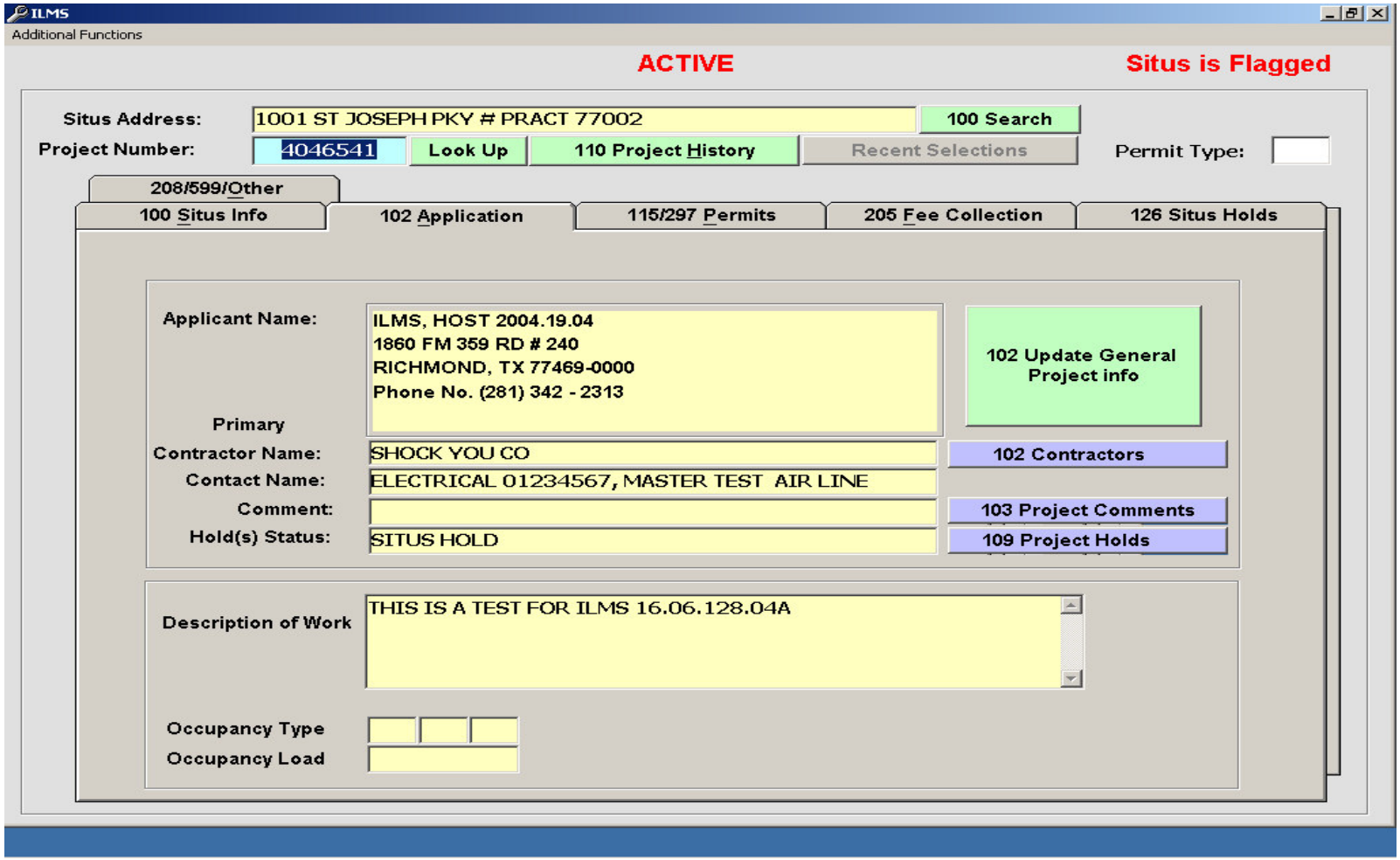
ILMS Project History Screen



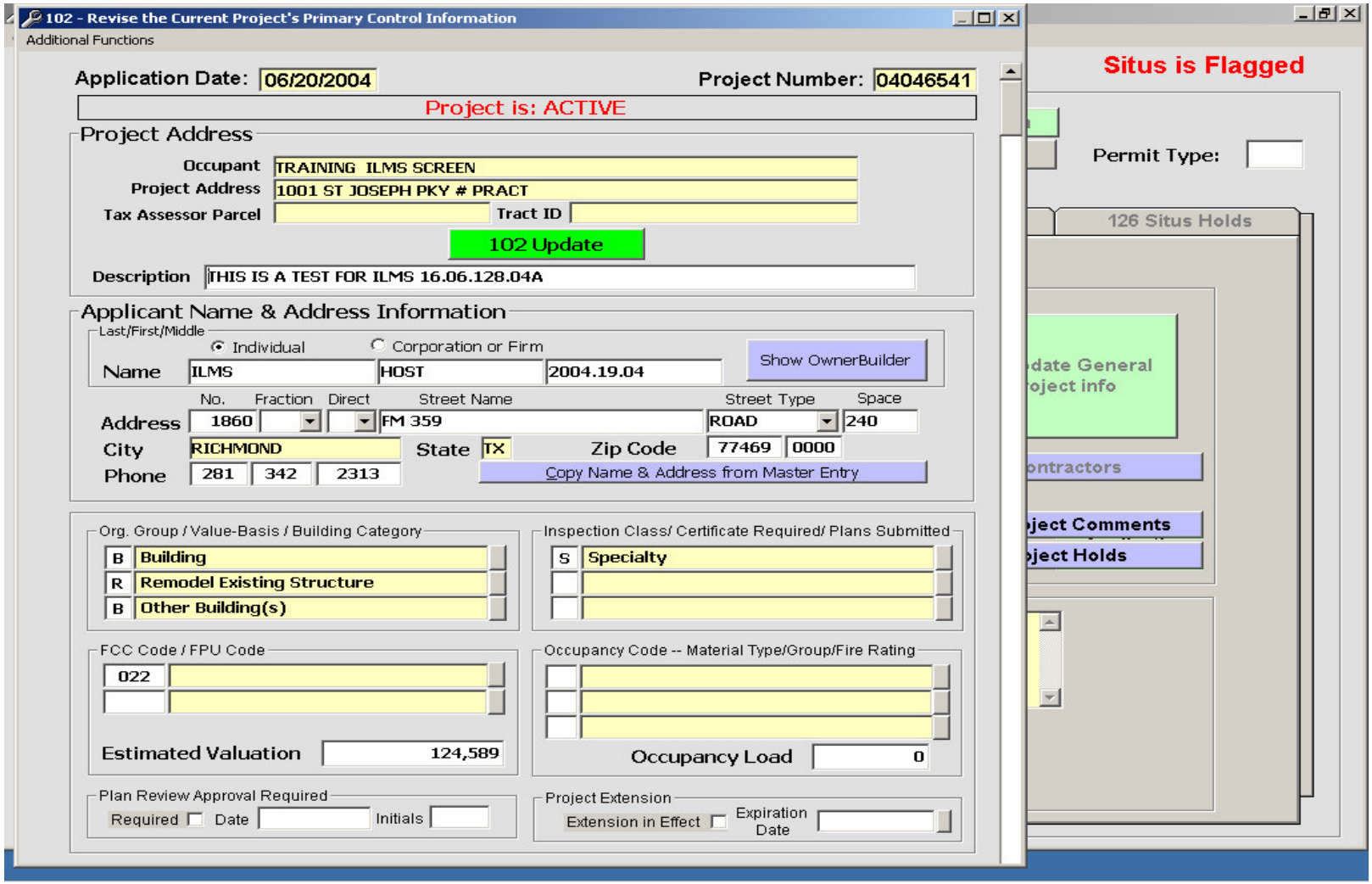
102 Screen Classic ILMS



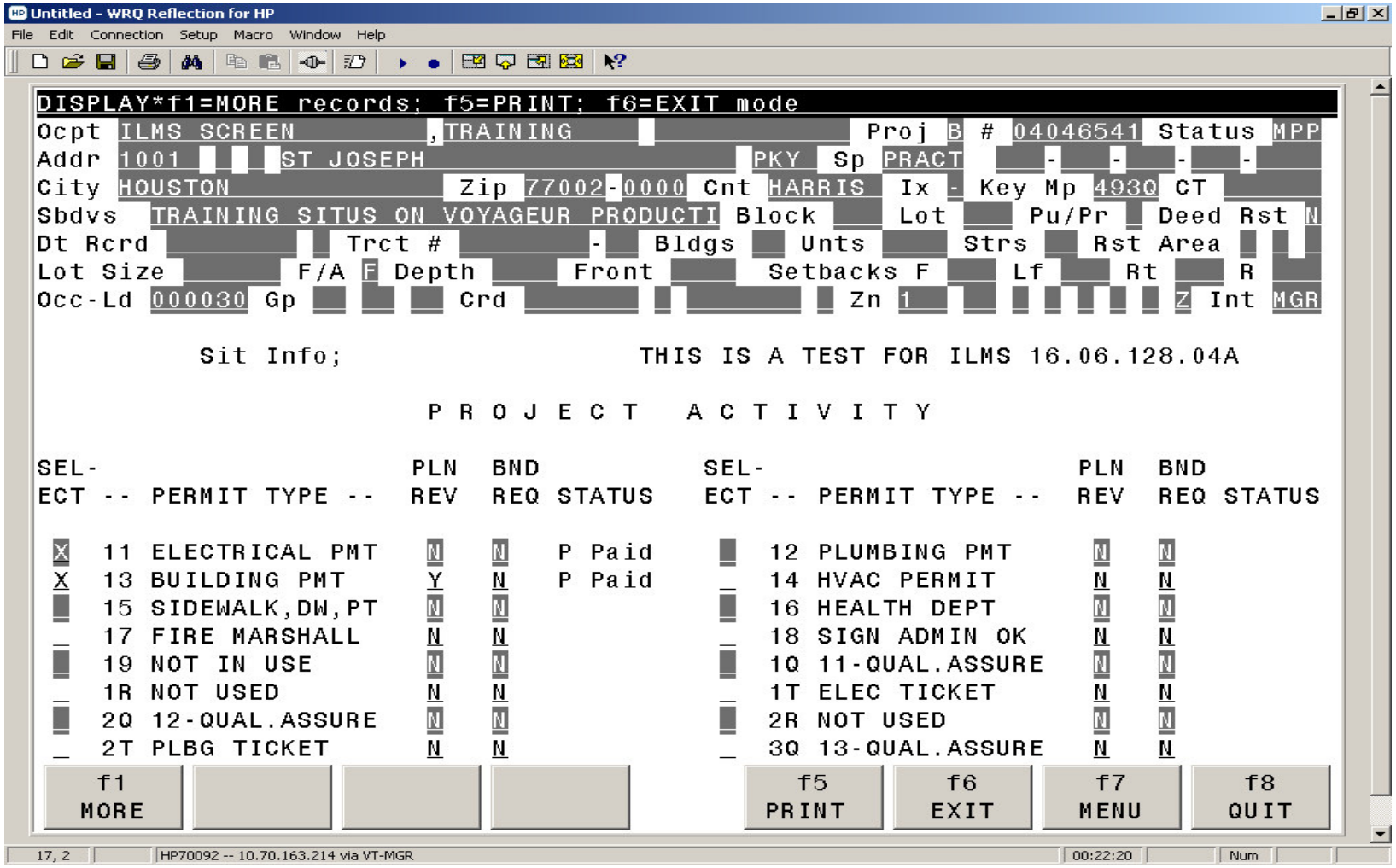
ILMS Project Application



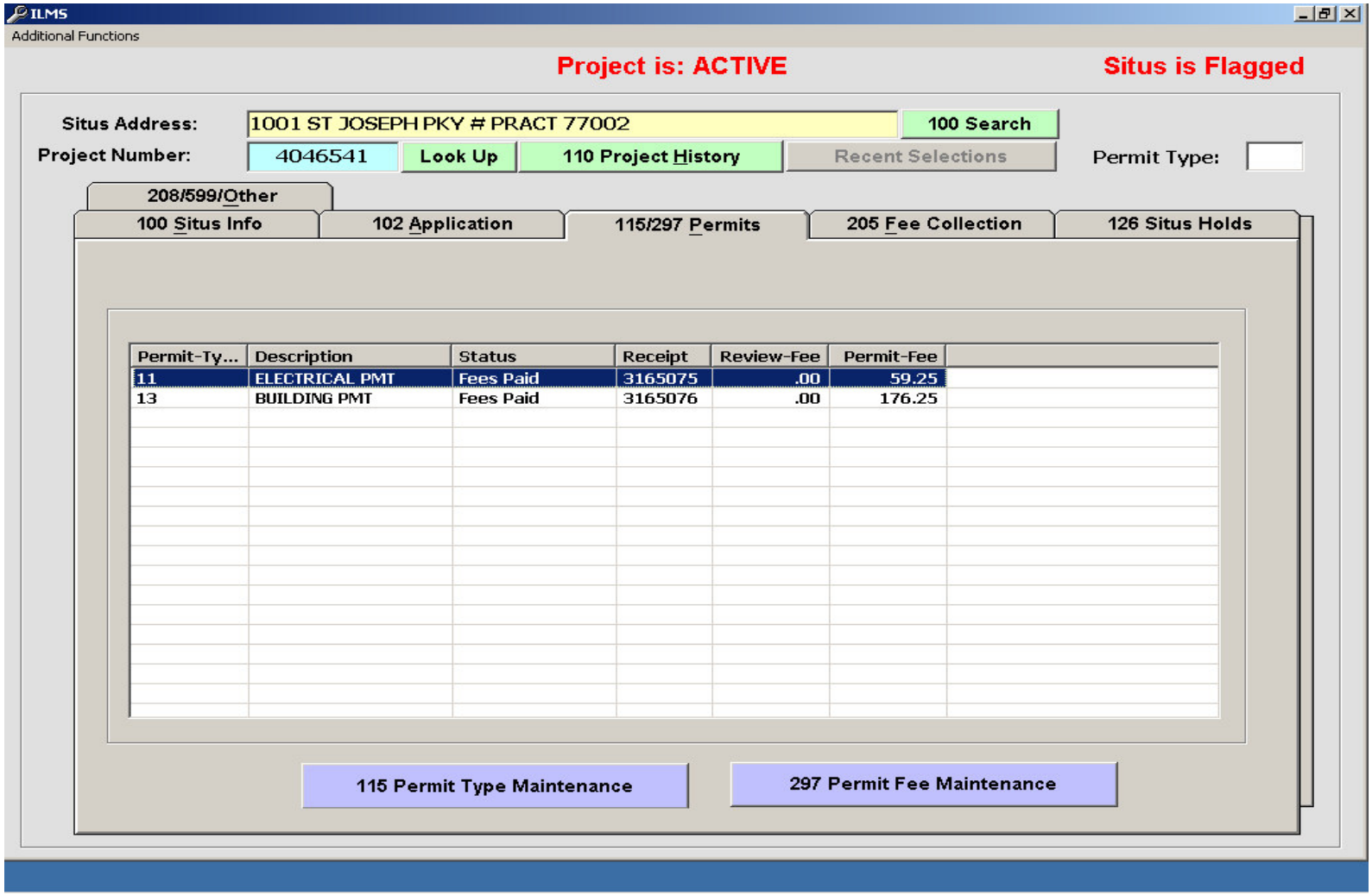
ILMS Project Application (Details)



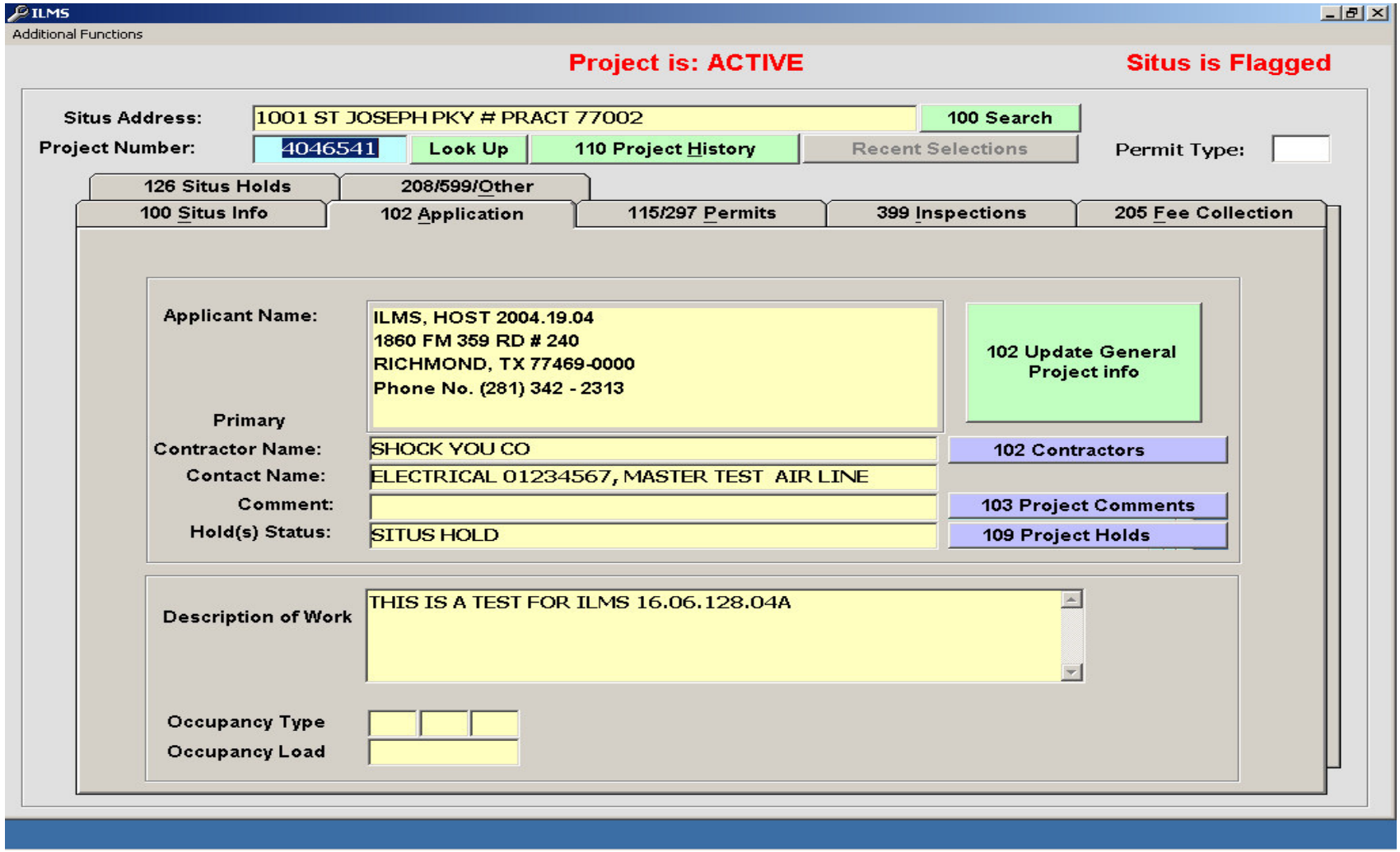
115A Screen Classis ILMS



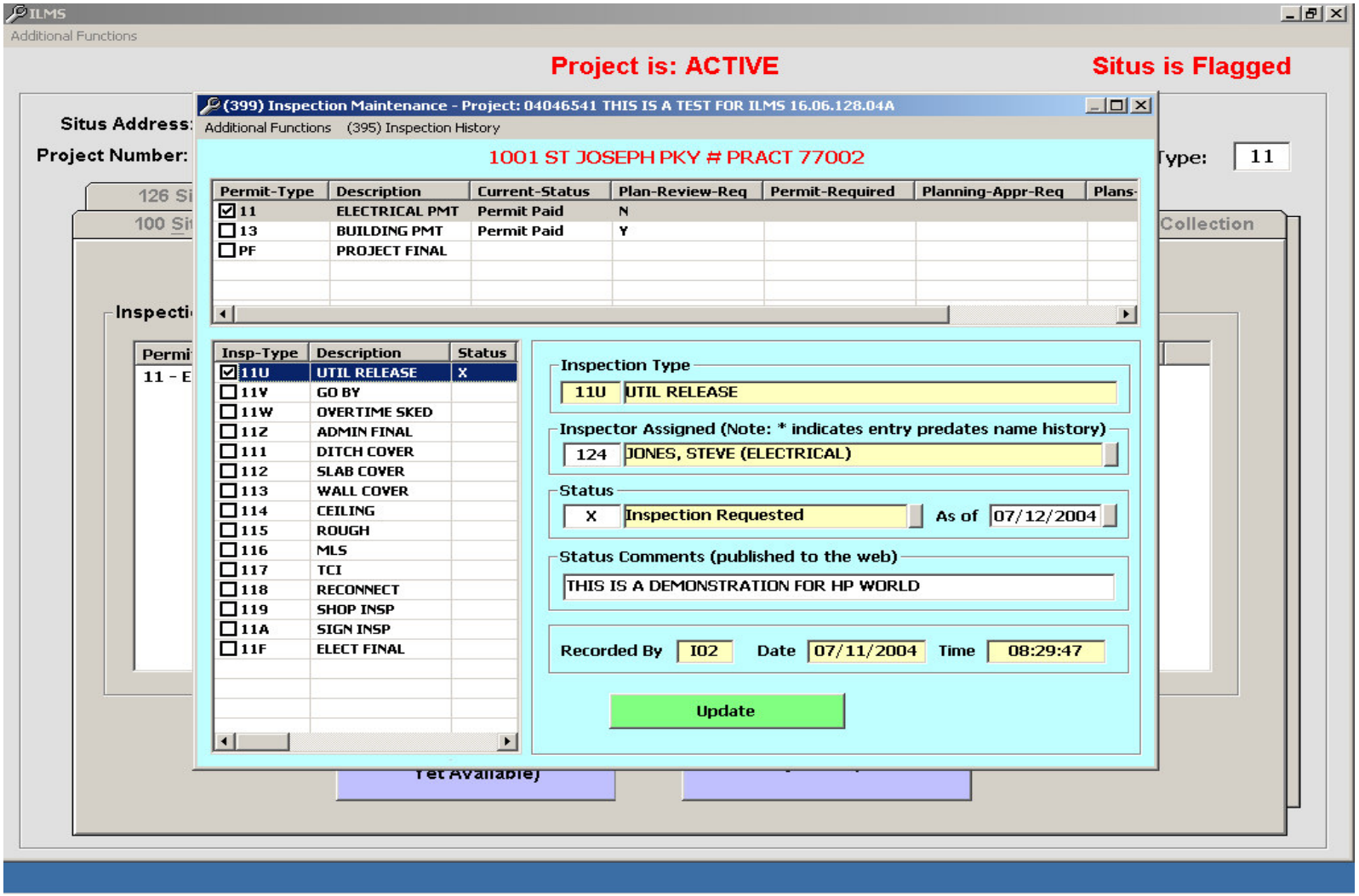
ILMS Permits



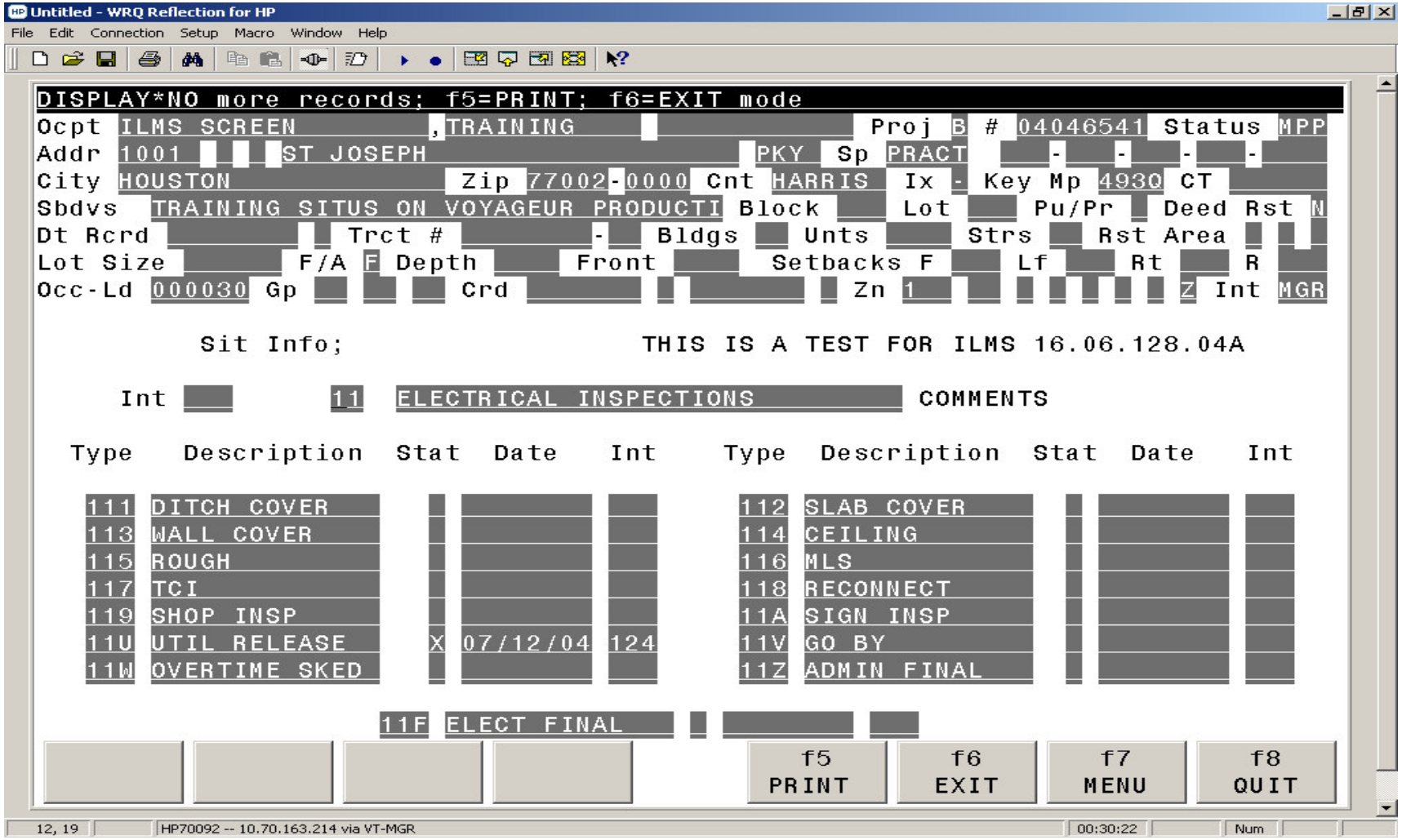
ILMS Main View



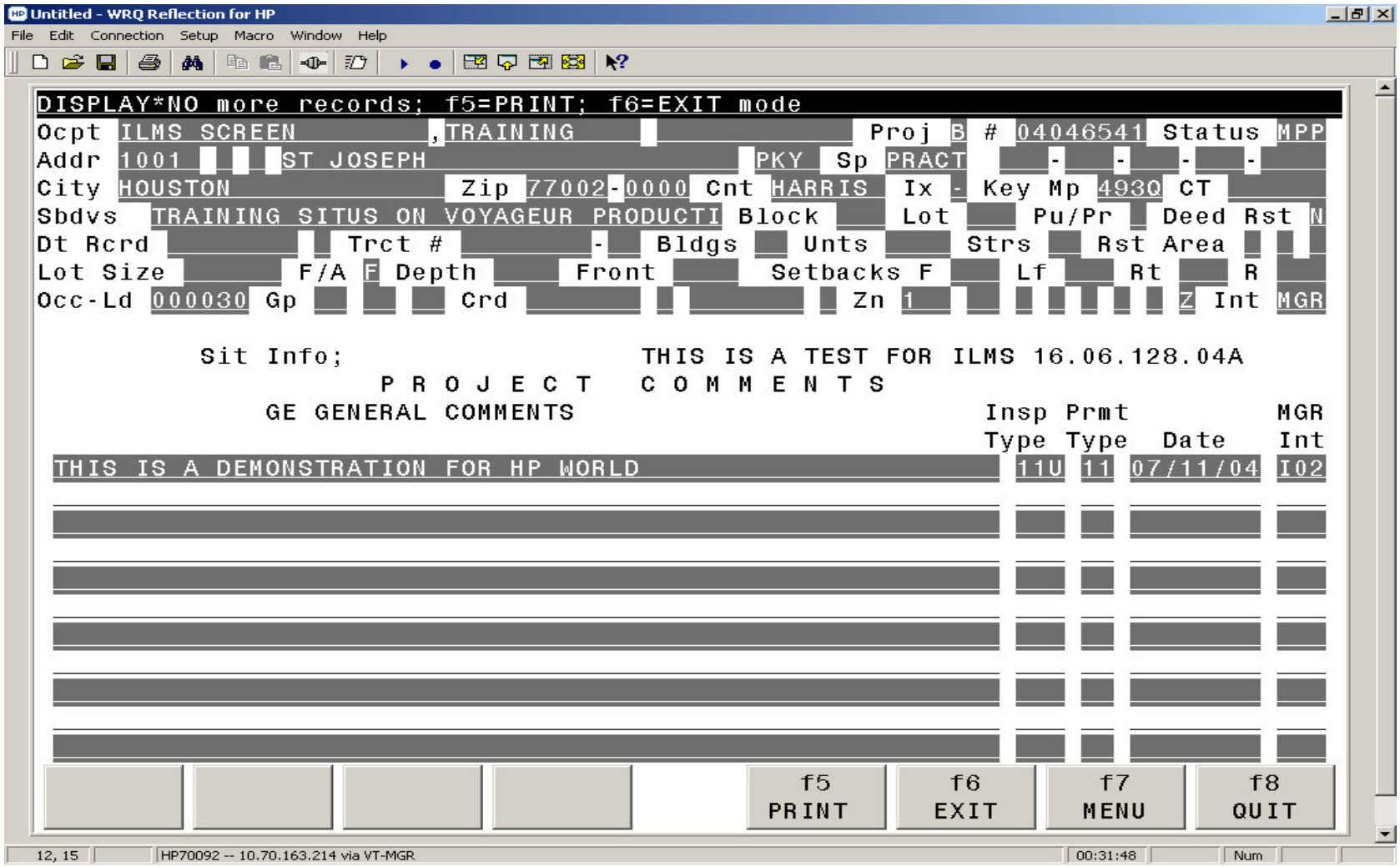
ILMS Inspection



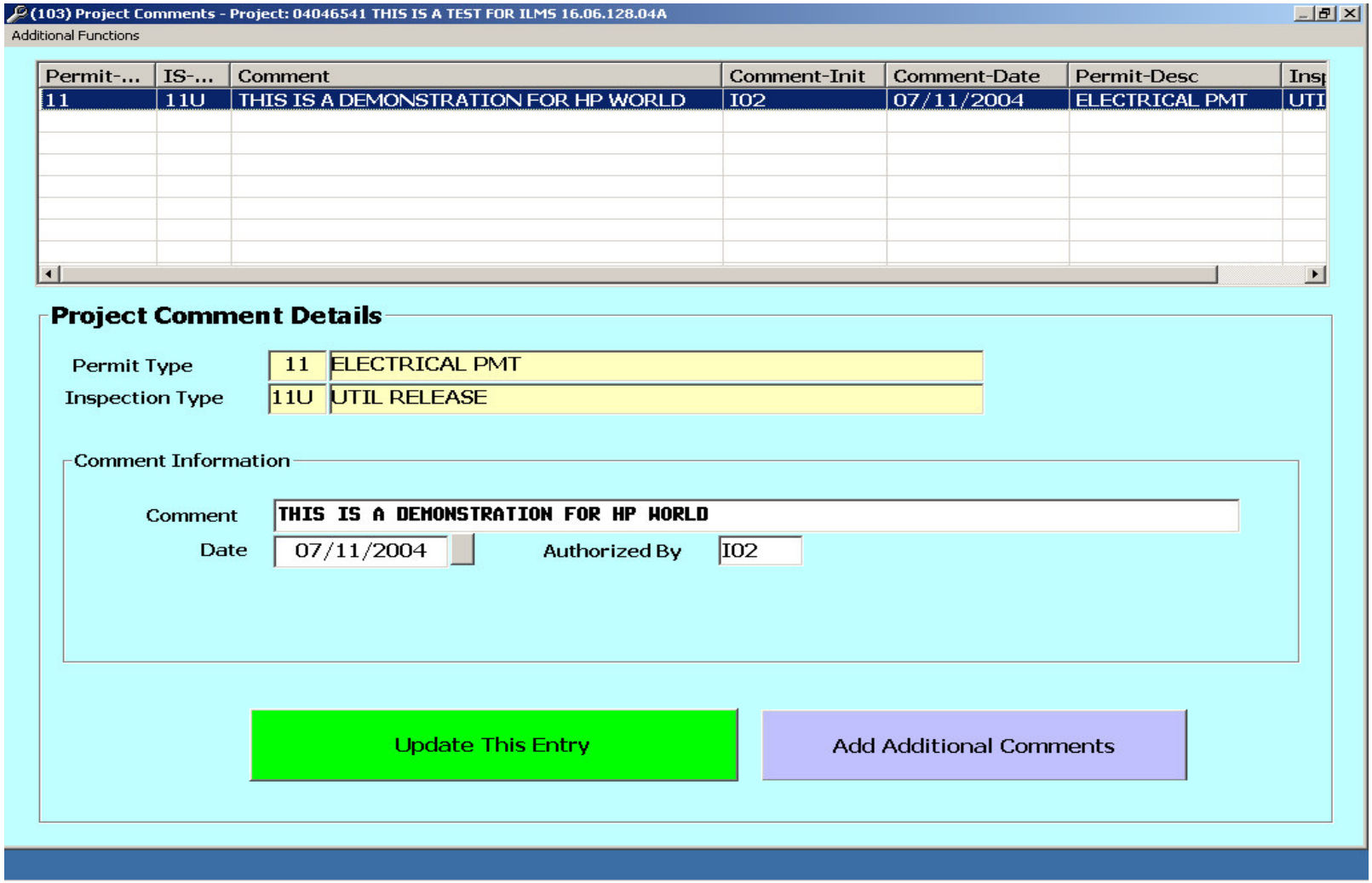
399 Screen Classic ILMS



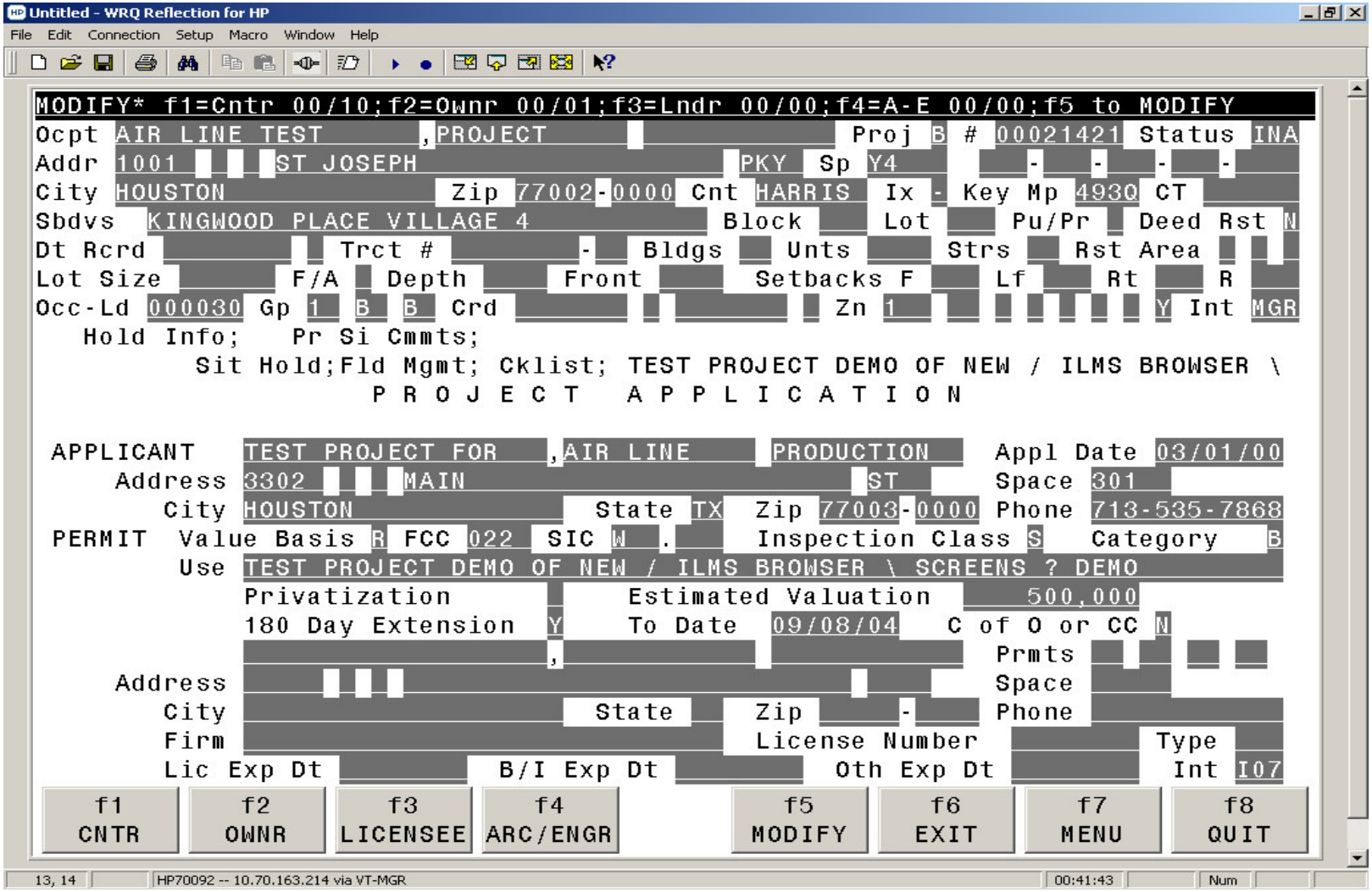
103 Screen Classic ILMS



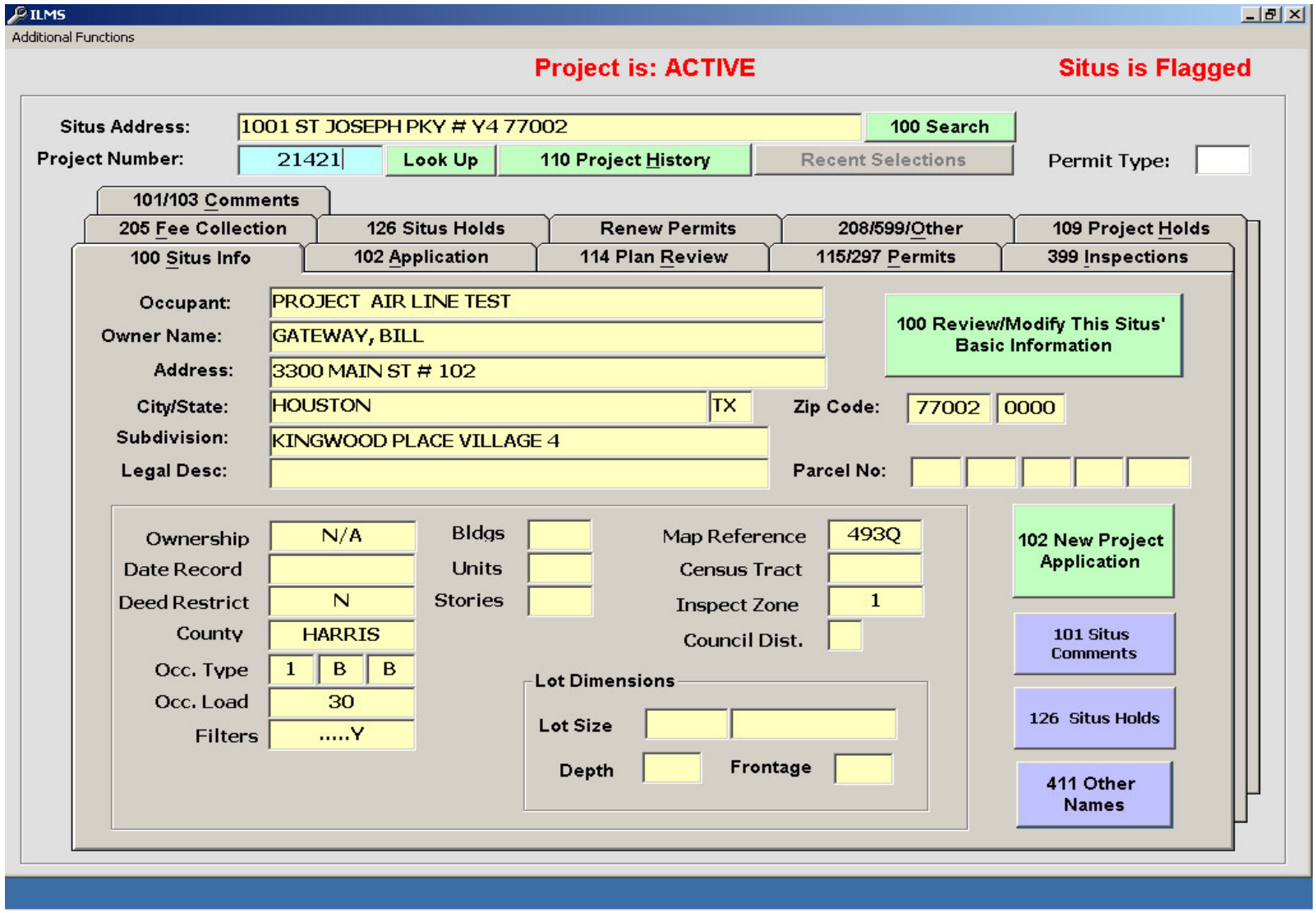
ILMS Comment



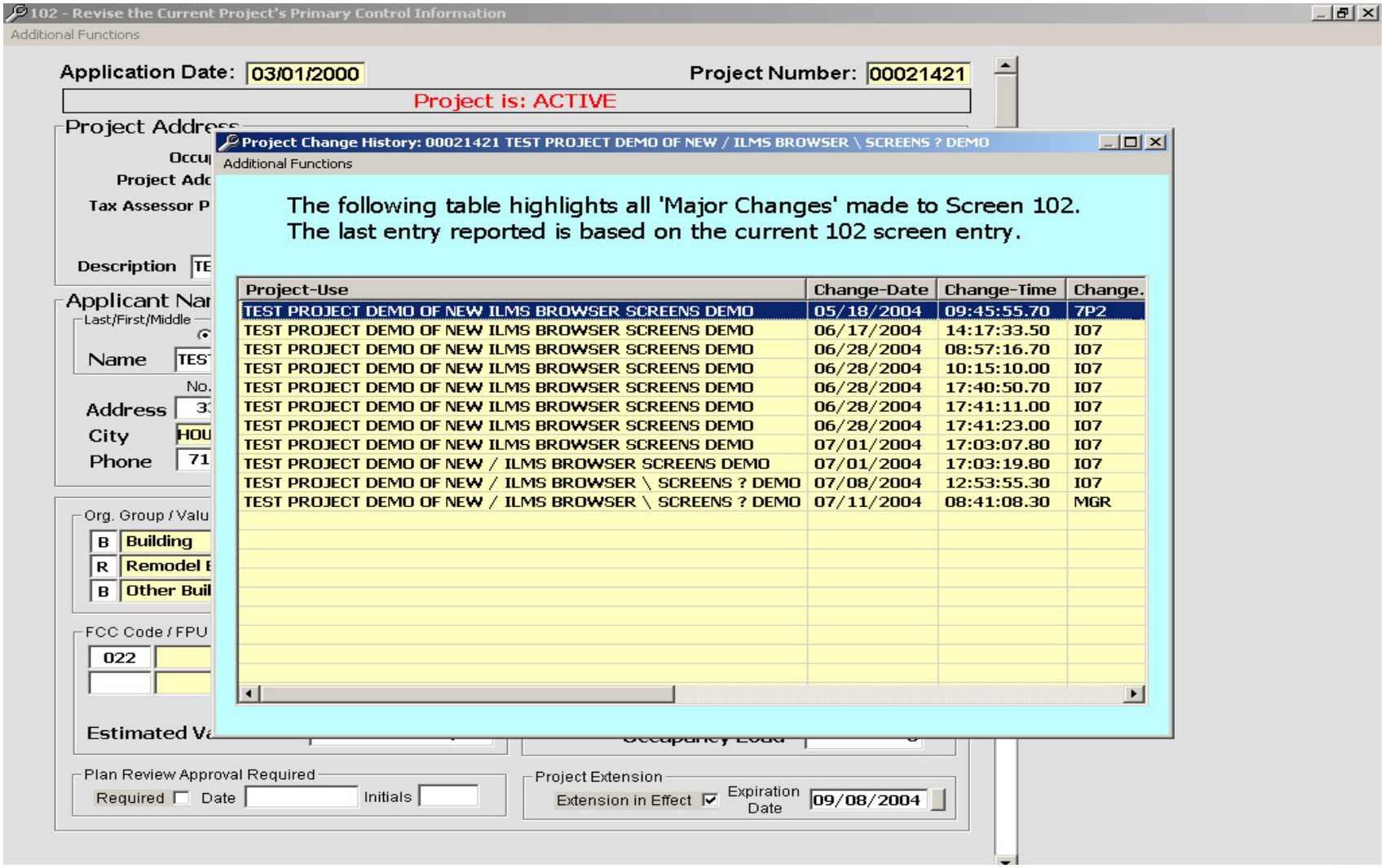
100/102 Screen Classic ILMS



ILMS Situs

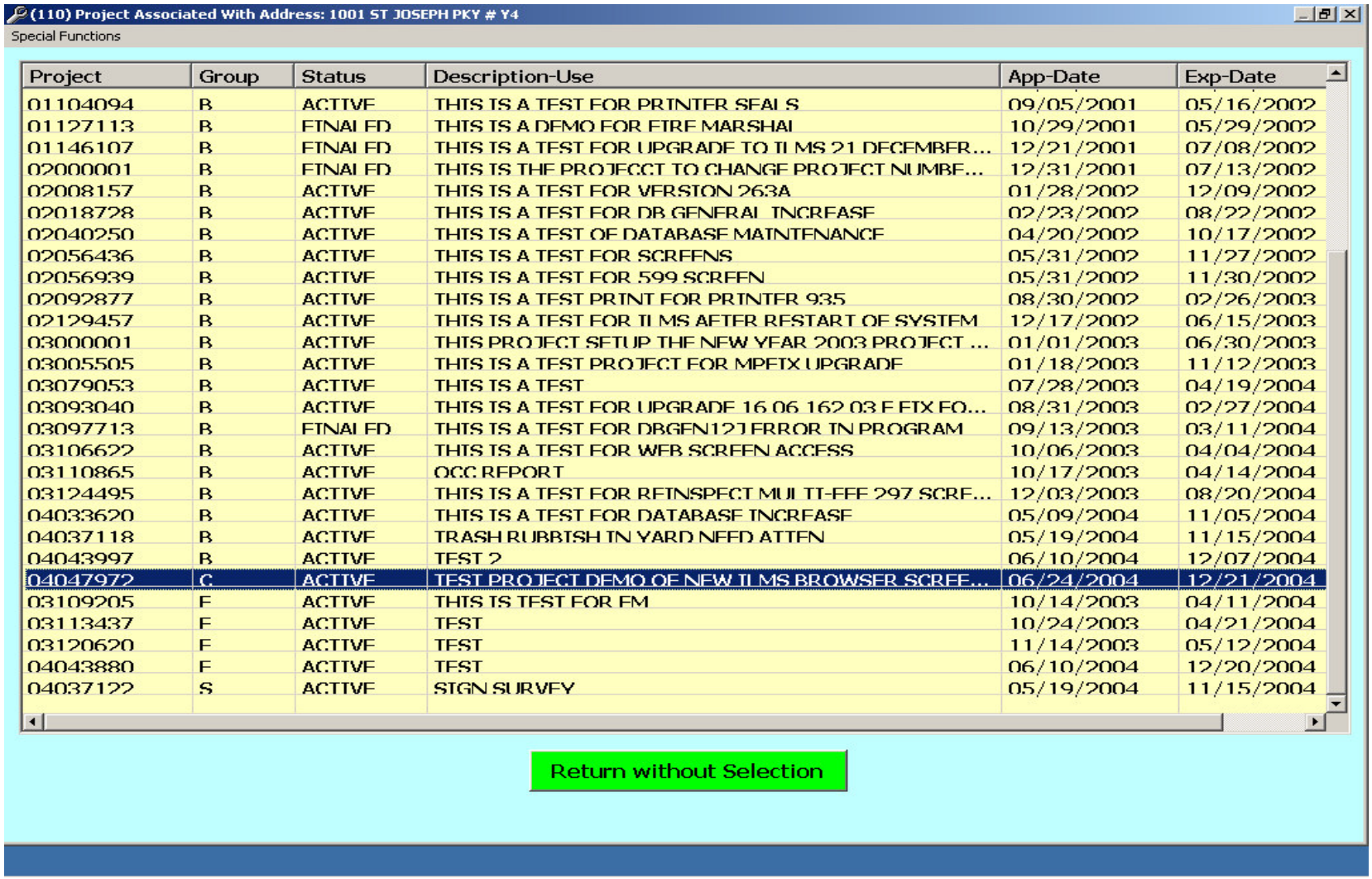

ILMS
Additional Functions
Project is: ACTIVE
Situs is Flagged
Situs Address:
1001 ST JOSEPH PKY # Y4 77002
100 Search
Project Number:
21421
Look Up
110 Project History
Recent Selections
Permit Type:
101/103 Comments
205 Fee Collection
126 Situs Holds
Renew Permits
208/599/Other
109 Project Holds
100 Situs Info
102 Application
114 Plan Review
115/297 Permits
399 Inspections
Occupant:
PROJECT AIR LINE TEST
Owner Name:
GATEWAY, BILL
Address:
3300 MAIN ST # 102
City/State:
HOUSTON
TX
Zip Code:
77002
0000
Subdivision:
KINGWOOD PLACE VILLAGE 4
Legal Desc:
Parcel No:
100 Review/Modify This Situs' Basic Information
Ownership
N/A
Date Record
Deed Restrict
N
County
HARRIS
Occ. Type
1
B
B
Occ. Load
30
Filters
.....Y
Bldgs
Units
Stories
Map Reference
493Q
Census Tract
Inspect Zone
1
Council Dist.
Lot Dimensions
Lot Size
Depth
Frontage
102 New Project Application
101 Situs Comments
126 Situs Holds
411 Other Names

ILMS Use Line Revised History (New Feature)



Project-Use	Change-Date	Change-Time	Change.
TEST PROJECT DEMO OF NEW ILMS BROWSER SCREENS DEMO	05/18/2004	09:45:55.70	7P2
TEST PROJECT DEMO OF NEW ILMS BROWSER SCREENS DEMO	06/17/2004	14:17:33.50	I07
TEST PROJECT DEMO OF NEW ILMS BROWSER SCREENS DEMO	06/28/2004	08:57:16.70	I07
TEST PROJECT DEMO OF NEW ILMS BROWSER SCREENS DEMO	06/28/2004	10:15:10.00	I07
TEST PROJECT DEMO OF NEW ILMS BROWSER SCREENS DEMO	06/28/2004	17:40:50.70	I07
TEST PROJECT DEMO OF NEW ILMS BROWSER SCREENS DEMO	06/28/2004	17:41:11.00	I07
TEST PROJECT DEMO OF NEW ILMS BROWSER SCREENS DEMO	06/28/2004	17:41:23.00	I07
TEST PROJECT DEMO OF NEW ILMS BROWSER SCREENS DEMO	07/01/2004	17:03:07.80	I07
TEST PROJECT DEMO OF NEW / ILMS BROWSER SCREENS DEMO	07/01/2004	17:03:19.80	I07
TEST PROJECT DEMO OF NEW / ILMS BROWSER \ SCREENS ? DEMO	07/08/2004	12:53:55.30	I07
TEST PROJECT DEMO OF NEW / ILMS BROWSER \ SCREENS ? DEMO	07/11/2004	08:41:08.30	MGR

ILMS Project History (New Feature Sort Items)



Phase II Develop+Implement new Business Intelligence Reports Application

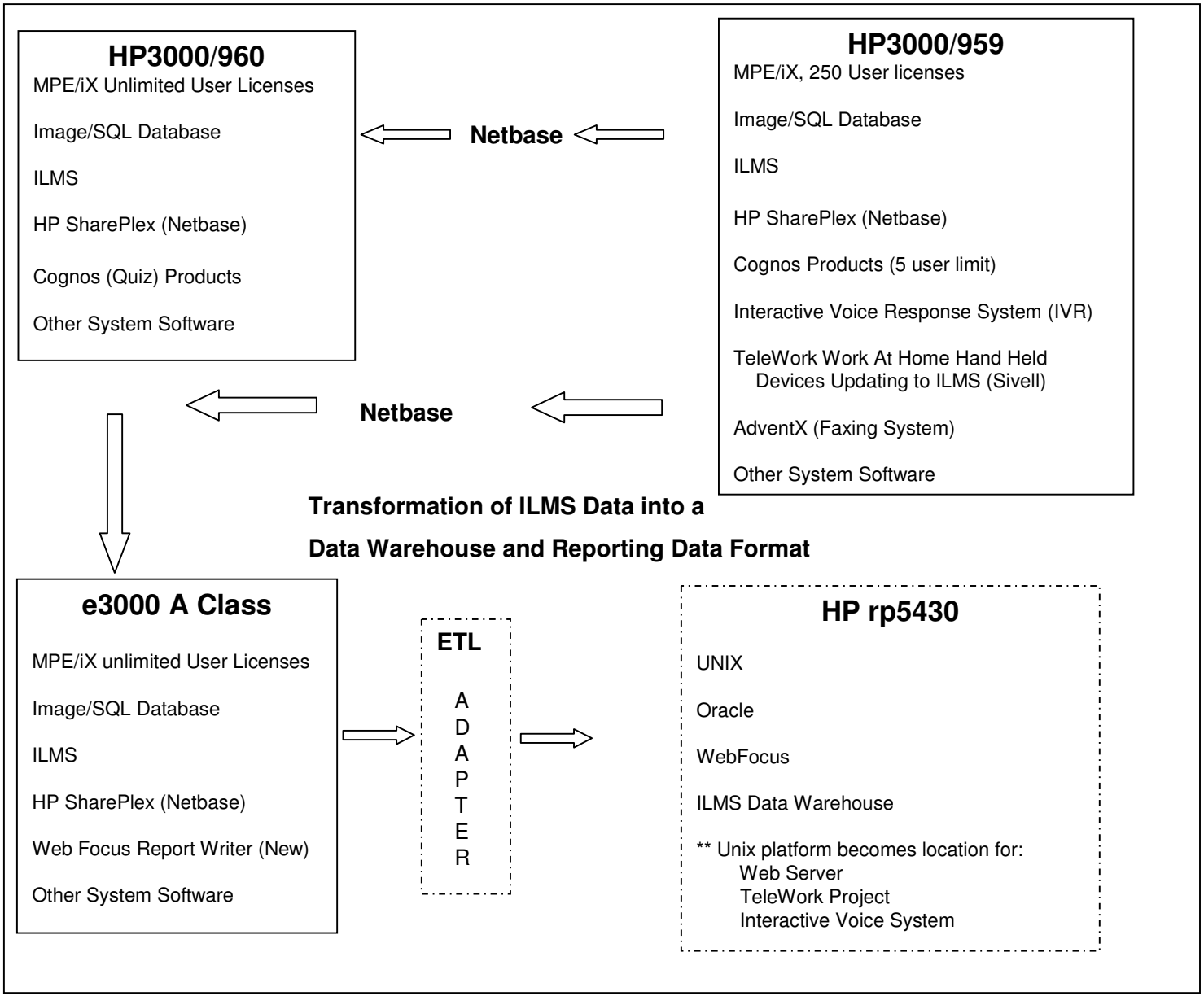
- Retire Powerhouse
- Implement WebFocus Reports
- Initiate Oracle Datamart
- Continue redevelopment of ILMS from classic MPE/iX to Multi-tier model

Phase II Develop+Implement new Business Intelligence Reports Application

Scope

- Install a HP rp5430Unix server
- Install Itanium server
- Replace terminal based Powerhouse Quiz Reports with Web Focus browser based Business Intelligence Reporting
- Develop a Data Warehouse in Oracle
- Incrementally update the Data Warehouse from current ILMS Image Database (Hierarchical structure)
- Continue ILMS transition to open environment

Phase II Browser Reports Generation

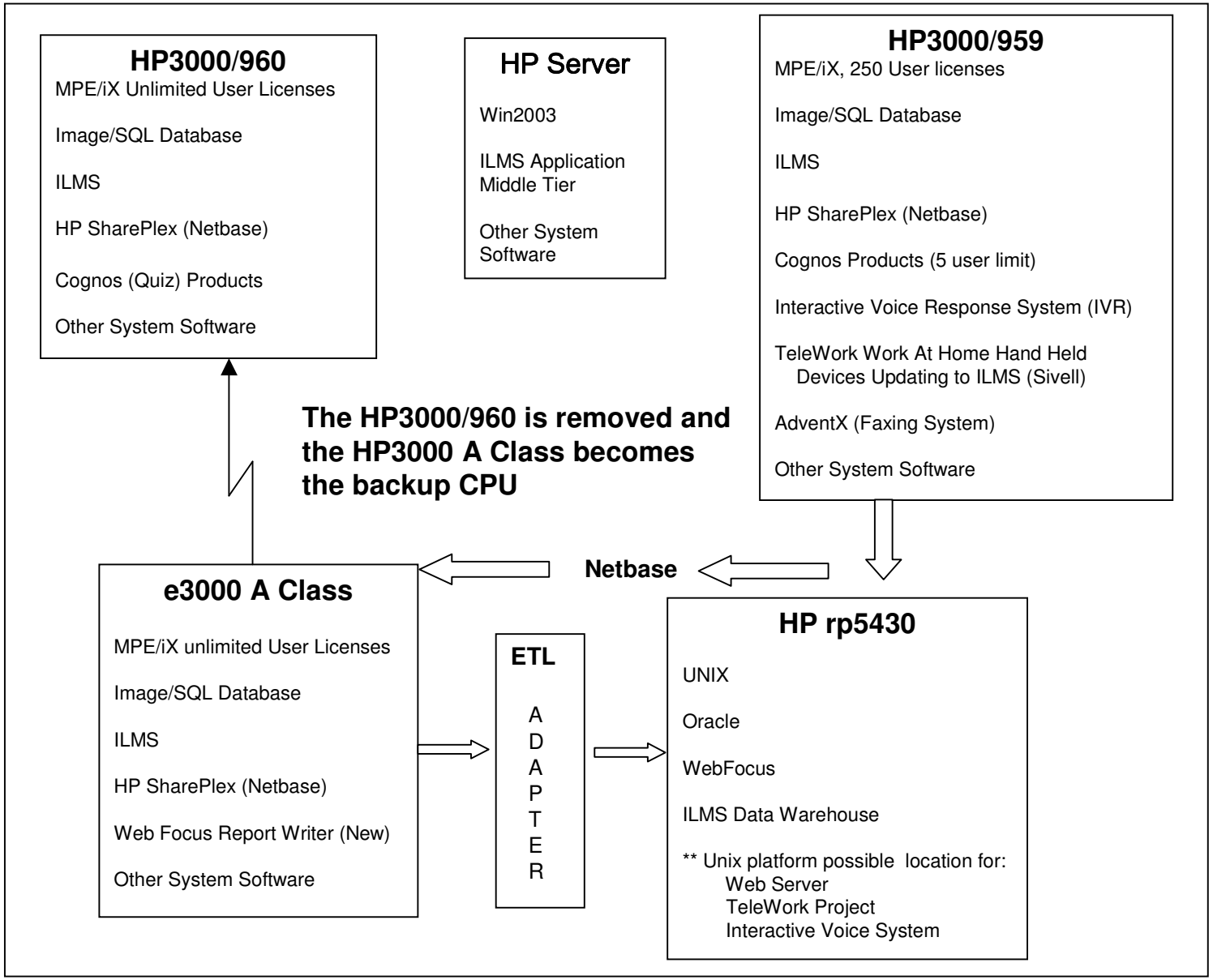


Phase III Sunset 9XX Servers

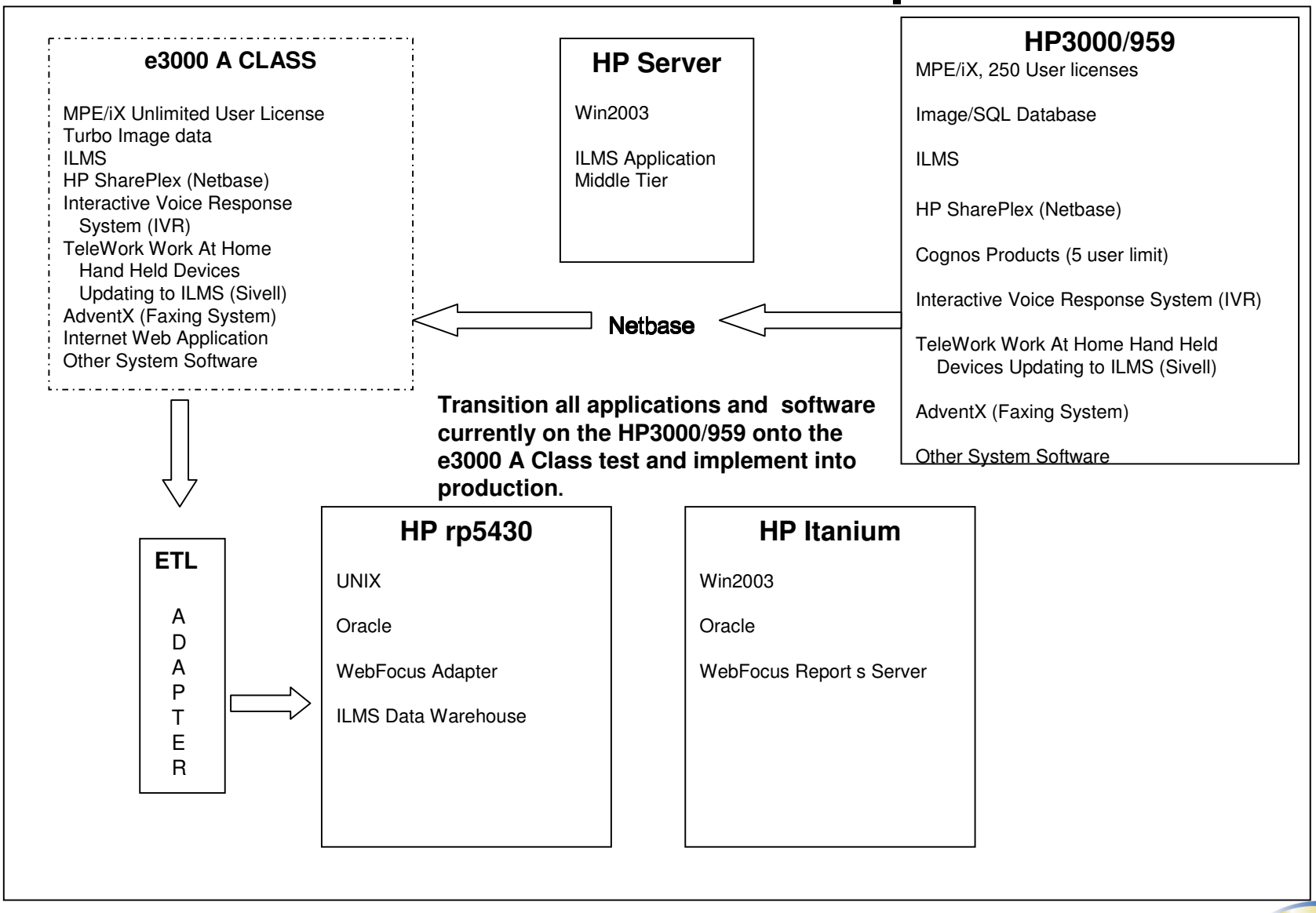
Scope

- Replace the HP3000/959 mainframe the primary ILMS application and database production server with a e3000 server
- Move TeleWork-(field inspection PDA application) and AIR line-(IVR) to e3000 server
- Begin the conversion from an image-hierarchical database management system to oracle-relational database management system

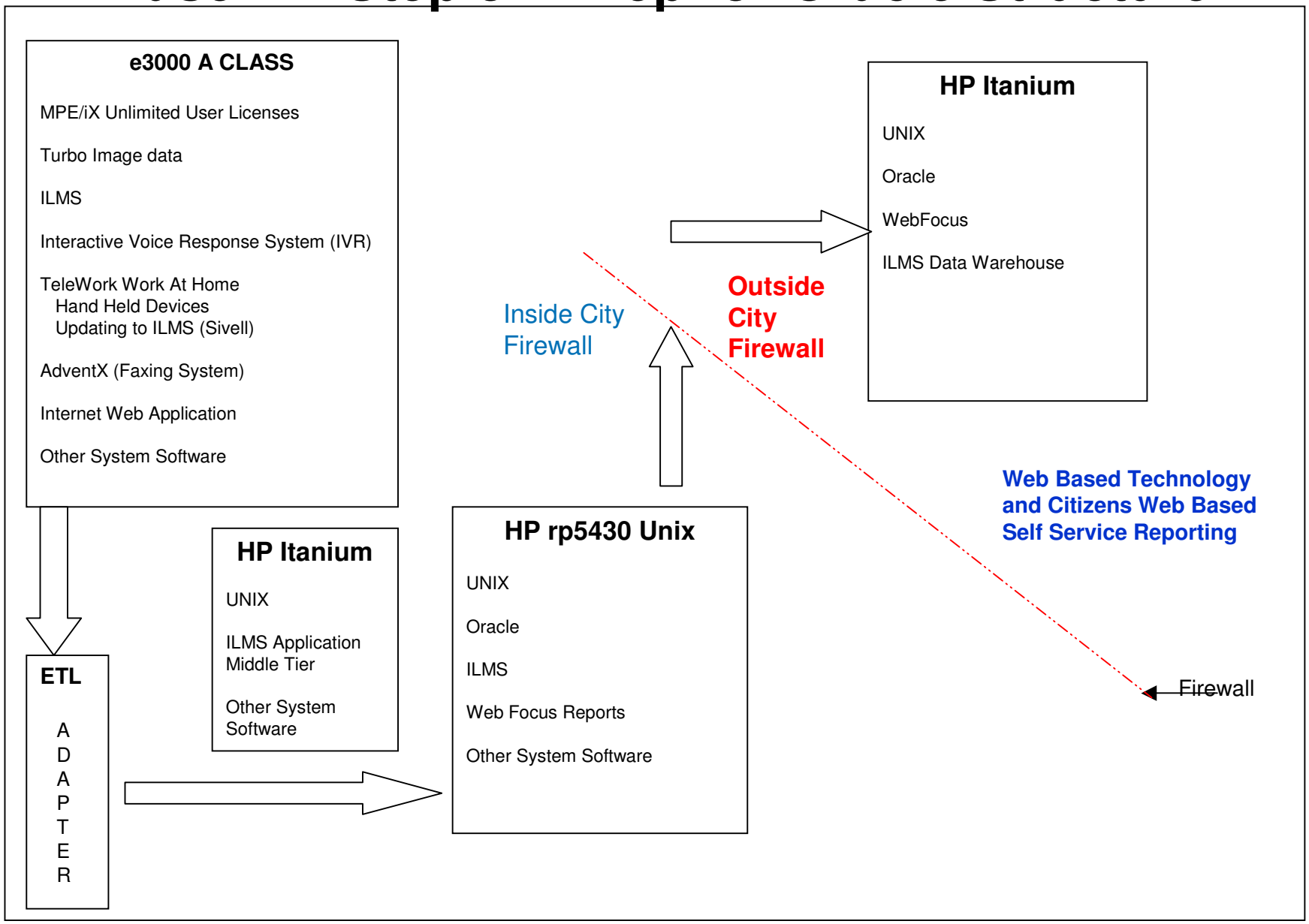
Phase III – Step 1



Phase III – Step 2



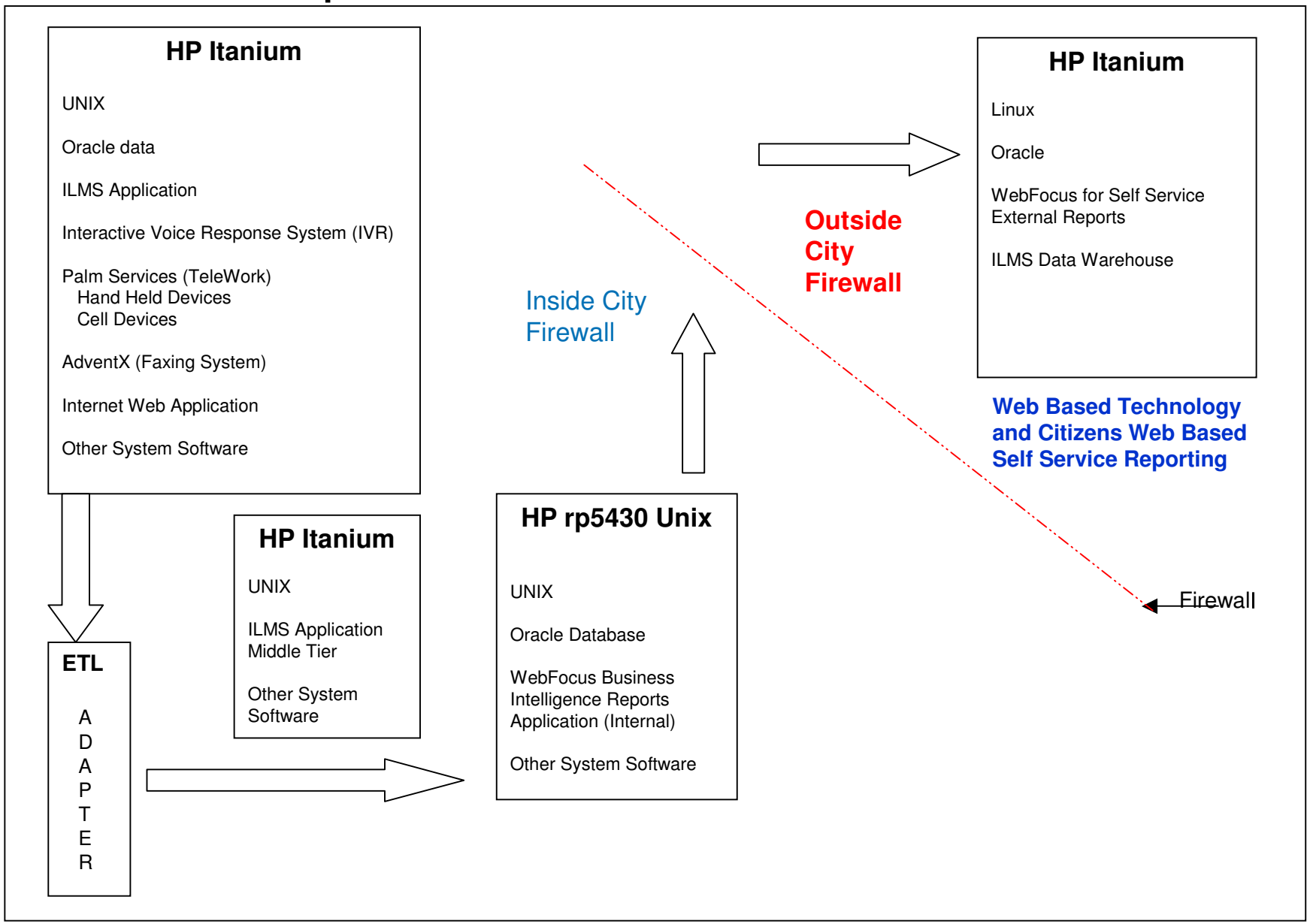
Phase III - Step 3 – Prep for Oracle Structure



Phase IV Implement redesign ILMS Application and database into Production

- Move complete ILMS screens into production
- Move ILMS Management 800 screens into production
- Implement ILMS Oracle production database into production
- Implement second generation Oracle Datamart into DMZ
- Implement new Self Service Reports applications and systems

Phase IV Open ILMS Environment



The End

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