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Page 1 of 1
1. EDT 608191

2. To: (Receiving Organization) Remote Access Technology Projects (RATP)	3. From: (Originating Organization) RATP	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: LDUA Program	6. Cog. Engr.: J. W. Engstrom	7. Purchase Order No.: N/A
8. Originator Remarks: This document is being transmitted for approval and release.		9. Equip./Component No.: LDUA System
		10. System/Bldg./Facility: N/A
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: 12/7/94

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Design- nator	Reason for Trans- mittal	Orig- inator Dispo- sition	Receiv- er Dispo- sition
1	WHC-SD-TD-ICD-001	ALL	0	LDUA Interface Control Document Plan	Q	1/2	1/2	

16. KEY					
Approval Designator (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec. 12.7)		1. Approval 2. Release 3. Information	4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment	4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

(G)	(H)	17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)				(G)	(H)
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
1/2	1	Cog. Eng. J. W. Engstrom	<i>J. W. Engstrom</i>	12/5/94	N1-21		
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18. <i>J. W. Engstrom</i> J. W. Engstrom Signature of EDT Originator Date 12/14/94	19. <i>B. A. Carteret</i> B. A. Carteret Authorized Representative for Receiving Organization Date 12/14/94	20. <i>B. A. Carteret</i> B. A. Carteret Cognizant Manager Date 12/5/94	21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments
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RELEASE AUTHORIZATION

Document Number: WHC-SD-TD-ICD-001, Revision 0

Document Title: Light Duty Utility Arm Interface Control Document Plan

Release Date: December 21, 1994

This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

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12/21/94

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SUPPORTING DOCUMENT		1. Total Pages 86
2. Title LDUA Interface Control Document Plan	3. Number WHC-SD-TD-ICD-001	4. Rev No. 0
5. Key Words LDUA Integrated System Interface Control Drawings Interface Control Database	6. Author Name: J. W. Engstrom <i>J. W. Engstrom</i> Signature Organization/Charge Code 8A810/H1E01	
7. Abstract This document describes the interface control documents that will be used to identify and control interface features throughout all phases of the LDUA development and design.		
<div style="text-align: right; font-size: 2em; font-weight: bold;">MASTER</div> <div style="border: 1px solid black; padding: 10px; margin-top: 20px;"> 8. RELEASE STAMP OFFICIAL RELEASE 43 BY WHC DATE DEC 27 1994 <i>Stall</i> </div>		

LIGHT DUTY UTILITY ARM INTERFACE CONTROL DOCUMENT PLAN

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LDUA INTERFACE CONTROL DOCUMENT PLAN

1.0 PURPOSE

The Light Duty Utility Arm (LDUA) Interface Control Documents are provided to control the design features for co-functioning LDUA subsystems, equipment, facilities and computer software.

2.0 SCOPE

This document describes the interface control documents that will be used to identify and control interface features throughout all phases of the LDUA development and design. After the system is built, delivered and installed in the Cold Test Facility and later at the tank farm, the Interface Control Documents can be used in maintaining the configuration control process. The Interface Control Document will consist of Interface Control Drawings and a data base directly tied to the Interface Control Drawings. The data base can be used as an index to conveniently find interface information. Design drawings and other text documents that contain interface information will appear in the database.

The Interface Control Drawings will be used to document and control the data and information that define the interface boundaries between systems, subsystems and equipment. Also, the interface boundaries will define the areas of responsibility for systems and subsystems. The drawing will delineate and identify all the physical and functional interfaces that require coordination to establish and maintain compatibility between the co-functioning equipment, computer software, and the tank farm facilities.

This interface control document is developed in accordance the interface control requirements in WHC-CM-6-1, *Standard Engineering Practices*, EP 1.5.

3.0 ORGANIZATION OF THE LDUA SYSTEM (System Numbers)

To organize the entire LDUA System, a numbering system was developed to identify each subsystem of the LDUA System. Eight major subsystems identify the LDUA System and the numbering system encompasses numbers 1000 to 8000. System 1000 is used to identify the entire LDUA System and has no subsystems. System 1000 and the major subsystems are listed and identified as follows:

- 1000 LDUA Integrated System
- 2000 Arm/Deployment System
- 3000 Tank Riser Interface Confinement
- 4000 Operations Control Center
- 5000 Utilities

6000 End Effectors
7000 Cold Test Facility
8000 Other Equipment

Each of these major subsystems (1000 level) are the divided into lower subsystems. The lower subsystems are in the 100 level and then the 10 level. For example, major subsystem 2000 is broken down into subsystems 2100, 2200, 2300 and 2400. Subsystem 2100 is further broken down into 2110 and 2120. The same sequence is used for the remaining major subsystems. A sample of the numbering scheme is found in appendix A, "LDUA System List." In this list are found additional information. Each major subsystem (1000 level) is assigned a cognizant engineer. In the list, a cognizant engineer is identified for each major subsystem. Also, the responsible person for each of the subsystems is listed as well as the U.S. Department Of Energy laboratory/vendor that are performing the actual design and delivery of hardware for each subsystem.

Each major subsystem has an assigned Safety Class. These Safety Classes are found in the preliminary safety equipment List (PSEL) document WHC-WM-SEL-034, *Preliminary Safety Equipment List for Light Duty Utility Arm System*. Safety Classes for the lower subsystems will be assigned as the detail designs of the subsystems develop.

This numbering scheme forms the basis for developing the interfaces between subsystems. Subsystems 2000 through 8000 interface with each other. For example, Operations Control Center (4000) interfaces with Arm/Deployment System (2000), Tank Riser Interface Confinement (3000) and Utilities (5000). Also, some of these subsystems interface with the waste tank risers, tank farm equipment, etc.

4.0 INTERFACE CONTROL DRAWINGS

The interface control drawings are used to graphically and pictorially define and locate the interfaces between subsystems. The top level interface control drawings are one line diagrams portraying the interfaces between subsystems. On these interface control document/drawings will be a unique number that identifies each interface. These numbers are called "Interface Control Numbers" or ICN on the drawings. Each interface on the Interface Control Drawing or other drawings can be readily identified by a special interface symbol, as shown.

A line or leader connects the interface with the interface symbol. One side of the leader is identified as the "A" side and other side is identified as the "B" side. Adjacent to the interface symbol will be the unique interface

number. These numbers will be a three digit number starting with Interface Control Number, ICN-001. Along side of the "A" and "B" arrows are subsystem identifications. Each interface identification represents specific information unique to that interface, ie. bolt hole pattern and size, electrical connector, etc. This information is tabulated in the interface control database.

5.0 INTERFACE CONTROL DATABASE

The Interface Control Drawings will be on AutoCad electronic drawing format. By using AutoCad, the interface information on the drawing can be extracted into the database. The data base can then be expanded to include all the information unique to that interface. This information can include the location of the interface on the drawings, the subsystems on each side of the interface, the responsibilities on each side of the interface, and technical information of the interface such as a fluid connection at a Tand Riser Interface and Confinement (TRIC) penetration, dimensional information at the interface of the TRIC and the tank riser, etc. Responsibility for each side of an interface can be maintained so that during installation of the various subsystems, the subsystems can be mated without missing components and other possible problems.

Initially, the data base is a flat database such as Excel. The ICN's and subsystem number and titles extracted from the AutoCad drawings are imported directly into the data base. Any of the interface information can then be manipulated and sorted into the required reports.

To reduce the time to update and maintain the database, and include all of the required interface information, a Paradox database application was developed. This database contains the LDUA System List, reference drawings, engineers and their responsibilities, etc. which can be drawn upon to input directly to each ICN. This saves considerable time in not having to repetitively enter that same information that is common to several ICN's. Figure 1 shows the semantic data model for the database. (Reference WHC-MR-0145, "Semantic Data Modeling" for an explanation of the technique and symbology). The database application will produce three reports; the LDUA System List, the Summary Interface Report and the Interface Report.

The Interface Report includes the following information:

- 1) Interface control number (ICN).
- 2) System numbers and names on each side of the interface.
- 3) Description of the interface - Such as cooling water, I&C, electrical power, etc.
- 4) Implementation - Three inch pipe connection, 24 pin I&C connector, 4 pin electrical power connector, etc.
- 5) Reference document information - document number, document revision, comments about the document, date document was released or revised, and title of document. The documents that appear on the database will generally be drawings where the interfaces will appear. Software interfaces will appear in text documents and sketches.

The type of information that will be found on the Summary Interface Reports is as follows:

- 1) Interface control number (ICN)
- 2) System numbers and names on each side of the interface boundary
- 3) Interface description synopsis
- 4) Interface implementation synopsis

Other report configurations can be created as needed.

Samples of a Paradox database Summary Interface Report and Interface report are found in appendix B and C, respectively.

A users manual on how to setup and use the LDUA interface database is found in appendix E.

The maintenance of the data base will be handled as follows. There will be a system administrator whose function is to oversee the database use, troubleshooting, issue passwords and data entry if required and other administrative responsibilities. The persons to enter the data will be the data entry clerks and there should be at least two persons delegated to perform this work. The cognizant engineers will have restricted entry to the database for the entry of the description, implementation and documentation data. View access to the database will be available to cognizant engineers, managers, principal investigators and system leads. The data entry clerks and those with view access only can print the desired database reports.

The database will be updated as follows:

WHC cognizant engineers will be responsible for updating the details and status of the interfaces in the Interface Control Database.

The status of each interface will be tracked at one of four possible values (in the "Resolved" field of the database):

- "A" - The initial status of an interface when not much is known except that it exists.
- "B" - The parties responsible for the interface have discussed it and have reached an agreement as to what the interface is, but the details may be incomplete at this stage the would be defined in informal or unreleased documents or drawings.
- "C" - The interface is completely resolved. All the details of the interface are defined in released documents or drawings. For the purposes of the Interface Control Database, "released" means that the drawings and documents are under formal document control as practiced by the supplier's site. In practice, this means that such drawings and documents would have an identifier, a title, a revision number, and approval signatures.
- "X" - The interface is not associated with Hanford mission 1 or the Idaho National Engineering Labortory or Oak Ridge National Laboratory hot demonstration units, and is therefore deferred until LDUA mission 2 or later.

The initial goal will be to resolve all LDUA mission 1 interfaces as soon as practicable. The status of interfaces will be reviewed by the LDUA cognizant engineers, LDUA program participants, LDUA Technical Lead and the LDUA program Administrator on a bi-weekly basis. Later in the design phase of the LDUA equipment, a once a month interface status review may be adequate. Individual conferences with cognizant engineers will be conducted as necessary to resolve any interface problems.

6.0 OTHER DRAWINGS

Other drawings or documents may also contain interface information. General arrangement, installation, assembly, etc. drawings may indicate interfaces between subsystems and equipment. These drawing may show some of the same interfaces that are found on the high level interface drawings. Each of these interfaces will also be identified by an ICN and the same ICN will be indicated on each drawing that has this identical interface. On the database, a given ICN may have several drawing numbers where this ICN may be found.

The types of drawings where interfaces may be found may be the following:

Mechanical Drawings:

- General Arrangement drawings
- Installation drawings
- Assembly drawings
- Subassembly drawings
- Detail and or fabrication drawings

I&C Drawings:

- Electrical Schemes
- Electrical Schematics
- Wiring diagrams
- Connection Diagrams
- Electrical Layouts and Assemblies

Software Documents:

- Logic Diagrams

Drawing lists will be maintained as part of the overall interface configuration control of the LDUA program.

7.0 GENERAL ARRANGEMENT DRAWINGS

In addition to the interface control drawings, high level general arrangement layouts of the LDUA System installed in a tank farm and in the Cold Test Facility depict the arrangement of each of the subsystem equipment. These layouts show the general relationship of the subsystems and the connecting

utilities. ICF Kaiser Hanford Company (ICF-KH) was given the task to generate information regarding the 12 and 4 inch riser locations and availability, and nearby tank support equipment that maybe obstructions to deploying the LDUA System into a tank. This work also included studies to determine accessibility of the LDUA deployment truck to a selected waste tank riser within a tank farm. The reports generated by ICF-KH included drawings of tanks selected for the hot testing, riser information, photographs of the tank farms, photographs of the tank interiors and a video of the tank farms of interest. Information from these reports are used to develop the general arrangement drawings. These reports are identified in appendix E.

8.0 LDUA SYSTEM INTERFACE CONTROL GENERAL ARRANGEMENT DRAWING LIST

For a listing of the LDUA System Interface Control and General Arrangement Drawings, see Appendix D.

9.0 REFERENCES

1. WHC-CM-6-1, *Standard Engineering Practices*, EP 1.5, "Interface Control Requirements"

APPENDIX A

LDUA System List Sample

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LDUA System List

Page 1

System Id	System Name	Engineer	Type	Company Id
1000	LDUA INTEGRATED SYSTEM (Rev. P)	Kiebel GR	SYSLEAD	WHC
2000	ARM/DEPLOYMENT SYSTEM	Smith CM	COGENG	PNL
2100	Deployment System	Smith CM	COGENG	PNL
2110	Deployment Vehicle	Smith CM Jones HM	COGENG SUPPLY	PNL SPAR
2120	Mast Housing Deployment System	Smith CM Jones HM	COGENG SUPPLY	PNL SPAR
2200	Mast Housing and Vertical Positioning System	Smith CM Jones HM	COGENG SUPPLY	PNL SPAR
2300	Manipulator Arm	Smith CM Jones HM	COGENG SUPPLY	PNL SPAR
2310	Tool Interface Plate	Smith CM Jones HM	COGENG SUPPLY	PNL SPAR
2400	Control System	Smith CM Battison G	COGENG SUPPLY	PNL SPAR
3000	TANK RISER INTERFACE CONFINEMENT (TRIC)	Potter JD	COGENG	WHC
3100	Confinement Enclosure	Potter JD	COGENG	WHC
3110	Enclosure (TRIC)	Potter JD Jones HM	COGENG SUPPLY	WHC SPAR
3120	Vertical Positioning Mast Adapter	Potter JD Jones HM	RESP SUPPLY	WHC SPAR
3130	Support and Alignment Frame	Potter JD Jones HM	COGENG SUPPLY	WHC SPAR
3140	Isolation Door	Potter JD Jones HM	COGENG SUPPLY	WHC SPAR
3200	End Effector Exchange System	Potter JD Jones HM	COGENG SUPPLY	WHC SPAR
3300	Decontamination System	Potter JD	COGENG	WHC
3310	Decon External Support System (CO2)	Potter JD Manhardt JM	COGENG SUPPLY	WHC INEL
3320	Decon Module (CO2)	Potter JD Manhardt JM	COGENG SUPPLY	WHC INEL
3330	Riser Adapter Module	Potter JD Manhardt JM	COGENG SUPPLY	WHC INEL
3340	Decon External Support System (Water)	Potter JD	COGENG	WHC

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LDUA System List

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System Id	System Name	Engineer	Type	Company Id
3340	Decon External Support System (Water)	Bartholomew JA	SUPPLY	LATA
3350	Decon Module (water)	Potter JD Bartholomew JA	COGENG SUPPLY	WHC LATA
3400	Ventilation System	Potter JD Rice PD	COGENG RESP	WHC ICFKH
3410	Air Inlet	Potter JD Manhardt JM Rice PD	COGENG SUPPLY RESP	WHC INEL ICFKH
3420	Exhaust System (CO2)	Potter JD Manhardt JM Rice PD	COGENG SUPPLY RESP	WHC INEL ICFKH
3500	Miscellaneous I&C	Potter JD Clark DA	COGENG RESP	WHC WHC
3510	Video System	Potter JD Clark DA Jones HM	COGENG RESP SUPPLY	WHC WHC SPAR
3520	Radiation Monitors	Potter JD Manhardt JM Clark DA	COGENG SUPPLY RESP	WHC INEL WHC
3600	TRIC Accessories	Potter JD	COGENG	WHC
3610	Installation Accessories	Potter JD	COGENG	WHC
3612	TRIC OAS Support	Potter JD TBD	COGENG SUPPLY	WHC TBD
3613	TRIC OAS Shroud	Potter JD TBD	COGENG SUPPLY	WHC TBD
3620	TRIC Operating Accessories	Potter JD TBD	COGENG SUPPLY	WHC WHC
3621	TRIC Access Stand	Potter JD TBD	COGENG SUPPLY	WHC TBD
3622	End Effector Pig-Tail	Potter JD TBD	COGENG SUPPLY	WHC TBD
3623	TRIC Jib Crane	Potter JD TBD	COGENG SUPPLY	WHC TBD
3630	TRIC Maintenance Accessories	Potter JD	COGENG	WHC
3640	TRIC Storage Accessories	Potter JD	COGENG	WHC
3650	TRIC Handling Accessories	Potter JD	COGENG	WHC

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LDUA System List

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System Id	System Name	Engineer	Type	Company Id
4000	OPERATIONS CONTROL CENTER	Kiebel GR	COGENG	WHC
4100	Operations Control Trailer	Clark DA Davies BR Bennett KL	RESP SUPPLY COGENG	WHC SNL WHC
4110	Trailer HVAC	Clark DA Davies BR Bennett KL	RESP SUPPLY COGENG	WHC SNL WHC
4120	Trailer Electrical	Clark DA Davies BR Bennett KL	RESP SUPPLY COGENG	WHC SNL WHC
4121	Trailer Instrument Power	Clark DA Davies BR Bennett KL	RESP SUPPLY COGENG	WHC SNL WHC
4122	Trailer Utility Power	Clark DA Davies BR Bennett KL	RESP SUPPLY COGENG	WHC SNL WHC
4130	Trailer Lighting	Clark DA Davies BR Bennett KL	RESP SUPPLY COGENG	WHC SNL WHC
4200	Supervisory Control System/Data Acquisition System	Ellis JE Bennett KL	RESP COGENG	WHC WHC
4210	Supervisory Control System	Davies BR Ellis JE Bennett KL	SUPPLY RESP COGENG	SNL WHC WHC
4220	Supervisory Data Acquisition System	Spletzer BL Bennett KL	SUPPLY COGENG	SNL WHC
4300	At Tank Instrument Enclosure	Clark DA TBD Bennett KL	RESP SUPPLY COGENG	WHC TBD WHC
4400	Control Network	Clark DA Bennett KL	SUPPLY COGENG	WHC WHC
5000	UTILITIES	Clark DA	COGENG	WHC
5100	Electrical Systems	Clark DA	COGENG	WHC
5110	Site Electrical Power	Clark DA TBD	COGENG SUPPLY	WHC WHC
5120	Portable Generator Power	Clark DA	COGENG	WHC
5200	Compressed Gas Systems	Clark DA Brown DH	COGENG RESP	WHC WHC

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LDUA System List

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System Id	System Name	Engineer	Type	Company Id
5210	Site Supplied Compressed Air	Clark DA Brown DH TBD	COGENG RESP SUPPLY	WHC WHC WHC
5220	Portable (Bottles, Compressor) Compressed Air	Clark DA Brown DH TBD	COGENG RESP SUPPLY	WHC WHC TBD
5230	Purge Gas	Clark DA Brown DH TBD	COGENG RESP SUPPLY	WHC WHC TBD
5300	Water Systems (Not presently identified)	Brown DH	COGENG	WHC
5400	Gas Systems (Not presently identified)	Brown DH	COGENG	WHC
5500	Communication Systems	Clark DA TBD	COGENG SUPPLY	WHC WHC
5510	Tank farm Communications System	Clark DA TBD	COGENG SUPPLY	WHC TBD
5520	LDUA Communication System	Clark DA TBD	RESP SUPPLY	WHC TBD
6000	END EFFECTORS	Pardini AF	COGENG	WHC
6100	Tank Mapping Systems	Pardini AF	COGENG	WHC
6110	Topographical Mapping System	Pardini AF Burks BL	COGENG SUPPLY	WHC ORNL
6120	Tank Mapping End Effector System	Pardini AF Gilbert RW	COGENG SUPPLY	WHC PNL
6200	Remote Viewing Systems	Pardini AF	COGENG	WHC
6210	Overview Video Camera System	Pardini AF Heckendorn FM	COGENG SUPPLY	WHC SRS
6220	Overview Stereoscopic Video Camera System	Pardini AF Heckendorn FM	COGENG SUPPLY	WHC SRS
6230	High Resolution Stereoscopic Video Camera System	Pardini AF Heckendorn FM	COGENG SUPPLY	WHC SRS
6240	Still/Stereoscopic Photographic System	Pardini AF Heckendorn FM	COGENG SUPPLY	WHC SRS
6250	Optical Alignment Scope (OAS)	Potter JD Pardini AF Heckendorn FM	COGENG RESP SUPPLY	WHC WHC SRS
6260	Remote Viewing System Common I&C (RVSCI&C)	Pardini AF Heckendorn FM	COGENG SUPPLY	WHC SRS

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LDUA System List

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System Id	System Name	Engineer	Type	Company Id
6300	Tank Inspection Systems	Pardini AF	COGENG	WHC
6310	NDE Weld/Thickness Inspection System	Pardini AF Conner C	COGENG SUPPLY	WHC INEL
6320	High Resolution Laser Rangefinder System	Pardini AF Davidson J	COGENG SUPPLY	WHC INEL
6400	Waste Analysis Systems	Pardini AF	COGENG	WHC
6410	Raman Spectrometer System	Pardini AF Reich FR	COGENG SUPPLY	WHC WHC
6420	Infrared Moisture Detection System	Pardini AF TBD	COGENG SUPPLY	WHC TBD
6430	Copper Foil Detection System	Pardini AF TBD	COGENG SUPPLY	WHC TBD
6440	Waste Rheology System	Pardini AF Smalley JT	COGENG SUPPLY	WHC PNL
6450	Mini-Lab System	Pardini AF Spletzer BL	COGENG SUPPLY	WHC SNL
6500	Small Scale Retrieval Systems	Pardini AF	RESP	WHC
7000	COLD TEST FACILITY	Engstrom JW	COGENG	WHC
7100	Test facility Modifications	Engstrom JW Perry JW Phillips JD	COGENG RESP SUPPLY	WHC WHC ICFKH
7110	FMEF Utilities	Engstrom JW Perry JW Phillips JD	COGENG RESP SUPPLY	WHC WHC ICFKH
7120	FMEF Building Modifications	Engstrom JW Perry JW Phillips JD	COGENG RESP SUPPLY	WHC WHC ICFKH
7200	Test Equipment	Engstrom JW Perry JW Phillips JD	COGENG RESP SUPPLY	WHC WHC ICFKH
7210	Pre-operational Test Equipment	Engstrom JW Perry JW Phillips JD	COGENG RESP SUPPLY	WHC WHC ICFKH
7220	Observation Equipment	Engstrom JW Perry JW Several	COGENG RESP SUPPLY	WHC WHC SEVERAL
8000	OTHER EQUIPMENT (Misc)	Brown DH	COGENG	WHC

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LDUA System List

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System Id	System Name	Engineer	Type	Company Id
8100	Riser Characterization Equipment	Brown DH	COGENG	WHC
8110	Plug Gage	Brown DH TBD	COGENG SUPPLY	WHC TBD
8200	LDUA Operations Overview Video System	Pardini AF TBD	COGENG SUPPLY	WHC TBD
T-Farms	Tank Farms	Several		SEVERAL
T-Farms 1	Tank Farms - Riser	Several		SEVERAL
T-Farms 2	Tank Farms - 12" Riser	Several		SEVERAL
T-Farms 3	Tank Farms - Ground Surface	Several		SEVERAL

APPENDIX B

Summary Interface Report Sample

ICH	System A	Name	System B	Name	Description	Implementation	R	
	241	UNUSED	Reserved	UNUSED	UNUSED		N	
	242	UNUSED	Reserved	UNUSED	UNUSED		N	
	243	UNUSED	Reserved	UNUSED	UNUSED		N	
	244	UNUSED	Reserved	UNUSED	UNUSED		N	
	245	UNUSED	Reserved	UNUSED	UNUSED		N	
	246	UNUSED	Reserved	UNUSED	UNUSED		N	
	247	UNUSED	Reserved	UNUSED	UNUSED		N	
	248	UNUSED	Reserved	UNUSED	UNUSED		N	
	249	UNUSED	Reserved	UNUSED	UNUSED		N	
	250	UNUSED	Reserved	UNUSED	UNUSED		N	
	251	6110	Topographical Mapping System	4300	At Tank Instrument Support	Electrical power for wire/fiber	120 VAC, Single-phase, 1 amp	N
	252	4300	At Tank Instrument Support	4100	Operations Control Trailer	Fiber-optic penetration(externa	2 fibers, ST connectors	N
	253	4300	At Tank Instrument Support	4100	Operations Control Trailer	Fiber-optic penetration (extern	3 fibers, ST connectors	N
	254	4300	At Tank Instrument Support	4100	Operations Control Trailer	Fiber Optic Penetration (extern	3 fibers, ST connectors	N
	255	4300	At Tank Instrument Support	4100	Operations Control Trailer	Fiber Optic Penetration (extern	3 fibers, ST connectors	N
	256	4100	Operations Control Trailer	6120	End of Arm Mapping System	MLRF Electrical Power (Fiber-op	120 VAC, single-phase, 2 amps	N
	257	4300	At Tank Instrument Support	4100	Operations Control Trailer	Fiber Optic Penetration (exteri	2 fibers, ST connectors	N
	258	4100	Operations Control Trailer	4200	Supervisory Control System/Data	SDAS VME Electrical Power	120 VAC, single-phase, 20 amps	N
	259	6120	Mapping Laser Rangefinder System	4200	Supervisory Control System/Data	MLRF/SDAS VME Interface	Input from PNL/SNL required.	N
	260	4300	At Tank Instrument Support	4300	At Tank Instrument Support	Multi-Circuit Switch Power	120 VAC, single-phase, 2 amps	N
	261	3200	End Effector Exchange System	3140	Isolation Door	Passage of End Effector Exchang	3200 - The EEES, while carrying	N
	262	3120		2300	Manipulator Arm	Passage of LDUA Manipulator Arm	3120 - The VPMA shall not inter	N
	263	3310	External Support System	3320	Decon Module (CO2)	Connection points between the E	3310 - Hoses for high pressure	N
	264	3310		1-Farms 3	Tank Farms - Ground Surface	The CO2 External Support System	3310 - The CO2 External Support	N
	265	3320	Cleaning Head System	3420	Exhaust System (CO2)	Attachment of Exhaust System to	3320 - The Decon Module (CO2) s	N
	266	3110	Enclosure	2300	Manipulator Arm	Passage of LDUA Manipulator Arm	3110 - The TRIC Enclosure shall	N
	267	3320	Cleaning Head System	2300	Manipulator Arm	Passage of LDUA Manipulator Arm	3320 - The Decon Module (CO2) s	N
	268	3330	Riser Adapter Module	2300	Manipulator Arm	Passage of LDUA Manipulator Arm	3330 - The Riser Adapter Module	N
	269	3320	Cleaning Head System	3330	Riser Adapter Module	Decon Module (CO2) attaches and	3320 - The Decon Module (CO2) h	N
	270	3420	Decontamination System	1-Farms 3	Tank Farms - Ground Surface	The Exhaust System is free stan	3420 - The Exhaust System shall	N
	271	UNUSED	Supervisory Control System/Data	UNUSED	UNUSED			N
	272	UNUSED	Enclosure	UNUSED	UNUSED			N
	273	UNUSED	Enclosure	UNUSED	UNUSED			N
	274	UNUSED	Enclosure	UNUSED	UNUSED			N
	275	UNUSED	Enclosure	UNUSED	UNUSED			N
	276	UNUSED		UNUSED	UNUSED			N
	277	UNUSED	External Support System	UNUSED	UNUSED			N
	278	UNUSED	Exhaust System	UNUSED	UNUSED			N
	279	2310	Tool Interface Plate	3200	End Effector Exchange System	The End Effector Exchange Syste	2310 - The end effector half of	N
	280	3410	Air Inlet	3110	Enclosure (TRIC)	Air flows into the TRIC Enclosu	3410 - The air inlet is provide	N

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Responsibility List, System A Key

Page 1

ICN	Sys A	System A Name	Sys B	System B Name	Description	Type	Resolved?
-----	-------	---------------	-------	---------------	-------------	------	-----------

Engineer: Bartholomew JA Company: LATA

10	3340	Decon External Support System (Water)	5120	Portable Generator Power	Power-Supply for water decon system.	SUPPLY	N
15	3340	Decon External Support System (Water)	3350	Decon Module (water)	Connection points between the External Water Support System and the Decon Module (water). Both sides of interface by LATA.	SUPPLY	N
16	3340	Decon External Support System (Water)	T-Far	Tank Farms - Ground Surface	The Water External Support System is free standing upon the ground surface at the tank farm.	SUPPLY	N
59	3340	Decon External Support System (Water)	4300	At Tank Instrument Support	F.O. to patch panel for water decon OPTO-22.	SUPPLY	
89	3340	Decon External Support System (Water)	4220	Supervisory Data Acquisition System	SDAS input for water decon.	SUPPLY	
14	3350	Decon Module (water)	3110	Enclosure (TRIC)	Attachment of Decon Module (water) to the TRIC Enclosure.	SUPPLY	N
19	3350	Decon Module (water)	2300	Manipulator Arm	Passage of LDUA Manipulator Arm through the Decon Module (water).	SUPPLY	N
20	3350	Decon Module (water)	3330	Riser Adapter Module	Decon Module (water) attaches and seals to the Riser Adapter Module (RAM).	SUPPLY	N
23	3350	Decon Module (water)	3520	Radiation Monitors	Radiation Monitors (3520) are installed inside the Decon Module (water) through penetrations in the walls of the module.	SUPPLY	N

Engineer: Battison G Company: SPAR

4	2400	Control System	4300	At Tank Instrument Support	External Interface for arm/deployment system E-Stop signal.	SUPPLY	N
25	2400	Control System	3520	Radiation Monitors	Arm withdraw permissive from radiation monitors (water decon)	SUPPLY	N
76	2400	Control System	4300	At Tank Instrument Support	Arm Pwr Control external interface	SUPPLY	
77	2400	Control System	4300	At Tank Instrument Support	External connection control Ethernet #1 from arm	SUPPLY	

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Responsibility List, System B Key

Page 1

ICN	Sys A	System A Name	Sys B	System B Name	Description	Type	Resolved?

Engineer: Bartholomew JA		Company: LATA					

27	4300	At Tank Instrument Support	3340	Decon External Support System (Water)	Initiate decon spray signal	SUPPLY	N
28	4300	At Tank Instrument Support	3340	Decon External Support System (Water)	Decon system operational signal	SUPPLY	N
29	4300	At Tank Instrument Support	3340	Decon External Support System (Water)	Low decon water supply signal	SUPPLY	N
49	4100	Operations Control Trailer	3340	Decon External Support System (Water)	F.O. Penetration (interior) for water decon.	SUPPLY	
53	4300	At Tank Instrument Support	3340	Decon External Support System (Water)	TRIC dp input to OPTO-22 for water (internal interface).	SUPPLY	
54	4300	At Tank Instrument Support	3340	Decon External Support System (Water)	TRIC temperature input to water decon OPTO-22 (internal interface).	SUPPLY	
55	4300	At Tank Instrument Support	3340	Decon External Support System (Water)	Initiate decon spray signal (internal side).	SUPPLY	
56	4300	At Tank Instrument Support	3340	Decon External Support System (Water)	Decon system operational signal (internal side).	SUPPLY	
57	4300	At Tank Instrument Support	3340	Decon External Support System (Water)	Low decon water supply signal.	SUPPLY	
58	4300	At Tank Instrument Support	3340	Decon External Support System (Water)	Power for water decon OPTO-22.	SUPPLY	
88	4121	Trailer Instrument Power	3340	Decon External Support System (Water)	Power for water decon OPTO-22 F.O./wire conversion.	SUPPLY	
15	3340	Decon External Support System (Water)	3350	Decon Module (water)	Connection points between the External Water Support System and the Decon Module (water). Both sides of interface by LATA.	SUPPLY	N
26	3520	Radiation Monitors	3350	Decon Module (water)	Rad monitor/water decon module interface	SUPPLY	N

Engineer: Battison G		Company: SPAR					

81	4300	At Tank Instrument Support	2400	Control System	Internal connection, E-stop	SUPPLY	
82	4300	At Tank Instrument	2400	Control System	Internal connection, Arm Power Control	SUPPLY	

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APPENDIX C

Interface Report Sample

ICN	System No.	System Name	Resolved
1	2310	Tool Interface Plate	N
	6000	END EFFECTORS	

Description

Attachment of the end effectors to the Tool Interface Plate

Implementation

2310 - The Tool Interface Plate will be supplied by SPAR with a sealing surface and mounting holes for fasteners. The TIP incorporates connectors for providing services to the end effectors.

6000 - The supplier for each end effector subsystem will provide connections to interface with the common connections of the TIP.

Document Number	Revision	Comments	Date	Document Title
H-2-821285	8		7/07/94	Arm/Deployment System

ICN	System No.	System Name	Resolved
2	3120	Vertical Positioning Mast Adapter	N
	3110	Enclosure (TRIC)	

Description

Attachment of the Vertical Positioning Mast Adapter (VPMA) to the TRIC Enclosure. Both sides of interface by SPAR.

Implementation

3120 - The VPMA is supplied with seal or gasket, to maintain confinement, and fasteners for attachment as determined by SPAR.

3110 - The TRIC Enclosure is supplied with a sealing surface and mounting holes for fasteners as determined by SPAR.

Document Number	Revision	Comments	Date	Document Title
H-2-821283	8	Sheets 1,2	7/07/94	Tank Riser Interface Confinement (TRIC)
H-2-821285	8		7/07/94	Arm/Deployment System

APPENDIX D

LDUA Drawing List

Listing of high level LDUA System Interface Control and General Arrangement Drawings. This list does not include all the LDUA System drawings.

- a) H-2-818139 -General Arrangement - Typical Tank Farm LDUA System Installation
- b) H-2-112294 - General Arrangement - Cold Test Facility - LDUA System Installation
- a) H-2-821284 - System 1000 Interface Control Drawing - LDUA INTEGRATED SYSTEM
- b) H-2-821285 - System 2000 Interface Control Drawing - ARM/DEPLOYMENT SYSTEM
- c) H-2-821283 - System 3000 Interface Control Drawing - TANK RISER INTERFACE CONFINEMENT (TRIC) (Mechanical Interfaces)
H-14-023500 - System 3000 Interface Control Drawing - TANK RISER INTERFACE CONFINEMENT (TRIC) (I&C Interfaces)
- d) H-2-821286 - System 4000 Interface Control Drawing - OPERATIONS CONTROL CENTER
- e) H-2-821287 - System 5000 Interface Control Drawing - UTILITIES
- f) H-2-818138 - System 6000 Interface Control Drawing - END EFFECTORS

APPENDIX E

Tank Farm Reports

List of ICF-KH Tank Farm Study Reports

- 1) WHC-SD-WM-ER-204 - Letter Report, SINGLE SHELL TANK RISER
CONFIGURATION, by ICF-KH
- 2) WHC-SD-WM-ER-222 - Letter Report, SINGLE SHELL TANK RISER
CONFIGURATION RESEARCH, by ICF-KH
- 3) Tank A-105 Accessibility Study No. 3.

APPENDIX F

LDUA Interface Database Users Manual

ENGINEERING INTERFACE CONTROL DATABASE SYSTEM

USER MANUAL

Rev. 1

April 1, 1994

Date of Revision	Description of Revision Made

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1.0 INTRODUCTION

This software is an integrated, menu-driven tracking system for

PLEASE FILL IN WHAT IS NECESSARY

All data will be entered into the EIC database through online data entry screens. The EIC system will only permit the viewing, modifying, or deleting of a record in the database by a user with a valid Access Code. This is determined using the user Access Code from the Password table.

1.1 PRODUCT DEPENDENCIES

This software is being designed to run on a 286/386/486 DOS platform with an extended memory board utilizing Paradox Runtime Ver 4.02. RunTime Paradox, the database, and the reports, must be in public space on a server for network access.

1.2 SYSTEM SCHEMATIC

The following schematic details the layout and physical location of the WRCTS system software. Individual server areas are considered to be individual servers in this diagram.

2.0 SYSTEM SETUP

2.1 ADDING EIC TO WINDOWS

The following are the instructions to adding access to the Engineering Interface Control Database (EIC) to a user's workstation.

1. A batch file called "EICINST.BAT" is placed on the user's hard drive at the root level (c:\). This will either be placed on the harddrive via the EIC Analyst or by the user.
2. At the DOS prompt run "EICINST.BAT" to create the PDOXRUN directory and place the Paradox Runtime files needed to run the application.
3. Select the Windows Group where the program icon will be installed and select File|New from the Program Manager Menu. Select the Program Item button and press OK.
4. Enter the following into the Program Properties Screen:

Description: EIC
Command Line: c:\pdoxrun\eic.pif
Working Directory: c:\pdoxrun
5. Choose the icon to represent this program and select OK.

If there any problems during the installation, please refer to your Windows User Manual. If problems persist, please call the System Administrator or the EIC Analyst.

Installation is now complete! Go to the window where the icon was placed and double-click the icon.

3.0 EXECUTING EIC SYSTEM

3.1 EIC SIGN ON

Double-click the EIC icon from your program group to get to the entry screen. The user will be prompted for the password to the file server where the EIC files are stored. Contact your System Administrator for this information. This will start Paradox and the EIC system. The following screen will appear:

ENGINEERING INTERFACE CONTROL DATABASE SYSTEM
LOGON SCREEN

— Password Entry —

Password: [Masked Password Field]

Accept Cancel

Enter your password at the logon screen prompt and press Enter, Alt-Y or use the mouse pointer to select **Accept** and click once to have the password accepted by the system. Invalid entry of the password will cause a message to be displayed in the lower-right corner of the screen indicating that an invalid password has been entered. The user will then have the opportunity to re-enter his\her password. If the user successfully enters the correct password, the following will be displayed:

Loading ENGINEERING INTERFACE CONTROL DATABASE Application

Please Wait...

3.2 SYSTEM BULLETIN

Once notification has been given to the user that the EIC program is loading, a System Bulletin may or not be displayed. The purpose of the System Bulletin is to allow the System Administrator to inform the user community of changes which may affect their usage of the system. The following is an example of the System Bulletin.

```
*****  
                        EIC Database System Bulletin  
*****
```

The following are notes to the user community identifying changes which have recently been made to the EIC System.

1. The following.....
2. Item number....
3. Printer

Text in the system bulletin is normally displayed white text on a red background. The double border displayed here is for presentation only and is not part of the screen.

3.3 SCROLLING SYSTEM MESSAGE

What happens if a change takes place while a user is currently using the EIC System? A scrolling message system has been designed to provide up to the minute information to the active user. Once activated, a user is automatically notified when movement between menus is detected. The message

will be displayed at the bottom of the screen scrolling from right to left. Once the entire message has been displayed, the user need only press the enter key to remove the message and continue whatever they were doing.

3.4 EIC SIGN OFF

Select the Leave System option from the main menu. This will display the following screen.

Are you sure you wish to exit this application?

Pressing the Enter key will accept the default value of No and return the user to the Main menu. Pressing Alt-Y or moving the mouse to the Yes option and pressing the left mouse button will cause the user to exit the EIC system, leave Paradox and return to Windows.

4.0 MENUS

The Engineering Interface Control Database System consists of four menus: 1) the EIC MAIN MENU, 2) the UPDATE/VIEW TABLES MENU, 3) the REPORTS MENU, and 4) the LAN ACCESS MENU. At each menu move either the cursor using the direction keys, mouse pointer or press the highlighted letter to select the desired option. The diagram below shows the relationship from one menu to another.

5.0 PROGRAM OPERATION

Upon accessing the EIC system, the users will find themselves at the EIC Main Menu. From this point, based on their previously defined access levels, they may go and perform any number of options.

5.1 EIC MAIN MENU

This menu is the first screen that appears once a valid password has been entered. The angle bracket ">" in the menu denotes submenus that exist under the main menu option.

LDUA MAIN MENU	
Update/View Tables	>
Reports	>
LAN Access	>
Who's On?	
Leave System	

Update/View Tables	- Update/View Tables
Reports	- Report Selection Menu
LAN Access	- Access LAN Services (ccMail, Phone, WordPerfect, etc.)
Who's On	- List Current Paradox Users
Leave System	- Exit Application

5.2 UPDATE/VIEW TABLES

To update or view table data, select the Update/View Tables option off of the EIC Main Menu. This can be done by either selecting the highlighted letter, using the directional arrows or by using the mouse.

The Update/View Tables Menu is broken down in three parts. The first part identifies all of the tables used in the Engineering Interface Control System. Access to these tables is based upon "rights" granted by the System Administrator to each individual. To select a table enter either the highlighted letter, use the directional arrows or select the table name using the mouse. These tables will be discussed later in greater detail.

The second section of the Update/View Tables Menu is strictly for use by the System Administrator. Detail on this option can be found in Appendix "C" - "System Administrator".

The third section provides the user a means of going back to a previous menu. In addition to using one of the three means of accessing items on a menu, by pressing the [Esc] key, the user will be taken to the menu from which he/she came from.

5.2.1 Company

5.2.1.1 Table View

The purpose of this table is to maintain a listing of all the Company's that an individual can work for. To enter/view Company data, select **Company** from the Update/View Tables menu using one of the three methods previously discussed. The following screen will appear:

Edit Toggle View <F7>	Print Record <F9>	Return <F2>
TAB\COMPANY	Company Id	Description
1	IFCKH	IFC Kaiser Engineers Hanford
2	INEL	Idaho National Engineering Laboratory
3	KEH	Kaiser Engineers Hanford

4	ORNL	Oak Ridge National Laboratory
5	PNL	Pacific Northwest Laboratory
6	SNL	Sandia National Laboratory
7	SPAR	Spar Aerospace, Ltd.
8	SRS	Savannah River Site
9	WHC	Westinghouse Hanford Company

<F10> = Menu | Hold down left mouse button to scroll up, right scroll down

This is the first of two screens the user will see when viewing or updating table data. This screen is called the Table View screen and consists of three parts. The first part is the line at the top of the display.

Edit Toggle View <F7> Print Record <F9> Return <F2>

These are the menu options available while accessing the table. Although present, some of these options are not available while in Table View. The only options active at this time are **Toggle View <F7>**, **Print Record <F9>** and **Return <F2>**. To access these options use either the mouse, [F10] key or use the function key identified in brackets. To access the other options, one must be in Form View. See Form View discussion for further information.

The second portion of this screen is the actual data in the table, displayed in field order. The following line happens to identify the name of the table and the first two fields in the table.

TAB\COMPANY	Company Id	Description
-------------	------------	-------------

If more fields exists in the table, they and their contents can be viewed by using the left and right direction arrows.

<F10> = Menu | Hold down left mouse button to scroll up, right scroll down

The third portion is the last line on the screen. This line identifies any other options which may be available while in Table View. The message displayed here identifies two things: 1) pressing the [F10] key grants the user access to the menu line at the top of the display, and 2) pressing the right or left mouse buttons will allow the user to scroll through the table.

5.2.1.2 Form View

This is the Form View for the Company table. To access this form, the user must first have been in Table View for the Company table. Select **Toggle View <F7>** to shift the display between Table and Form View. It is here in Form View that the user has the ability to add, change or delete a record in a table.

Edit Toggle View <F7> Print Record <F9> Return <F2>

"INS" to insert a record "DEL" to delete a record
"ALT-F5" to enter field edit to change contents of a field
"PAGE UP/PAGE DOWN" to scroll through records

Company Id: IFCKH

Company Name: IFC Kaiser Engineers Hanford

<F10> = Menu

The **INS** option allows the user to enter a new record into the table. Once selected a new blank record is displayed. Data can then be entered into the table. When finished, select the **Return <F2>** option or move off of the new record by using the up or down direction arrows. The following message: "Posted New Record #" will be displayed in the lower right corner of the screen. The # identifies its location in the table. All records in the table are in sorted order. This allows for ease of searching.

The **DEL** option allows the user to delete a record from the table. All the user needs to do is move to the record to delete and press the delete key. A confirmation message is then displayed:

Delete the current record?	
☐ No	☐ Yes

The user can now either change one's mind or continue the process. Pressing **ALT-Y** will delete the record while pressing **ALT-N** (or **[ESC]**) will cancel the deletion processing. If the user accidentally deletes the record all is not lost. The **Edit** option in the menu line gives the user a chance to undo his/her last operation.

Edit Toggle View <F7> Print Record <F9> Return <F2>

UNDO Delete

Selecting **UNDO** will retrieve the record just deleted.

The UNDO option in the Edit menu is only good for the last operation performed. If another deletion takes place, then the ability to retrieve the first record deleted is gone. The message "Nothing to Undo" will appear if the user tries to undo an operation that doesn't exist.
--

The UNDO option in the Edit menu is only good for the last operation performed. If another deletion takes place, then the ability to retrieve the first record deleted is gone. The message "Nothing to Undo" will appear if the user tries to undo an operation that doesn't exist.

The [ALT-F5] key allows the user to make changes to a data field. Normally the user, in making changes to a field, would use the backspace key to delete characters until one gets to the section of the field in which data is to be changed. This is not practical for large data fields or memo fields. Pressing [ALT-F5] allows the user to go right to the section to be changed without deleting already existing data. To do this go to the field to be changed. Press [ALT-F5]. The cursor will have changed from an underscore character to a reddish-colored shadow box (⌘) with a blue underscore character inside. Using the direction arrow keys move the box to the area to be changed. As you move the box, the letters inside the box will change color. This is normal. When you are finished making changes, press the [F2] key. This will change the shadow box back to the underscore character. Moving off the record, or pressing Return <F2> will save the change and display the following message "Posted Change to Record #".

To scroll through a file press the "PAGE DOWN" key to scroll forwards and "PAGE UP" key to scroll backwards through a file.

To print a record at any time, position the cursor to the record to be printed and select the **Print Record <F9>** option from the menu. The report will look as follows:

4/06/94 07:44:28

Company Id: IFCKH
Description: IFC Kaiser Engineers Hanford

Each report will consist of a Date\Time stamp followed by the record printed one field per line.

The [F10] key identified in the lower left corner of the input screen allows for the user to gain access to the menu line when not using a mouse. Pressing [F10] will cause a highlighted bar to appear on the menu line. The

user only need to move the highlight bar to the desired option and press the return/enter key.

5.2.2 Document

5.2.2.1 Table View

The purpose of this table is to maintain a listing of all the Documents that are associated with the Interface Control Numbers. To enter/view Document data, select Document from the Update/View Tables menu using one of the three methods discussed earlier. The following screen will appear:

Edit Toggle View <F7> Print Record <F9> Return <F2>		
TAB\DOCUMENT	Document Number	Document Title
1	jims test #1	Software Engineering Standards, Third
2	jims test #2	Webster's Ninth New Collegiate Dictio
3	jims test #3	Roget's II: The New Thesaurus - Publi
4	jims test #4	Paradox Programmer's Guide: PAL By Ex

<F10> = Menu | Hold down left mouse button to scroll up, right scroll down

See Section 5.2.1.1 for an explanation on how to read this screen.

5.2.2.2 Form View

This is the Form View for the Company table. To access this form, the user must first have been in Table View for the Company table. Select **Toggle View <F7>** to shift the display between Table and Form View. It is here in Form View that the user has the ability to add, change or delete a record in a table.

Edit Toggle View <F7> Print Record <F9> Return <F2>

"INS" to insert a record "DEL" to delete a record
"ALT-F5" to enter field edit to change contents of a field
"PAGE UP/PAGE DOWN" to scroll through records

Document Number: jims test #1
Document Title: Software Engineering Standards, Third Edition -
Publisher: The Institute of Electrical and
Electronic Engineers, Inc.

Version: 1
Sheet Number: 1
Date: 3/07/94

<F10> = Menu |

5.2.3 Engineer

5.2.3.1 Table View

The purpose of this table is to maintain a listing of all the Engineer's associated with an ICN. To enter/view Engineer data, select **Engineer** from the Update/View Tables menu using one of the three methods. The following screen will appear:

Edit Toggle View <F7> Print Record <F9> Return <F2>			
TAB\ENGINEER	Engineer Id	Engineer Name	Company Id
1	1	CM Smith	PNL
2	2	JW Engstrom	WHC
3	3	GR Kiebel	WHC
4	4	JD Potter	WHC
5	5	JM Manhardt	INEL
6	6	DA Clark	WHC
7	7	BA Carteret	WHC
8	8	AF Pardini	WHC
9	9	DH Brown	WHC
10	10	MK Kirk	WHC
11	11	KE Keene	PNL
12	12	PD Rice	KEH
13	13	SJ Eberlein	WHC
14	14	BL Burks	ORNL
15	15	RW Gilbert	PNL
16	16	LA Strobe	PNL
17	17	FM Heckendorn	SRS
18	18	C Conner	INEL
19	19	J Davidson	INEL
20	20	FR Reich	WHC
21	21	JT Smalley	PNL
22	22	RM Steele	WHC

<F10> = Menu | Hold down left mouse button to scroll up, right scroll down

The bottom of this screen is slightly different from what we've seen before. This line contains more than the [F10] option. It also describes a scrolling function associated with the mouse. At times, more information than what will fit on the screen is available. In order to view this data, we need to move through the table. This is called scrolling. This can be accomplished one of two ways: via either the mouse or keyboard. To use the keyboard, one uses the direction keys. Using the mouse one presses the left button to scroll upwards and presses the right button to scroll downwards.

5.2.3.2 Form View

This is the Form View for the Company table. To access this form, the user must first have been in Table View for the Company table. Select **Toggle View <F7>** to shift the display between Table and Form View. It is here in Form View that the user has the ability to add, change or delete a record in a table.

Edit Toggle View <F7> Print Record <F9> Return <F2>

"INS" to insert a record "DEL" to delete a record
 "ALT-F5" to enter field edit to change contents of a field
 "PAGE UP/PAGE DOWN" to scroll through records

Engineer Id:	1	
Engineer Name:	CM Smith	
Company Id:	SNL	Sandia National Laboratory

<F10> = Menu |

5.2.4 Interface

5.2.4.1 Table View

The purpose of this table is to maintain the relationship between the ICN's and the Documents associated with each ICN. To enter/view Interface data, select **Interface** from the Update/View Tables menu using one of the three methods. The following screen will appear:

Edit	Toggle	View <F7>	Print	Record <F9>	Return <F2>	
TAB\INTERFACE	ICN	Side A	Side B			
1	1	2300	3140			Manipulator Arm
2	2	2200	2120			Mast Housing and
3	3	3100	3000			Confinement Encl

<F10> = Menu | Hold down left mouse button to scroll up, right scroll down

5.2.4.2 Form View

This is the Form View for the Interface table. To access this form, the user must first have been in Table View for the Company table. Select **Toggle View <F7>** to shift the display between Table and Form View. It is here in Form View that the user has the ability to add, change or delete a record in a table.

Edit Toggle View <F7> Print Record <F9> Return <F2>

ICN:	1
From Syst: 2300	Manipulator Arm
To Syst: 3140	Isolation Door
Description:	Space... the Final Frontier These are the voyages of the Starship Enterprise. Her continuing mission... to explore
Implement:	I pledge allegiance to the flag of the United States of America and to the Republic to which it stands, one nation,
Resolved:	Y

Document #	Comments
jims test #1	This is comment #1.
jims test #2	This is comment #2.
jims test #3	This is comment #3.
jims test #4	Cinderella and the Prince

"INS" - insert

"DEL" - delete

"F3" - to move
between
forms"F1" - help with
Doc#\Sys

<F10> = Menu |

This forms actually consists of two parts. The top of the screen describes the ICN information. The bottom portion of the screen describes the documents associated with the ICN.

The [F3] key allows the user to move between the two portions of the form.

The [F1] key provides help information to the user for the "From Syst" and "To Syst" field(s) located on the top of the screen and the "Document #" field located at the bottom of the screen. In order to access help, the cursor must be placed on the field. Moving to either of the System fields and pressing the [F1] key displays the following:

[■] Tab\system [↑]		
TAB\SYSTEM	System Id	System Name
1	1000	LDUA INTEGRATED SYSTEM
2	2000	ARM/DEPLOYMENT SYSTEM
3	2100	Deployment System
4	2110	Deployment Vehicle
5	2120	Mast Housing Deployment System
6	2200	Mast Housing and Vertical Deployment System
7	2300	Manipulator Arm
8	2310	Tool Interface Plate
9	2400	Control System
10	3000	TANK RISER INTERFACE CONFINEMENT
11	3100	Confinement Enclosure
12	3110	Enclosure
13	3120	Vertical Positioning Mast Adapter
14	3130	Alignment Device
15	3140	Isolation Door
1 of 75		

This screen displays the contents of the "System" table. These are the valid data choices the user can select for data input. When information is placed into either the "To Syst" or "From Syst" fields, a check is made against the System table to verify the data. If the value entered does not match any of the choices in the System table, then the following message will appear, "Not one of the possible values for this field". At this point, the user will not be allowed off of this field until a valid entry has been made.

[■] Tab\system [↑]

The top of the display tells the user what table is being displayed. The [■] symbol is the close window symbol in windows. If the user is using a mouse, just place the pointer in the box and click once. The window will close. The symbol, [↑] is the expand window box. Placing the pointer in this box and clicking once will expand the window to full screen size. Clicking again will shrink the window.

1 of 75

This line located at the bottom of the window tells how many records there are in the table, which record the cursor is currently on, and allows the user to scroll to the left and right to view fields not already displayed on the screen. Placing the pointer on the ◀ or ▶ markers will cause the table to scroll left and right. The ■ marker will move to the left and right, indicating to the user where he/she is in the record being viewed.

Move to the record you want; press F2 to select it, Esc to cancel

This line, located at the bottom of the screen, informs the user as to what options are available when a help screen is being displayed. Select [F2] to utilize the Help and Fill feature. This causes the field being pointed at to fill into the corresponding field on the input form. Pressing

[ESC] will allow the user to leave the Help screen without making a selection.

Moving to the "Document #" field and pressing the [F1] key triggers help for document information. The following screen is displayed:

Tab\document		
TAB\DOCUMENT	Document Number	Document
1	jims test #1	Software Engineering Standards,
2	jims test #2	Webster's Ninth New Collegiate D
3	jims test #3	Roget's II: The New Thesaurus -
4	jims test #4	Paradox Programmer's Guide: PAL
1 of 4		

Note: See above for explanation on how to read this screen.

5.2.5 System

5.2.5.1 Table View

The purpose of this table is to maintain a listing of all the Systems that the ICN's tie together. To enter/view System data, select **System** from the Update/View Tables menu using one of the methods previously discussed. The following screen will appear:

Edit Toggle View <F7> Print Record <F9> Return <F2>		
TAB\SYSTEM	System Id	System Name
1	1000	LDUA INTEGRATED SYSTEM
2	2000	ARM/DEPLOYMENT SYSTEM
3	2100	Deployment System
4	2110	Deployment Vehicle
5	2120	Mast Housing Deployment System
6	2200	Mast Housing and Vertical Deployment System
7	2300	Manipulator Arm
8	2310	Tool Interface Plate
9	2400	Control System
10	3000	TANK RISER INTERFACE CONFINEMENT
11	3100	Confinement Enclosure
12	3110	Enclosure
13	3120	Vertical Positioning Mast Adapter
14	3130	Alignment Device
15	3140	Isolation Door
16	3200	End Effector Exchange Station
17	3210	End Effector Exchange System
18	3300	Decontamination System
19	3310	External Support System
20	3320	Cleaning Head System
21	3330	Riser Adapter Module
22	3400	Ventilation System

<F10> = Menu | Hold down left mouse button to scroll up, right scroll down

5.2.5.2 Form View

This is the Form View for the System table. To access this form, the user must first have been in Table View for the Company table. Select **Toggle View <F7>** to shift the display between Table and Form View. It is here in Form View that the user has the ability to add, change or delete a record in a table.

Edit Toggle View <F7> Print Record <F9> Return <F2>

System Id: 1000

Name: LDUA INTEGRATED SYSTEM

"F3" to move between forms

"PAGE UP" to scroll backwards

"INS" to insert new record

"PAGE DOWN" to scroll forwards

"DEL" to delete a record

"F1" for help with Eng Id & Role fields

Eng Id	Engineer Name	Role
1	JJ HAMMOND	ASSO
2	KJ PHILLIPS	SYSLEAD
6	DA Clark	SUPPLY

<F10> = Menu |

The [F1] key provides help information to the user for the "Engineer Id" and the "Role" field located at the bottom of the screen. In order to access field help, the cursor must be placed on the field. Moving to the Engineer ID field and pressing the [F1] key displays the following:

[.]		Tab\engineer		[.]	
TAB\ENGINEER	Engineer Id	Engineer Name	Company Id		
1	1	CM Smith	SNL		
2	2	JW Engstrom	WHC		
3	3	GR Kiebel	WHC		
4	4	JD Potter	WHC		
5	5	JM Manhardt	INEL		
6	6	DA Clark	WHC		
7	7	BA Carteret	WHC		
8	8	AF Pardini	WHC		
9	9	DH Brown	WHC		
10	10	MK Kirk	WHC		
11	11	KE Keene	PNL		
12	15	RW Gilbert	PNL		
1 of 25					

Moving to the Role field and pressing the [F1] key displays the following:

[■] Tab\Types [■]		Tab\Types	
TAB\TYPES	Type Id	Description	
1	ASSO	Associate Engineer	
2	COGENG	Cognizant Engineer	
3	LEAD	Lead Engineer	
4	SUPPLY	System Supplier	
5	SYSLEAD	System Lead	
1 of 5			

See Section 5.2.4.2 for explanation on interpreting this screens.

5.2.6 Types

5.2.6.1 Table View

The purpose of this table is to maintain a listing of the roles each Engineer will provide for each ICN. To enter/view Types data, select Types from the Update/View Tables menu using one of the three methods discussed. The following screen will appear:

Edit Toggle View <F7>		Print Record <F9>	Return <F2>
TAB\TYPES	Type Id	Description	
1	ASSO	Associate Engineer	
2	COGENG	Cognizant Engineer	
3	LEAD	Lead Engineer	
4	SUPPLY	System Supplier	
5	SYSLEAD	System Lead	

<F10> = Menu | Hold down left mouse button to scroll up, right scroll down

5.2.6.2 Form View

This is the Form View for the Types table. To access this form, the user must first have been in Table View for the Company table. Select **Toggle View <F7>** to shift the display between Table and Form View. It is here in Form View that the user has the ability to add, change or delete a record in a table.

Edit Toggle View <F7> Print Record <F9> Return <F2>

"INS" to insert a record "DEL" to delete a record
"ALT-F5" to enter field edit to change contents of a field
"PAGE UP/PAGE DOWN" to scroll through records

Type Id: ASSO

Description: Associate Engineer

<F10> = Menu |

5.2.7 Searching Through a Table

When there are more items in a table than can be viewed on the screen, the user has a built-in Search routine to help locate data. This routine can be implemented at any time by pressing [Ctrl-Z]. In order to use the Search routine, the user must first be in Table View or Form View. Pressing [Ctrl-Z] displays the following screen:

Zoom

Value:

If a value is entered that does not exist, the message "Match not found" will be displayed in the lower-right corner of the screen. If a match is found, then the curser will immediately go to the record where the value was found and momentarily display the value in an inverse video to get the user's attention.

If the value being searched for can exist in multiple records, pressing the [Alt-Z] keys will cause the search to resume. If no matches are found then the message "Match not found" is displayed.

Note: Searches are case-insensitive, i.e., the user does not need to worry about capitalization. Searches can be performed on any field except memo fields. See the Data Dictionary for more information on memo fields.

5.3 LAN ACCESS

This menu is mainly for those users who are not running under Windows, although Windows users may take advantage of this menu. Selecting one of these options will cause the user to shell out to the application of choice. When finished, all the user need do is exit the application and they will automatically be returned to this menu.

Note: WordPerfect will not run properly for those users who operate under Windows. It is best to select WordPerfect from the Program Manager.

5.4 WHO'S ON

This menu choice allows the user community to see who is currently accessing the EIC application on their file server.

Form Toggle <F7>		Instant Report <Alt F7>	Return <Esc>
LIST	UserName	Product	
1	WC11660	Paradox 4.0	
<F10> = Menu			

Form Toggle <F7> Instant Report <Alt F7> Return <Esc>

The above line is the menu bar which allows various operations to be performed by the user. The first Form Toggle <F7> toggles the user between the Table View and the Form View (similar to previous examples). Instant Report <Alt F7> allows the user to print a complete report of all the users listed in the Table. This is different from previous examples where only one record of information was printed. Return <Esc> returns the user to the previous menu.

LIST	UserName	Product
------	----------	---------

The above line are the column headers for the table and the report which can be generated by the user. The headers tell the user the number of users, their name and the software being used, in this case "Paradox 4.0". It does not specify the application being used.

6.0 REPORT OUTPUT

Direct reporting from the EIC System Administrator will be non-routine and limited. Only the System Administrator will be allowed to initiate the generation of reports directly from the EIC system. All others who require EIC information will obtain it from EIC reports by requesting the System Administrator to initiate a report from the EIC system.

6.1 REPORTING SPECIFICATIONS

The following are general criteria which apply to the report generation process and predefined reports produced from the EIC system.

- 1) All reports for the EIC system will be "On Request" reports. These predefined reports are user requested from the online report generation menu.
- 2) A standard report layout is defined for all predefined reports.
- 3) Three predefined report formats have been identified for the EIC system. The sorting order for information on each report is fixed and not subject to variable sort order selection. The predefined formats are:

- Interface Report
- Summary Interface Report
- System List

APPENDIX A - DETAILED DATA DICTIONARY

Following are the definitions for all the data elements defined for the EIC system.

The following pages contain the data dictionary for the Engineering Interface Control system. The format for each data field follows: first a brief description is given of the element including, if necessary, an example. The rest of the format includes edit rules for the element, a physical field size with type (alphanumeric, numeric,...), and additional comments to further characterize and describe the data element.

	<u>Type</u>	<u>Size</u>
Comment	A/N	32
*Company Id	A/N	8
Company Name	A/N	37
Date	Date	10
Description	Memo	
*Document Number	A/N	20
Document Title	A/N	250
*Engineer Id	S	
Engineer Name	A/N	20
*ICN	N	
Implementation	Memo	
Resolved	A/N	1
Sheet Number	A/N	4
Side A	A/N	10
Side B	A/N	10
Side A Name	A/N	64
*System Id	A/N	10
System Name	A/N	64
Type	A/N	8
*Type Id	A/N	8
Type Name	A/N	25
Version	A/N	5

Note: Fields marked '*' are key fields.

Element Name: Comment

Alias: Comment
Forms, Reports: Comment

Description: Free format field used for identifying limited information to the user community.

Edit Rules: N/A

Field Size: 32 characters

Table(s): Reference Document

Comments: N/A

Element Name: Company Id

Alias: Company Id
Forms, Reports: Company Id

Description: Code indicating a company identification code used to identify the company/organization that an individual works for. This data element exists as the key field for the Company Table and as an informational field in the Engineer Table.

Edit Rules: For the commitment action item;
o Must be a valid entry in the Company Table.
o Must be unique.
o A minimum of two characters is required during input.
All characters are converted to uppercase.

Field Size: 8 characters

Table(s): Company
Engineer

Comments: When viewing this field in the input form for the Engineer Table, a Help and Fill Lookup exists with the Company Table.

Element Name: Company Name

Alias: Company Name
Forms, Reports: Company Name

Description: Field indicating the company name associated with the Company Id field.

This data element exists as a descriptive field in the Company Table and as an informational field in the Engineer Table.

Edit Rules: N/A

Field Size: 37 characters

Table(s): Company

Comments: N/A

Element Name: Date

Alias: Date
 Forms, Reports: Date

Description: Date for the document.

Edit Rules: N/A

Field Size: Date

Table(s): Document

Comments: N/A

Element Name: Description

Alias: Description
Forms, Reports: Description

Description: Free format field allowing user(s) to enter all appropriate information for an Interface Control Number (ICN).

Edit Rules: N/A

Field Size: Memo

Table(s): Interface

Comments: Searches cannot be performed on Memo fields.

Element Name: Document Number

Alias: Document Number
Forms, Reports: Document Number, Document #

Description: Field indicating the Document Number of the Document where an Interface Control Number (ICN) is referenced. This data element exists as the key field in the Document Table and as a key field in the Reference Document (Ref_Doc) Table.

Edit Rules: For the commitment action item;
o System required field during data entry.
o Must be unique.

Field Size: 20 characters

Table(s): Reference Document

Comments: When viewing this field in the input form for the Interface Table, a Help and Fill Lookup exists with the Document Table.

Element Name: Document Title .

Alias: Document Title
Forms, Reports: Document Title

Description: Field indicating the Document Title associated with the Document Number field.

Edit Rules: N/A

Field Size: 250 characters

Table(s): Document

Comments: N/A

Element Name: Engineer Id

Alias: Engineer Id
Forms, Reports: Engineer Id

Description: A value used to uniquely identify an individual.

Edit Rules: For the commitment action item;
o System required field during data entry.
o Must be unique.
o Limited to integers

Field Size: Short

Table(s): Engineer
Responsibility

Comments: When viewing this field in the input form for the System
Table, a Help and Fill Lookup exists with the Engineer Table.

Element Name: Engineer Name

Alias: Engineer Name
Forms, Reports: Engineer Name

Description: Field indicating the Engineer Name associated with the Engineer Id field.

Edit Rules: N/A

Field Size: 20 characters

Table(s): Engineer

Comments: When viewing this field in the input form for the System Table, a Help and Fill Lookup exists with the Engineer Table.

Element Name: ICN

Alias: Interface Control Number
Forms, Reports: Interface Control Number, ICN

Description: A unique value used to represent the Interface Control Number (ICN) which is being monitored.

Edit Rules: For the commitment action item;
o System required field during initial data entry.
o Must be unique.
o Limited to integers.

Field Size: Numeric

Table(s): Interface
Reference Document

Comments: N/A

Element Name: Implementation

Alias: Implementation
Forms, Reports: Implementation

Description: Free format field allowing user(s) to enter all appropriate information for how an Interface Control Number (ICN) is to be implemented.

Edit Rules: N/A

Field Size: Memo

Table(s): Interface

Comments: Searches cannot be performed on Memo fields.

Element Name: Resolved

Alias: Resolved
Forms, Reports: Resolved, R

Description: Indicates whether an Interface Control Number (ICN) has been resolved.

Edit Rules: For the action item;
o Values converted to uppercase.
o Only "Y,y" or "N,n" values valid.

Field Size: 1 character

Table(s): Interface

Comments: N/A

Element Name: Sheet Number

Alias: Sheet Number
Forms, Reports: Sheet Number

Description: Indicates where a particular Interface Control Number (ICN) can be found in a document.

Edit Rules: N/A

Field Size: 4 characters

Table(s): Document

Comments: N/A

Element Name: Side A

Alias: Side A
Forms, Reports: Side A, System No.

Description: Code indicating one of two sides (systems) that an Interface Control Unit is connected.

Edit Rules: For the action item;
o Values must coincide with System table.

Field Size: 10 characters

Table(s): Interface

Comments: When viewing this field in the input form for the Interface Table, a Help and Fill Lookup exists with the System Table.

Element Name: Side A Name

Alias: Side A Name
Forms, Reports: System Name, From Syst, Name

Description: Descriptive identification of System A Code.

Edit Rules: N/A

Field Size: 64 characters

Table(s): Interface

Comments: N/A

Element Name: Side B

Alias: Side B
Forms, Reports: Side B, System No.

Description: Code indicating one of two sides (systems) that an Interface Control Unit is connected.

Edit Rules: For the action item;
o Values must coincide with System table.

Field Size: 10 characters

Table(s): Interface

Comments: When viewing this filed in the input form for the Interface Table, a Help and Fill Lookup exists with the System Table.

Element Name: System Id

Alias: System Id
Forms, Reports: System Id

Description: A value used to uniquely identify systems used in the database.

Edit Rules: For the action item;
o System required field during data entry.
o Must be unique.

Field Size: 10 characters

Table(s): System
Responsibility

Comments: N/A

Element Name: System Name

Alias: System Name
Forms, Reports: System Name, Name

Description: Descriptive name for a given System Id.

Edit Rules: N/A

Field Size: 64 characters

Table(s): System

Comments: N/A

Element Name: Type Id

Alias: Type
Forms, Reports: Type, Role

Description: A value used to represent the role an individual will have in the development/maintenance of an Interface Control Number (ICN).

Edit Rules: For the commitment action item;
o System required field during initial data entry.
o Must be unique.
o A minimum of two characters is required during input.
All characters are converted to uppercase.

Field Size: 3 characters

Table(s): Types

Comments: When viewing this field in the input form for the System Table, a Help and Fill Lookup exists with the Types Table.

Element Name: Type Name

Alias: Type Name
Forms, Reports: Type Name, Role

Description: Descriptive name identifying a Type Id.

Edit Rules: N/A

Field Size: 25 characters

Table(s): Types

Comments: N/A

Element Name: Version

Alias: Version
Forms, Reports: Version

Description: Value indicating which version of the Document is being used as a reference.

Edit Rules: For the action item;
o Any combinations of 0-9, A-Z, "-" or "."
o All letters converted to uppercase.

Field Size: 5 characters

Table(s): Document

Comments: N/A

APPENDIX B - SYSTEM MESSAGES

Informative Messages

"Cancelling [+task]"

[A generic message informing the user of the cancellation of a particular task.]

"Ending Coedit"

[Editing of a table has ended.]

"Fix Your Printer--Press [Esc] to Quit, or Another Key to Continue"

[Message informing user that print job was not completed.]

"Generating [+rptname]"

[The report entitled [+rptname] is being created]

"Please Wait"

[Prompt user to wait for an operation to be completed.]

"Not one of the possible values for this field"

[The user has entered an invalid value for the current field.]

"Posted New Record ##"

[A new record has been posted to the table.]

"Print Complete"

[A given print job is complete.]

"Printing Current Record"

[The selected record being viewed is being printed.]

"Processing Query Document Table"

[The Document table is being queried for selected data.]

"Processing Query Engineer Table"

[The Engineer table is being queried for selected data.]

"Processing Query Interface Table"

[The Interface table is being queried for selected data.]

"Processing Query System Table"

[The System table is being queried for selected data.]

"Record currently locked by 'xxxx', try again later"

[The commitment record being accessed is being modified by another user.]

"Searching"

[The database is being scanned to locate the record specified.]

"The [+sysname] System is not available at this time"

[Access to the system is not available due to system lockout implemented by the System Administrator or the EIC Analyst.]

"Verifying password"

[The system is accessing the User table to verify the password entered by the user.]

Error Messages

- "A value must be provided in this field"
[The current field is required for data entry and may not be left blank.]
- "Can't delete a new record"
[A record cannot be deleted by the user on this form]
- "Can't insert a new record"
[A new record cannot be entered by the user on this form]
- "Field cannot be modified"
[The current field may not be modified by the user.]
- "Invalid password"
[The password entered is invalid, re-enter or contact the System Administrator.]
- "Modifying Structure of Answer Table"
[An Answer table is being re-structured to meet requirements for a report definition.]
- "Not one of the possible values for this field"
[The user has entered an invalid value for the current field.]
- "Unexpected condition, Leaving Paradox"
[An anomalous condition exists causing an exit from the WRCTS system and Paradox. Contact the WRCTS system analyst or the EUC immediately.]
- "Value 'xxx' not found"
[Value searched for does not exist in the database or does not belong to the current users functional group.]
- "You are not authorized to delete this record"
[The user does not have the proper access to delete records.]
- "You Have Insufficient Access Rights for this Operation"
[The user's access code does not allow for this operation.]

APPENDIX C - SYSTEM ADMINISTRATOR

This purpose of this section is to provide information specific to the operation of the EIC program for the System Administrator. To access System Administrator function, one needs to go to the Update/View Tables menu:

Update/View Tables
Company Document Engineer Interface System Types
Passwords System Lockout System Messages
Previous Menu

There are three options set aside for the System Administrator: Passwords, System Lockout and System Messages.

Passwords

Only the System Administrator has the ability to grant passwords. These passwords allow the user not only to gain access to the EIC System, but grant various "privileges" to the user. It is this password which determines whether a user has access to various parts of the program. Selecting Passwords from the menu displays the following:

Edit	Toggle View <F7>	Print Record <F9>	Return <F2>
TAB\ADMIN\PASS	User pass	Access	User name
1	POWERFUL	ALL	IRM ANALYSTS
2	DYNAMIC	ALL	EIC LEAD
3	MEDIUM	UPDATE	JP MORGAN
4	READ	READONLY	A GRANT
5	REGULAR	INSMOD	P SIMON
6	SEE	READONLY	W PHILLIPS
7	TEST	UPDATE	B MOTSENBACHER
8	WINDOW	INSMOD	K CLEM

<F10> = Menu | Hold down left mouse button to scroll up, right scroll down

This is the Table View for the Password Table. In review, no editing can be performed at this level. Pressing Toggle View <F7> will display the Form View:

Edit Toggle View <F7> Print Record <F9> Return <F2>

User Password GENERAL	Access Level ALL	User Name IRM ANALYSTS
--------------------------	---------------------	---------------------------

<table border="1"> <tr> <td>System</td> <td>End Function</td> </tr> <tr> <td>ALL</td> <td>ALL</td> </tr> </table>	System	End Function	ALL	ALL
System	End Function			
ALL	ALL			

<F10> = Menu |

The Form View for the Password consists of four parts. The first section allows for password input, the second for the access level and the third for the user name. The fourth second consists of two fields: System and End Function. This area allows for further defining of the access rights given to an individual. The EIC program does not make use of this section at this time, due to users needing access to all of the data. Any user being given "ALL" access rights needs to have the words "ALL" displayed in both columns in this lower section. All other users should have the word "EIC" entered into the System field. Pressing <F3> will toggle the user between the top and bottom portions of this form.

System Lockout

This option allows the System Administrator to lock users out of the program for an indefinite period of time. This is used to allow the Administrator or the EIC Analyst to perform maintenance work without being interrupted by the users. Selecting this option brings up the Table View:

TAB\ADMIN\LOCK	ELOCK
1	N

<F10> = Menu |

Pressing Toggle View <F7> will display the Form View:

Edit Toggle View <F7> Print Record <F9> Return <F2>		
ELOCK: N	Tab\admin\lock	#

This option will not remove users who are all ready using the EIC System. It will only prevent new users from entering the program.

System Messages

This option allows the System Administrator to send messages to the user community. Messages can be received either during the logon process or to users already in the system via a scrolling message option. Selecting this options displays the following:

Edit Toggle View <F7>	Print Record <F9>	Return <F2>	
TAB\ADMIN\MESSAGE	Logon_Message		Scrolling_Me
1			

<F10> = Menu | Hold down left mouse button to scroll up, right scroll down

There is only one record in this table consisting of two fields: Logon_Message and Scrolling_Message. The logon message is a Memo field which is displayed to the user during the logon process. This will be a full screen display with a red background. The scrolling message is a 250 character field which is displayed at the bottom of the screen scrolling from right to left. This message cannot be stopped by the user until the entire message has been displayed. To enter data into either of these fields, press Toggle View <F7> to display the input form.

Edit Toggle View <F7> Print Record <F9> Return <F2>	
Logon Message:	Tab\admin\message #
Scrolling_Message:	

To enter a message into the Logon Message field, the user must first press <Alt-F5>. This will display a full screen, free-format display with the following header:

===== Tab\admin\message->Logon_Message =====

All the user need do now is to start typing. When finished entering a message, press <F2> to exit the Logon Message display. Press <F2> again to return to the previous menu saving all changes.

To enter information into the Scrolling message field, move the cursor to the field and start typing. Press <F2> to return to the previous menu saving all changes.