

Figure 1.7.2.2-17: Process Structure (BASIC INFORMATION Export Process)

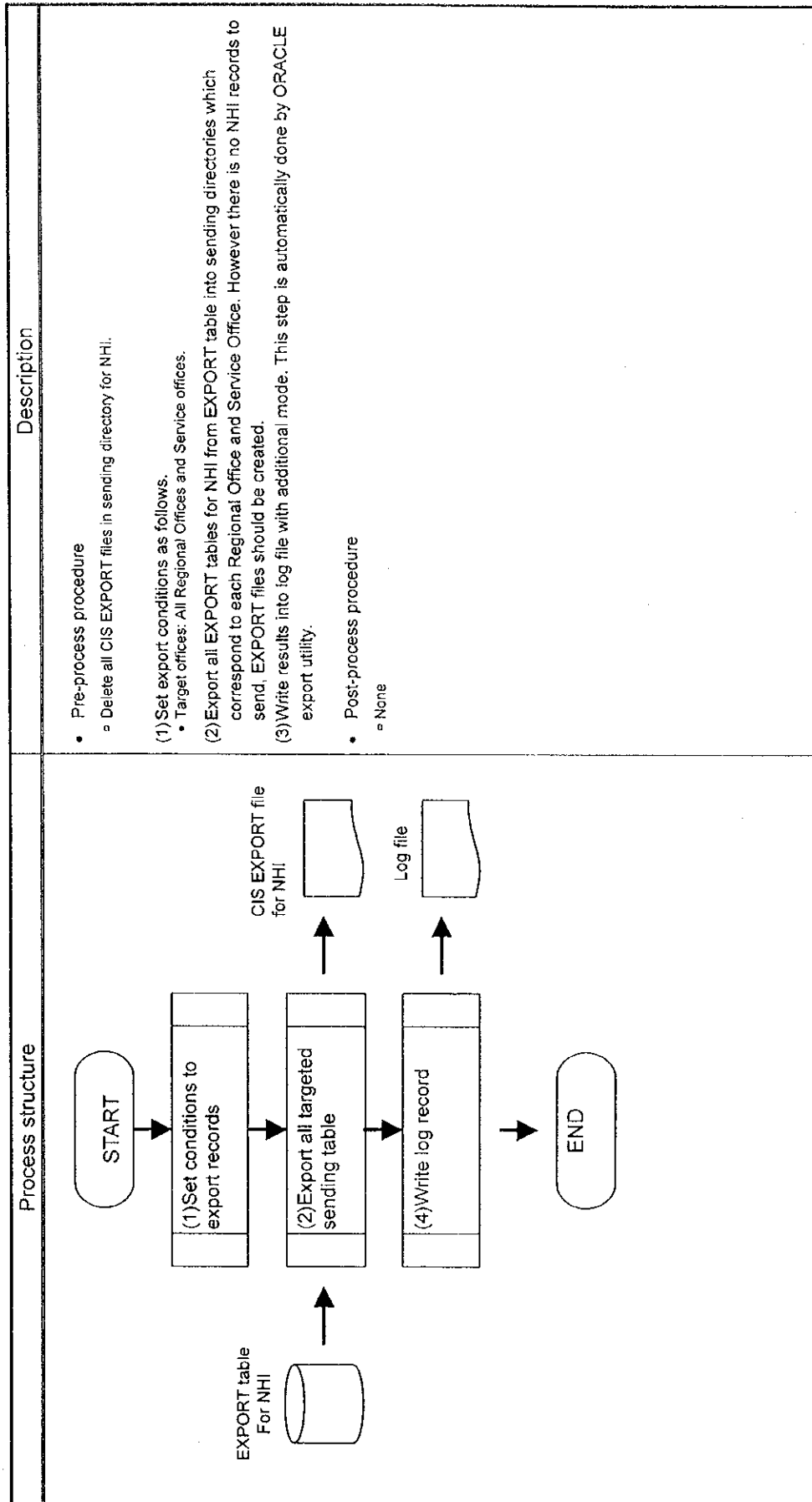


Figure 1.7.2.2-18: Process Structure (NHI Export Process)

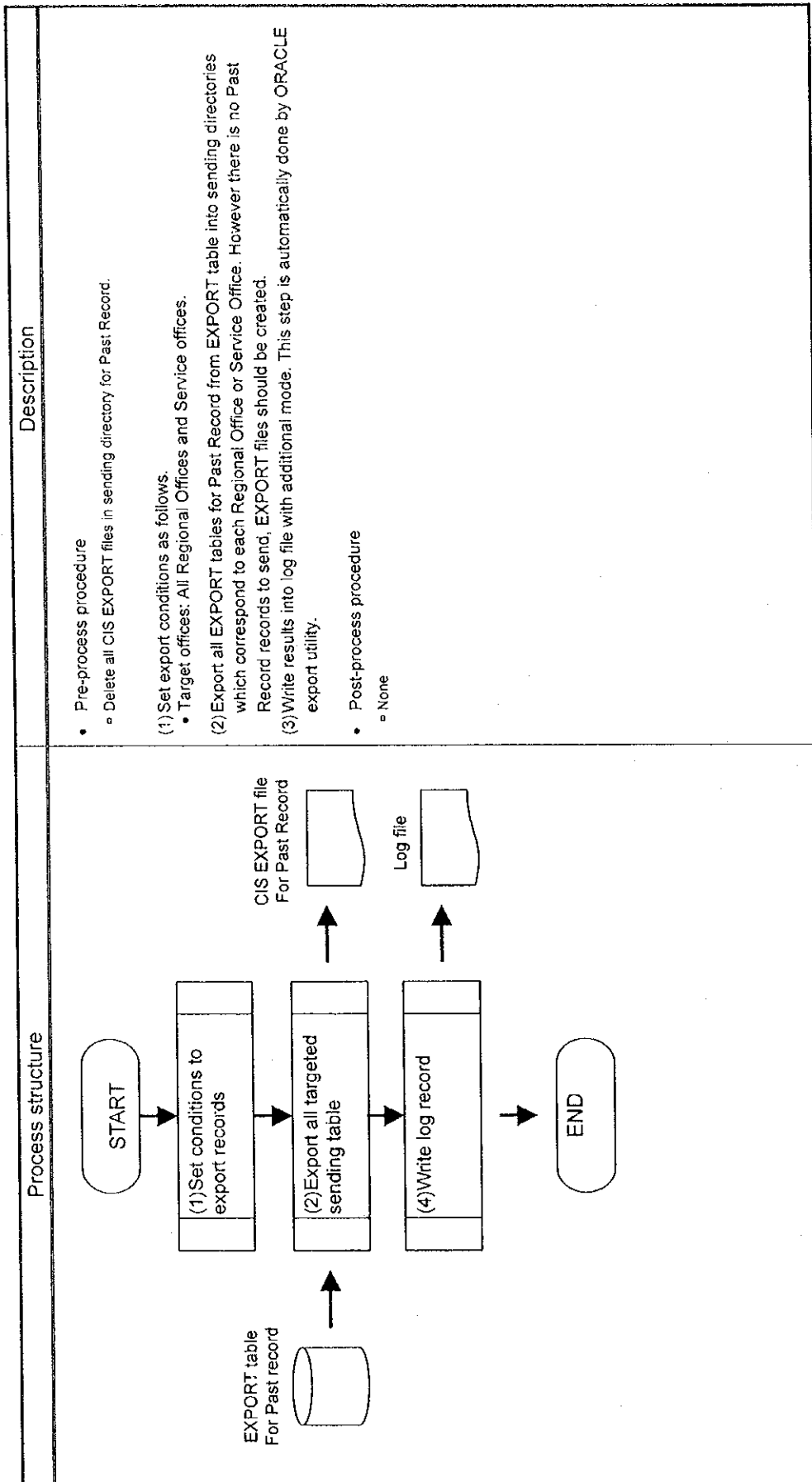


Figure 1.7.2.2-19: Process Structure (Past Record Export Process)

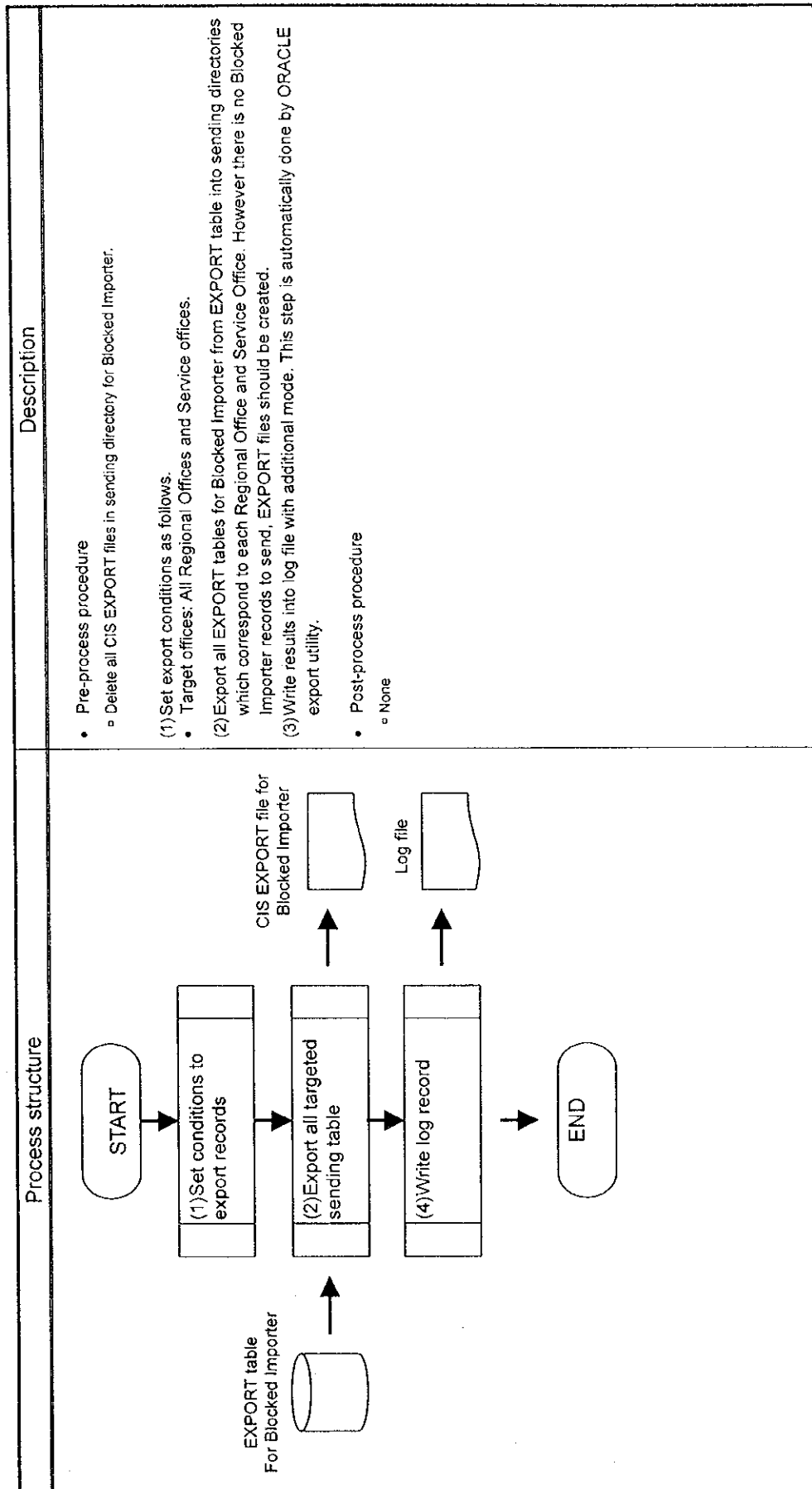


Figure 1.7.2.2-20: Process Structure (Blocked Importer Export Process)

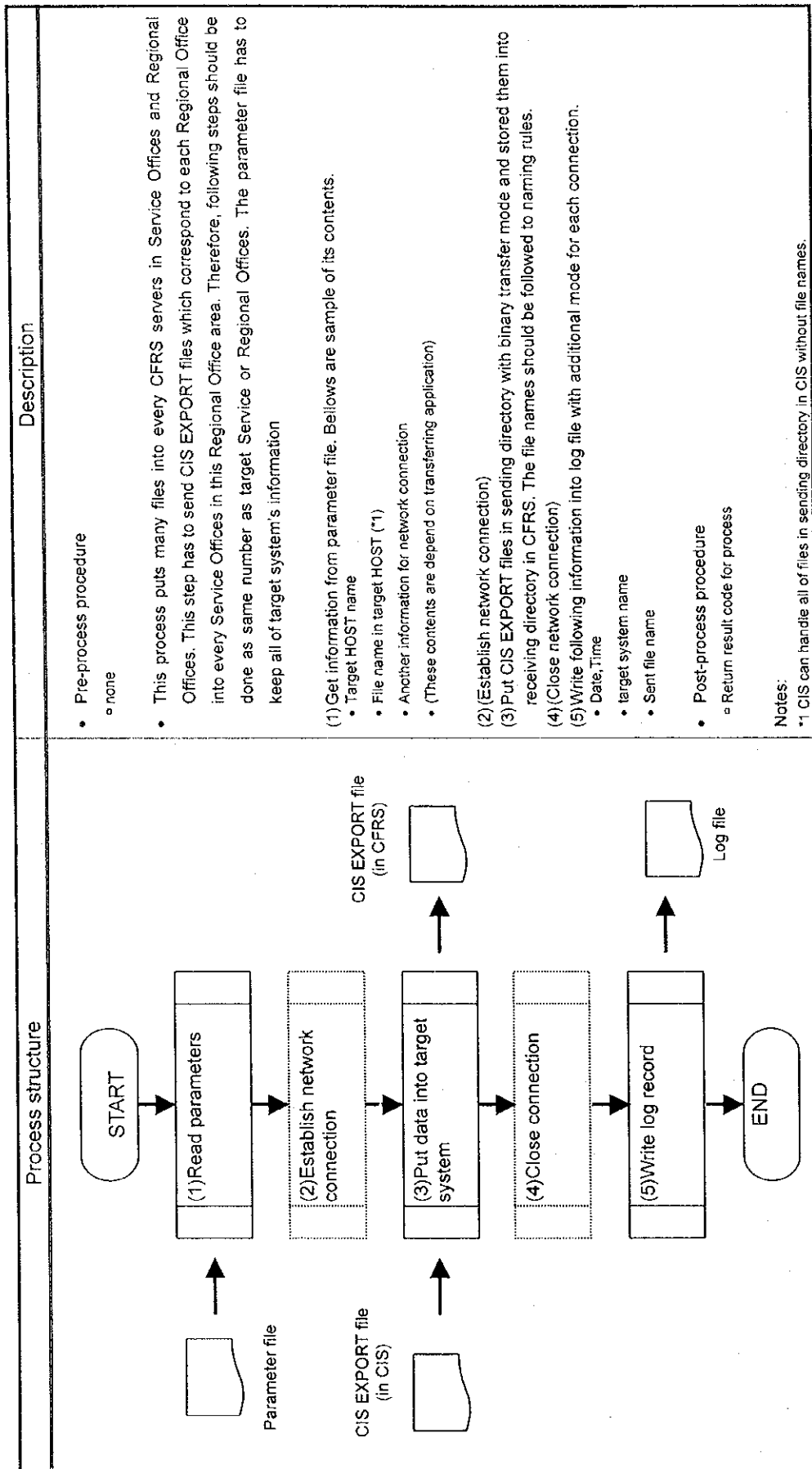


Figure 1.7.2.2-21: Process Structure (Transfer process for data sending)

Table 1.7.2.2-1: File property (Data exchanging between CIS and CFRS)

No	File name	File type	I/O	Unit	Duration	Remarks
1	CFRS EXPORT file (in CFRS)	EXPORT FILE	INPUT	1 set of files/Service Office	Temporary	Each CFRS in Service Office creates CFRS EXPORT file by Oracle export utility.
2	CFRS EXPORT file (in CIS)	EXPORT FILE	INPUT /OUTPUT	1 set of files/Service Office	Temporary	Transfer process creates CFRS EXPORT files in CIS by coping from CFRS servers.
3	CFRS EXPORT file (in magnetic tape)	EXPORT FILE	INPUT	1 set of files/Service Office	Temporary	CFRS server which doesn't have network connection creates CFRS EXPORT file.
4	CFRS database in CIS	ORACLE	OUTPUT	1 database/system Several tables/database	Temporary	IMPORT tables and EXPORT tables are included in CFRS database in CIS
5	Parameter file	ASCII FILE	INPUT	1 file/system	Permanent	—
6	CIS database	ORACLE DB	INPUT /OUTPUT	1 database/system Several tables/database	Permanent	—
7	CFRS EXPORT file (in CIS)	EXPORT FILE	INPUT/ OUTPUT	1 set of files/Regional Office or Service Office	Temporary	CIS creates CIS EXPORT file by Oracle export utility for each Regional Offices or Service Offices.
8	CIS EXPORT file (in CFRS)	EXPORT FILE	OUTPUT	1 set of files/Regional Office or Service Office	Temporary	CIS creates CIS EXPORT file by Oracle export utility for each Regional Offices or Service Offices.
9	CIS EXPORT file (in magnetic tape)	EXPORT FILE	OUTPUT	1 set of files/Regional Office or Service Office	Temporary	CIS creates CIS EXPORT file by Oracle export utility for each Regional Offices or Service Offices.
10	Log file	ASCII	OUTPUT	1 file/system	Permanent	—

Table 1.7.2.2-2: Error definition (Transfer process for data receiving)

No	Error case	Action	Error level	Remarks
1	Can not read parameter file or can not allocate parameter file.	Stop process.	Failed (unable to retry)	—
2	There is no record in parameter file.	Stop process.	Failed (unable to retry)	—
3	Can not establish network connection	After making several retries, skip process for this Office.	Warning	—
4	There is no file in sending directory in CFRS.	Close network connection and continue process for next Office.	Warning	—
5	There is no sending directory in CFRS.	Close network connection and continue process for next Office.	Warning	—
6	There is no receiving directory in CIS	Close network connection and continue process for next Office.	Warning	—
7	Can not put CFRS EXPORT files into receiving directory in CIS.	Close network connection and continue process for next Office.	Warning	—
8	There already exists same record.	Replace exiting records by received record.	Warning	—
9	Can not close network connection	After making several retries, skip process for this Office.	Warning	—
10	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	—

Table 1.7.2.2-3: Error definition (Import process)

No	Error case	Action	Error level	Remarks
1	There is no CFRS EXPORT file in receiving directory.	Skip process for this Office.	Warning	—
2	There is no receiving directory in CIS.	Skip process for this Office.	Warning	—
3	Can not read CFRS EXPORT file by Oracle export utility.	Skip process for this file.	Warning	—
4	Can not put IMPORT table into the CIS database.	Skip process for this file.	Warning	—
5	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	—

Table 1.7.2.2-4: Error definition (NPWP registration process)

No	Error case	Action	Error level	Remarks
1	Can not access IMPORT table for NPWP in CIS database.	Stop process.	Failed (unable to retry)	—
2	There is no record in IMPORT table for NPWP.	Stop process.	Warning	—
3	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	—
4	Can not allocate or access CIS database.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
5	Can not put records into BASIC INFORMATION in CIS.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.

Table 1.7.2.2-5: Error definition (PIB registration process)

No	Error case	Action	Error level	Remarks
1	Can not access IMPORT table for PIB in CIS database.	Stop process.	Failed (unable to retry)	—
2	There is no record in IMPORT table for PIB.	Stop process.	Warning	—
3	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	—
4	Can not allocate or access CIS database.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
5	Can not put records into PIB tables in CIS.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.

Table 1.7.2.2-6: Error definition (PIBT registration process)

No	Error case	Action	Error level	Remarks
1	Can not access IMPORT table for PIBT in CIS database.	Stop process.	Failed (unable to retry)	—
2	There is no record in IMPORT table for PIBT.	Stop process step.	Warning	—
3	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	—
4	Can not allocate or access CIS database.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
5	Can not put records into PIBT tables in CIS.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.

Table 1.7.2.2-7: Error definition (PEB registration process)

No	Error case	Action	Error level	Remarks
1	Can not access IMPORT table for PEB in CIS database.	Stop process.	Failed (unable to retry)	---
2	There is no record in IMPORT table for PEB.	Stop process.	Warning	---
3	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	---
4	Can not allocate or access CIS database.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
5	Can not put records into PEB tables in CIS.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.

Table 1.7.2.2-8: Error definition (BASIC INFORMATION extraction process)

No	Error case	Action	Error level	Remarks
1	Can not access BASIC INFORMATION in CIS database.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
2	There is no record to be extracted in BASIC INFORMATION in CIS	Stop process.	Warning	—
3	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	—
4	Can not allocate or access CIS database.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
5	Can not put records into EXPORT table for BASIC INFORMATION.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
6	Can not create EXPORT table for BASIC INFORMATION in CFRS database in CIS.	Stop process.	Failed (unable to retry)	—

Table 1.7.2.2-9: Error definition (NHI extraction process)

No	Error case	Action	Error level	Remarks
1	Can not access NI/NHI in CIS database.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
2	There is no record to be extracted in NI/NHI in CIS	Stop process.	Warning	—
3	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	—
4	Can not allocate or access CIS database.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
5	Can not put records into EXPORT table for NHI.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
6	Can not create EXPORT table for NHI in CFRS database in CIS.	Stop process.	Failed (unable to retry)	—

Table 1.7.2.2-10: Error definition (Past Record extraction process)

No	Error case	Action	Error level	Remarks
1	Can not access PASTRECORD AND BLOCKED IMPORTER in CIS database.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
2	There is no record to be extracted in PASTRECORD AND BLOCKED IMPORTER in CIS	Stop process.	Warning	—
3	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	—
4	Can not allocate or access CIS database.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
5	Can not put records into EXPORT table for Past Record.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
6	Can not create EXPORT table for Past Record in CFRS database in CIS.	Stop process.	Failed (unable to retry)	—

Table 1.7.2.2-11: Error definition (Blocked Importer extraction process)

No	Error case	Action	Error level	Remarks
1	Can not access PASTRECORD AND BLOCKED IMPORTER in CIS database.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
2	There is no record to be extracted in PASTRECORD AND BLOCKED IMPORTER in CIS	Stop process.	Warning	---
3	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	---
4	Can not allocate or access CIS database.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
5	Can not put records into EXPORT table for Blocked Importer.	Stop process.	Failed (unable to retry)	In some cases, the operation must be rolled back.
6	Can not create EXPORT table for Blocked Importer in CFRS database in CIS.	Stop process.	Failed (unable to retry)	---

Table 1.7.2.2-12: Error definition (BASIC INFORMATION export process)

No	Error case	Action	Error level	Remarks
1	Can not access EXPORT table for BASIC INFORMATION in CFRS database in CIS.	Stop process.	Failed (unable to retry)	—
2	There is no record in EXPORT table for BASIC INFORMATION in CFRS database in CIS.	Continue this process.	Warning	CIS has to send the record with 0 record.
3	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	—
4	Can not allocate or access CFRS database in CIS.	Stop process.	Failed (unable to retry)	—
5	Can not put a file into sending directory.	Stop process.	Failed (unable to retry)	—
6	There is no sending directory.	Stop process.	Failed (unable to retry)	—

Table 1.7.2.2-13: Error definition (NHI export process)

No	Error case	Action	Error level	Remarks
1	Can not access EXPORT table for NHI in CFRS database in CIS.	Stop process.	Failed (unable to retry)	—
2	There is no record in EXPORT table for NHI in CFRS database in CIS.	Continue this process.	Warning	CIS has to send the record with 0 record.
3	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	—
4	Can not allocate or access CFRS database in CIS.	Stop process.	Failed (unable to retry)	—
5	Can not put a file into sending directory.	Stop process.	Failed (unable to retry)	—
6	There is no sending directory.	Stop process.	Failed (unable to retry)	—

Table 1.7.2.2-14: Error definition (Past Record export process)

No	Error case	Action	Error level	Remarks
1	Can not access EXPORT table for Past Record in CFRS database in CIS.	Stop process.	Failed (unable to retry)	---
2	There is no record in EXPORT table for Past Record in CFRS database in CIS.	Continue this process.	Warning	CIS has to send the record with 0 record.
3	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	---
4	Can not allocate or access CFRS database in CIS.	Stop process.	Failed (unable to retry)	---
5	Can not put a file into sending directory.	Stop process.	Failed (unable to retry)	---
6	There is no sending directory.	Stop process.	Failed (unable to retry)	---

Table 1.7.2.2-15: Error definition (Blocked Importer export process)

No	Error case	Action	Error level	Remarks
1	Can not access EXPORT table for Blocked Importer in CFRS database in CIS.	Stop process.	Failed (unable to retry)	—
2	There is no record in EXPORT table for Blocked Importer in CFRS database in CIS.	Continue this process.	Warning	CIS has to send the record with 0 record.
3	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	—
4	Can not allocate or access CFRS database in CIS.	Stop process.	Failed (unable to retry)	—
5	Can not put a file into sending directory.	Stop process.	Failed (unable to retry)	—
6	There is no sending directory.	Stop process.	Failed (unable to retry)	—

Table 1.7.2.2-16: Error definition (Transfer process for data sending)

No	Error case	Action	Error level	Remarks
1	Can not read parameter file or can not allocate parameter file.	Stop process.	Failed (unable to retry)	Next process should not be run.
2	There is no record in parameter file.	Stop process.	Failed (unable to retry)	---
3	Can not establish network connection	After making several retries, skip process for this Office.	Warning	---
4	There is no file in sending directory in CIS.	Close network connection and continue process for next Office.	Warning	---
5	There is no receiving directory in CFRS.	Close network connection and continue process for next Office.	Warning	---
6	There is no sending directory in CIS	Close network connection and continue process for next Office.	Warning	---
7	Can not put CIS EXPORT files into receiving directory in CFRS.	Close network connection and continue process for next Office.	Warning	---
8	There already exists same record in receiving directory.	Replace exiting records by received record.	Warning	---
9	Can not close network connection	After making several retries, skip process for this Office.	Warning	---
10	Can not put records into log file or can not allocate log file.	Stop process.	Failed (unable to retry)	---

Table 1.7.2.2-17: Preconditions and Restrictions (Transfer process for receiving)

No	Type	Description	Remarks
1	Precondition	All CFRS servers in every Service Offices must follow the naming rules which defined file names for data exchanging between CIS and CFRS.	Refer to Figure 1.7.2.2-22.
2	Precondition	CIS gets all of files which are existing in sending directory in CFRS, however some of them are not for CIS. Therefore, certainly CFRS should prepare daily transaction files only for CIS every day.	—
3	Precondition	CFRS should be running when CIS gets CFRS export files. Also, all of network equipment should be turn on. Otherwise, CIS can not get files.	—
4	Precondition	CIS makes copy of CFRS EXPORT files to keep files a fixed period time.	—
5	Precondition	CFRS does not create CFRS EXPORT file on Sunday and national holidays. Therefore, the next day of Sunday or national holidays, CFRS creates CFRS EXPORT files for previous day(s) and current day.	—
6	Precondition	CFRS creates many CFRS EXPORT files for every exchanging data, such as PIB, PEB, PIBT, NPWP and currency exchange table.	—
7	Precondition	Only one Service Office should creates CFRS EXPORT file for currency exchange rate table every week.	The Office is not decided yet.
8	Precondition	CFRS creates CFRS EXPORT file for NPWP file when a new NPWP information has been registered or existing NPWP information has been changed.	—
9	Precondition	CFRS creates CFRS EXPORT file for PIB, PIBT and PEB data as daily transaction data every day.	—
10	Precondition	Service Offices which has no online-connection are expected to send CIS PIB records by magnetic tape.	CIS keeps more than one generation.

Table 1.7.2.2-18: Preconditions and Restrictions (Import process)

No	Type	Description	Remarks
1	Precondition	CFRS has to use export function of ORACLE to make CFRS EXPORT files. Also, CIS uses import function of ORACLE to import CFRS EXPORT file into CIS database.	—
2	Precondition	CIS tries to import all of receiving files from CFRS into IMPORT file in CIS, however the files have different formats or different names.	—
3	Precondition	When there are duplicated records among receiving files, then only one of them would be registered into CIS database. The selectivity is depend on sequence of record processing.	After the second records might be discarded.

Table 1.7.2.2-19: Preconditions and Restrictions (NPWP registration process)

No	Type	Description	Remarks
1	Precondition	NPWP files in receiving file have to have same data items as BASIC INFORMATION table in CIS database.	Refer to Supplement C.1 and C.2
2	Precondition	CFRS should set a value in flag to inform status of this record to CIS. For example, "NEW" is used for new NPWP records, also "UPDATED" indicates that something changes are in this record.	---

Table 1.7.2.2-20: Preconditions and Restrictions (PIB registration process)

No	Type	Description	Remarks
1	Precondition	PIB files in receiving file have to have same data structure as PIB tables in CIS database. (PIB HEADER, PIB DETAIL, PIB PAYMENT, PIB PROCESS, PIB CONTAINER, FSSBCS)	Refer to Supplement C.1
2	Precondition	When the company has additional payment duties, CFRS is expected to send its PIB data twice. In this case, CFRS set a certain value in flag-area to inform CIS that the data includes additional payment (e.g. "finished"). In this case, CIS replaces existing PIB record by received one.	In case of sending same data more than two times, both CIS and CFRS have to re-consider this mechanism.
3	Precondition	When CIS receives the same PIB data from CFRS, excluding the case of additional payment, CIS discards it.	Necessary to check status flag in PIB record before discarding.
4	Precondition	Service Offices which has no online-connection are expected to send CIS PIB records by magnetic tape.	---
5	Precondition	None-computerized Service Offices has to send the documents to their Regional Offices in order to input the PIB data into computer system such as SE-11, CIS or CFRS. DJBC has to decide the operation rule. Otherwise, CIS can not gather all of PIB data.	---

Table 1.7.2.2-21: Preconditions and Restrictions (PIBT registration process)

No	Type	Description	Remarks
1	Precondition	PIBT files in receiving file have to have same data structure as PIBT tables in CIS database. (PIBT HEADER, PIBT DETAIL, PIBT PAYMENT, PIBT PROCESS, PIBT FSSBCS)	Refer to Supplement C.1
2	Precondition	When the company has additional payment duties, CFRS is expected to send its PIBT data twice. In this case, CFRS set a certain value in flag-area to inform CIS that the data includes additional payment (e.g. "finished"). In this case, CIS replaces existing PIBT record by received one.	In case of sending same data more than two times, both CIS and CFRS have to re-consider this mechanism.
3	Precondition	When CIS receives the same PIBT data from CFRS, excluding the case of additional payment, CIS discards it.	Necessary to check status flag in PIBT record before discarding.
4	Precondition	Service Offices which has no online-connection are expected to send CIS PIBT records by magnetic tape.	—
5	Precondition	None-computerized Service Offices has to send the documents to their Regional Offices in order to input the PIB data into computer system such as SE-11, CIS or CFRS. DJBC has to decide the operation rule. Otherwise, CIS can not gather all of PIBT data.	—

Table 1.7.2.2-22: Preconditions and Restrictions (PEB registration process)

No	Type	Description	Remarks
1	Precondition	PEB files in receiving file have to have same data structure as PEB tables in CIS database. (PEB HEADER, PEB DETAIL, PEB CONTAINER)	Refer to Supplement C.1
2	Precondition	Service Offices which has no online-connection are expected to send CIS PEB records by magnetic tape.	—
3	Precondition	None-computerized Service Offices has to send the documents to their Regional Offices in order to input the PEB data into computer system such as SE-11, CIS or CFRS. DJBC has to decide the operation rule. Otherwise, CIS can not gather all of PEB data.	—
4	Precondition	When CIS receives same PEB records from CFRS, CIS discards them.	—

Table 1.7.2.2-23: Preconditions and Restrictions (BASIC INFORMATION extraction process)

No	Type	Description	Remarks
1	Precondition	This process has been scheduled monthly-JOB. Therefore, CFRS can get latest BASIC INFORMATION table once a month.	---
2	Precondition	CIS uses export function of ORACLE to create CIS EXPORT files. Therefore, CFRS has to use import function of ORACLE to import CIS EXPORT file into CFRS database.	---
3	Precondition	CIS sends BASIC INFORMATION table with same structure as in CIS. Therefore, when CFRS reflect this data to NPWP file in CFRS database, then CFRS has to assemble NPWP record from BASIC INFORMATION by itself.	---
4	Precondition	CIS follows to sending mechanism for NPWP data which has been agreed between ADP and the JICA Study Team.	Refer to Figure 1.7.2.2-6.

Table 1.7.2.2-24: Preconditions and Restrictions (NHI extraction process)

No	Type	Description	Remarks
1	Precondition	This process would be run when new NHI has been issued or existing NHI has been updated, as one of daily batch processes.	—
2	Precondition	CIS sends NHI to every Service Office which are specified from NHI management screen by CIS user.	—
3	Precondition	CIS sends NI/NHI table and related several tables with same structure as in CIS. Therefore, when CFRS reflects these records to NHI tables in CFRS, then CFRS has to assemble NHI records from NI/NHI tables by itself.	—

Table 1.7.2.2-25: Preconditions and Restrictions (Past Record extraction process)

No	Type	Description	Remarks
1	Precondition	This process would be run when new Past Record has been issued or existing Past Record has been updated.	—
2	Precondition	CIS sends PASTRECORD AND BLOCKED IMPORTER table with same structure as in CIS. Therefore, when CFRS reflect this data to Past Record table in CFRS database, then CFRS has to assemble Past Record records from PASTRECORD AND BLOCKED IMPORTER table by itself.	—
3	Precondition	CIS follows to sending mechanism for Past Record data which has been agreed between ADP and the JICA Study Team.	Refer to Figure 1.7.2.2-6.

Table 1.7.2.2-26: Preconditions and Restrictions (Blocked Importer extraction process)

No	Type	Description	Remarks
1	Precondition	This process would be run when new Blocked Importer has been issued or existing Blocked Importer record has been updated, as one of daily batch processes.	—
2	Precondition	CIS sends PASTRECORD AND BLOCKED IMPORTER table with same structure as in CIS. Therefore, when CFRS reflects this data to Blocked Importer table in CFRS database, then CFRS has to assemble Blocked Importer records from PASTRECORD AND BLOCKED IMPORTER table by itself.	—
3	Precondition	CIS follows to sending mechanism for Blocked Importer data which has been agreed between ADP and the JICA Study Team.	Refer to Figure 1.7.2.2-6.

Table 1.7.2.2-27: Preconditions and Restrictions (BASIC INFORMATION export process)

No	Type	Description	Remarks
1	Precondition	CIS uses export function of ORACLE to create CIS EXPORT files. Therefore, CFRS has to use import function of ORACLE to import CIS EXPORT file into CFRS database.	—
2	Precondition	CIS creates CIS EXPORT file for each Service Office which has been targeted for file sending from CIS.	—
3	Precondition	CIS make copy of CIS EXPORT files to keep files for a fixed period of time.	—

Table 1.7.2.2-28: Preconditions and Restrictions (NHI export process)

No	Type	Description	Remarks
1	Precondition	CIS uses export function of ORACLE to create CIS EXPORT files. Therefore, CFRS has to use import function of ORACLE to import CIS EXPORT file into CFRS database.	—
2	Precondition	CIS creates CIS EXPORT file for each Service Office which has been targeted for file sending from CIS.	—
3	Precondition	CIS make copy of CIS EXPORT files to keep files for a fixed period of time.	—

Table 1.7.2.2-29: Preconditions and Restrictions (Past Record export process)

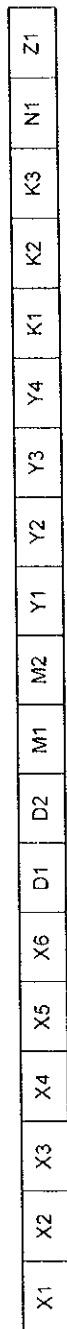
No	Type	Description	Remarks
1	Precondition	CIS uses export function of ORACLE to create CIS EXPORT files. Therefore, CFRS has to use import function of ORACLE to import CIS EXPORT file into CFRS database.	---
2	Precondition	CIS creates CIS EXPORT file for each Service Office which has been targeted for file sending from CIS.	---
3	Precondition	CIS make copy of CIS EXPORT files to keep files for a fixed period of time.	---

Table 1.7.2.2-30: Preconditions and Restrictions (Blocked Importer export process)

No	Type	Description	Remarks
1	Precondition	CIS uses export function of ORACLE to create CIS EXPORT files. Therefore, CFRS has to use import function of ORACLE to import CIS EXPORT file into CFRS database.	—
2	Precondition	CIS creates CIS EXPORT file for each Service Office which has been targeted for file sending from CIS.	—
3	Precondition	CIS make copy of CIS EXPORT files to keep files for a fixed period of time.	—

Table 1.7.2.2-31: Preconditions and Restrictions (Transfer process for sending)

No	Type	Description	Remarks
1	Precondition	When CIS puts CIS EXPORT file into CFRS server, CIS gives file names which are followed to naming rules.	Refer to Figure 1.7.2.2-22.
2	Precondition	CFRS should be running when CIS gets CFRS export files. Also, all of network equipment should be turn on. Otherwise, CIS can not get files.	—
3	Precondition	CIS sends CIS EXPORT file to every Service Office every day.	—
4	Precondition	When CIS EXPORT file has not been sent by several reasons, CIS can not make any retry to send. Therefore, CFRS operator should ask CIS operator to send CIS EXPORT file again.	—
5	Precondition	CIS creates many CIS EXPORT files for each exchanging data, such as BASIC INFORMATION, NHI, Past Record and Blocked Importer.	—



Office code: Office code that shows from or to which Service Office the files are originated. The length is six digits. CIS sets the Service Office code which corresponds to targeted Service Office. CFRS sets its own Service Office code. The structure of Office code must follow the basic rules in DJBC.

Date: Date when the file is exchanged. The length is eight digits. Both CIS and CFRS set current processing date.

Sequence: Sequential number which shows the order of files delivered. The length is one digit. In case of there are more than one files to exchange in a day, both CIS and CFRS should use this field to indicate sequence of files. Usually, it should be set for 01.

Identifier: Direction of data exchanging. "0" means the file from CFRS to CIS, "1" means the file from CIS to CFRS. The length is one character. CIS should set "1", also CFRS should set "0".

Kind of data: This field shows what kind of data is included in this file. The following values are example.

- "010" : NPWP data
- "020" : PIB data
- "030" : PIBT data
- "040" : PEB data
- "050" : Currency exchange rate table
- "110" : BASIC INFORMATION
- "120" : NHI
- "130" : PastRecord / Blocked importer

Example:
 0401002907199801010
 -Office code: 040100
 -Date: 29/07/1998
 -Kind of data: 010
 -Sequence: 1
 -Identifier : 0

This file is first sending (sequence=1) NPWP data (Kind of data="010") which has been originated from CFRS in Service Office Tanjung Priok I (its office code is "040100"), on 29 July 1998.

Figure 1.7.2.2-22: Technical detail information (Naming rules for the CIS EXPORT files and CFRS EXPORT files)

1.7.3 PIB statistical data creation

1.7.3.1 Design policy and circumstances

When the CIS operator wants to refer the summarized PIB information, the CIS application has to retrieve all of records from huge PIB database. It means this process may need much time to make results. Therefore, PIB statistical table is to be prepared in advance in order to avoid taking much time.

PIB statistical table contains several important statistical items and they are counted by each company per each month in every Regional Offices. In case of online connection with Service Office, this data would be updated everyday after receiving PIB data from CFRS. On the other hand, in case of no connection with Service Office, this data might be updated every month. because, these data have to be sent by magnetic media. The CIS end users have to understand that not all data of Service Offices are included in the CIS database for a certain period.

1.7.3.2 Specification of processes

As a result of system detail design (Phase II), the following documents are attached.

Conventions for describing formats are explained in Figure 1.7.2.2-1.

Process overview	Figure 1.7.3.2-1
Process structure	Figure 1.7.3.2-2
File property	Table 1.7.3.2-1
Error definition	Table 1.7.3.2-2
Preconditions and Restrictions	Table 1.7.3.2-3
Detail mechanism	Figure 1.7.3.2-3

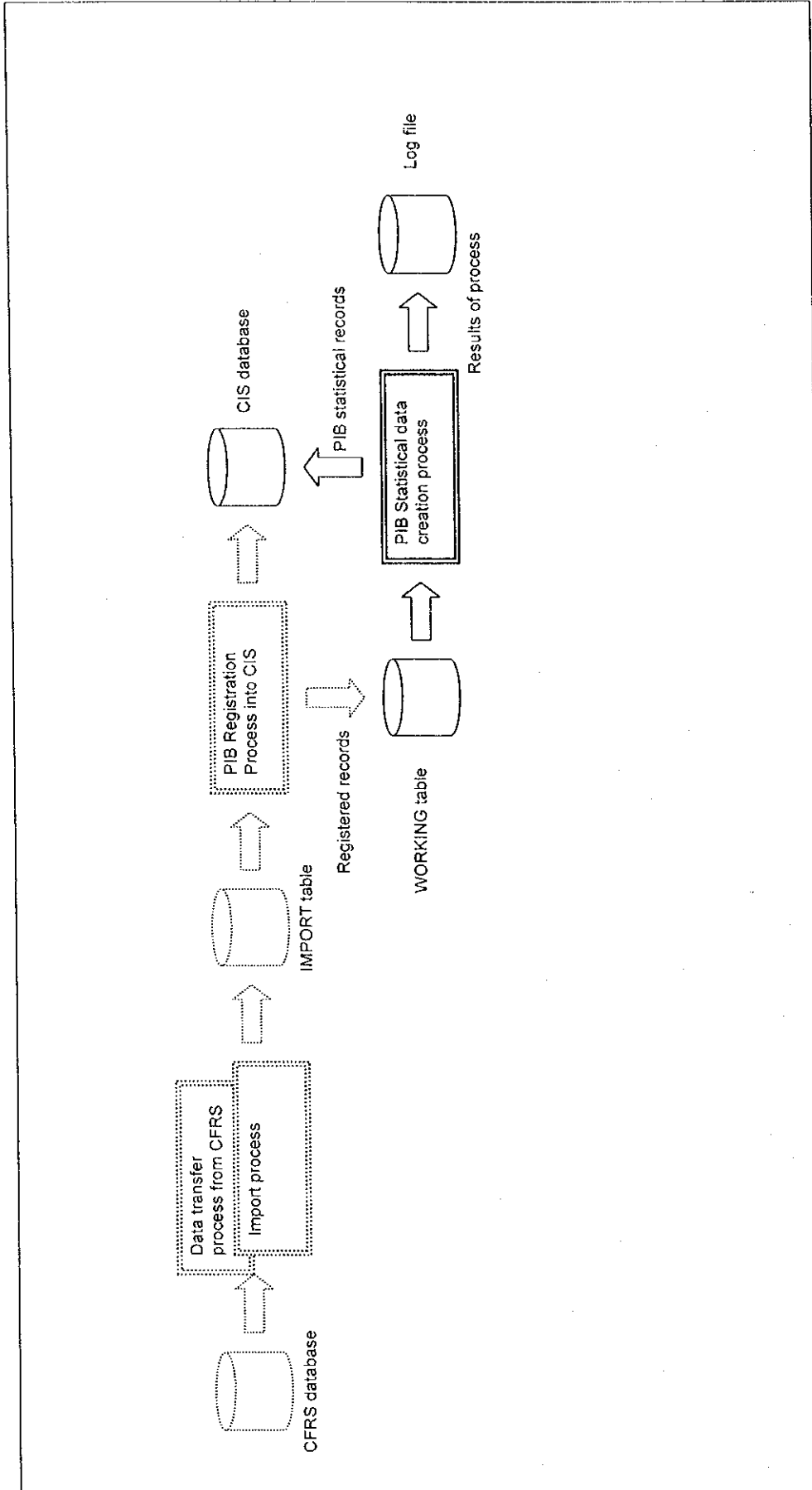


Figure 1.7.3.2-1: Process Overview (PIB statistical data creation)

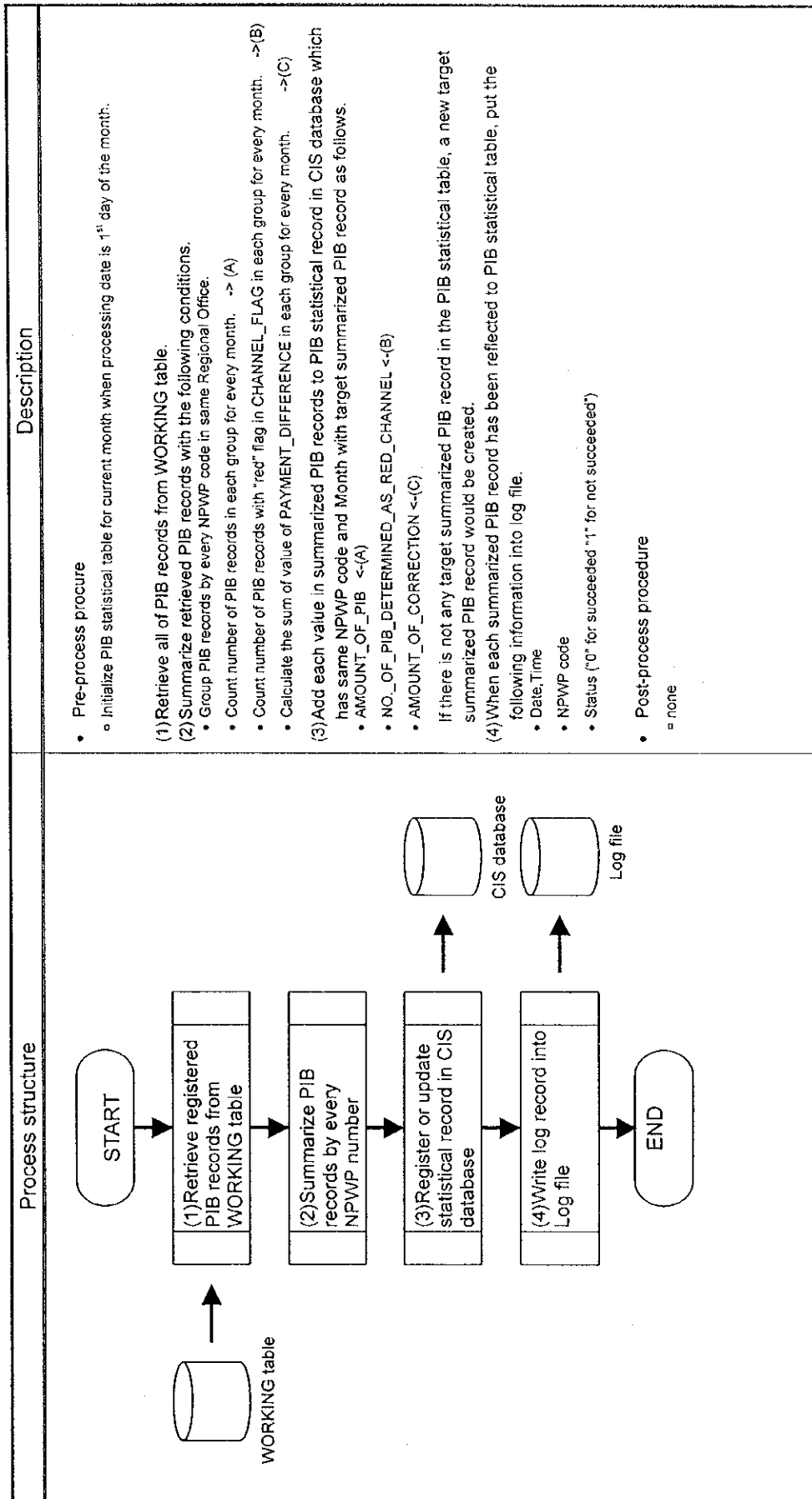


Figure 1.7.3.2-2: Process Structure (PIB statistical data creation)

Table 1.7.3.2-1: File property (PIB statistical data creation)

No	File name	File type	I/O	Unit	Duration	Remarks
1	PIB statistical	ORACLE (CIS database)	INPUT/OUTPUT	1 table/system (1 record/NPWP/Regional Office/month)	Permanent	—
2	WORKING table for PIB	ORACLE (CIS database)	INPUT	1 table/system	Temporary	<ul style="list-style-type: none"> All tables should be initialized before starting of process. PIB registration process stores only registered PIB records into WORKING table. This table has the same structure as CIS-PIB tables in CIS database.
3	Log file	ASCII	OUTPUT	1 file/system	Permanent	<ul style="list-style-type: none"> After backup, log file should be recreated to avoid file size become huge.

Table 1.7.3.2-2: Error definition (PIB statistical data creation)

No	Error case	Action	Error level	Remarks
1	Can not allocate WORKING table or can not access WORKING table.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	—
2	Can not allocate CIS database or can not access data CIS database.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	In some cases, the operation must be rolled back.
3	Can not allocate Log file or can not access data from Log file.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	—
4	No data can be retrieved from WORKING table.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	—

Table 1.7.3.2-3: Preconditions and Restrictions (PIB statistical data creation)

No	Type	Description	Remarks
1	Precondition	When the company has additional payment duties, CFRS is expected to send its PIB data twice. In this case, CFRS set a certain value in flag-area to inform CIS that the data includes additional payment (e.g. "finished"). CIS calculates amount of payment and count up for PIB statistical data based on this data.	In case of sending same data more than two times, both CIS and CFRS have to reconsider this mechanism.
2	Precondition	When CIS receive the same PIB records from CFRS, the CIS procedure for these records should follow the status flag for updating or discarding.	—
3	Precondition	CIS can get PIB records of previous day from the Service Offices which has online-connection. However, that number of Service Office is limited. Therefore, the PIB statistical data does not include all PIB data of previous day.	—
4	Precondition	Service Offices which has no online-connection are expected to send CIS PIB records by magnetic tape.	—
5	Precondition	In case of additional payment, only "short payment" values are added to existing record. Refund values would be discarded.	—
6	Precondition	None-computerized Service Offices has to send the documents to their Regional Offices in order to input the PIB data into computer system such as SE-11, CIS or CFRS. DJBC has to decide the operation rule. Otherwise, CIS can not gather all of PIB data.	—

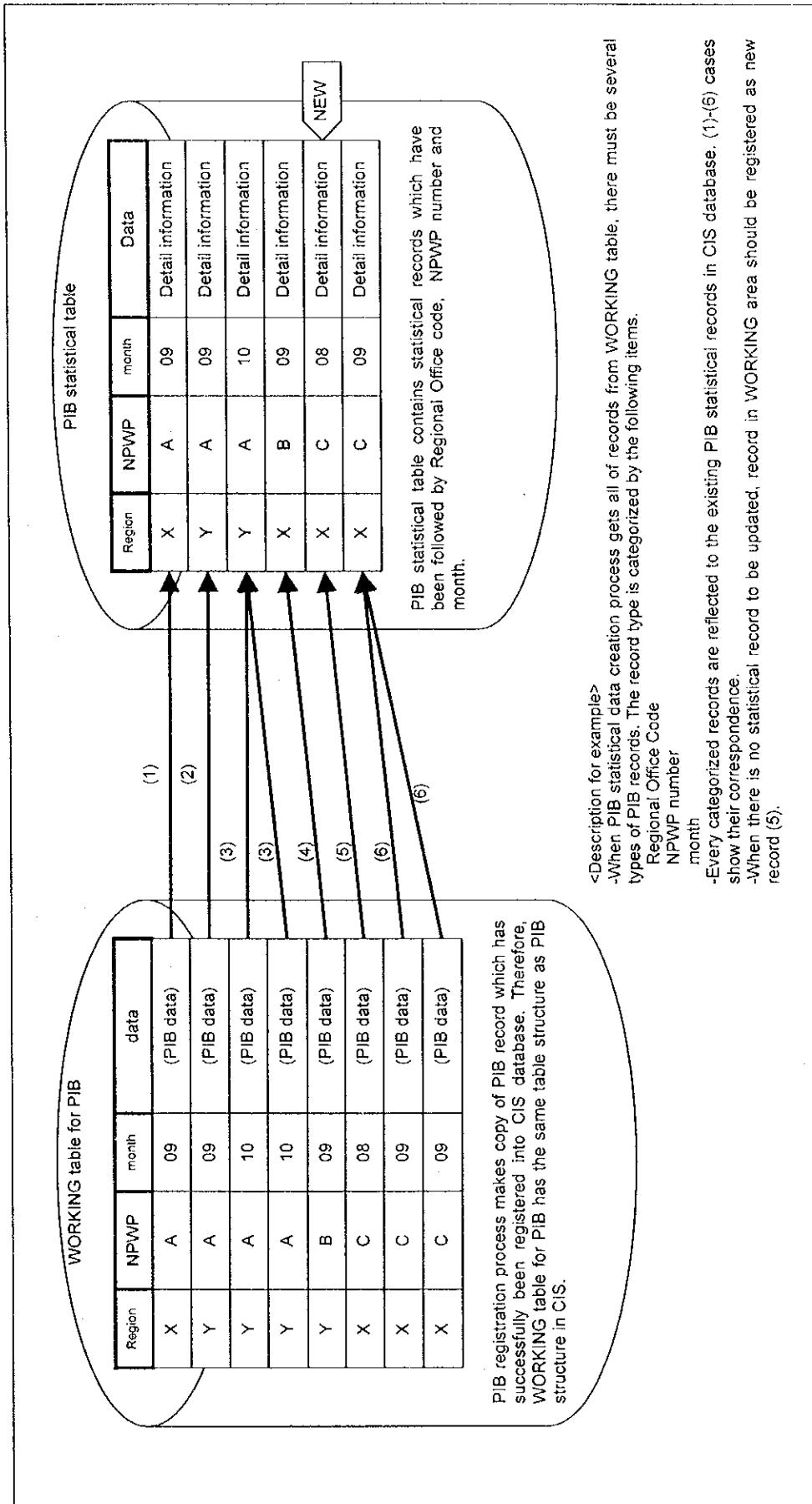


Figure 1.7.3.2-3: Detail mechanism (PIB statistical data registration)

1.7.4 PEB statistical data creation

1.7.4.1 Design policy and circumstances

When the CIS operator wants to refer the summarized PEB information, the CIS application has to retrieve all of records from huge PEB database. It means this process may need much time to make results. Therefore, PEB statistical table is to be previously prepared in order to avoid taking much time.

PEB statistical table contains several important statistical items and they are counted by each company per each month in every Regional Offices. In case of online connection with Service Office, this data would be updated everyday after receiving PEB data from CFRS. On the other hand, in case of no connection with Service Office, this data might be updated every month. In this case, these data have to be sent by magnetic media. The CIS end users have to know that not all data of Service Offices are included in the CIS database for a certain period.

1.7.4.2 Specification of processes

As a result of system detail design (Phase II), the following documents are attached.

Conventions for describing formats are explained in Figure 1.7.2.2-1.

Process overview	Figure 1.7.4.2-1
Process structure	Figure 1.7.4.2-2
File property	Table 1.7.4.2-1
Error definition	Table 1.7.4.2-2
Preconditions and Restrictions.....	Table 1.7.4.2-3
Detail mechanism.....	Figure 1.7.4.2-3

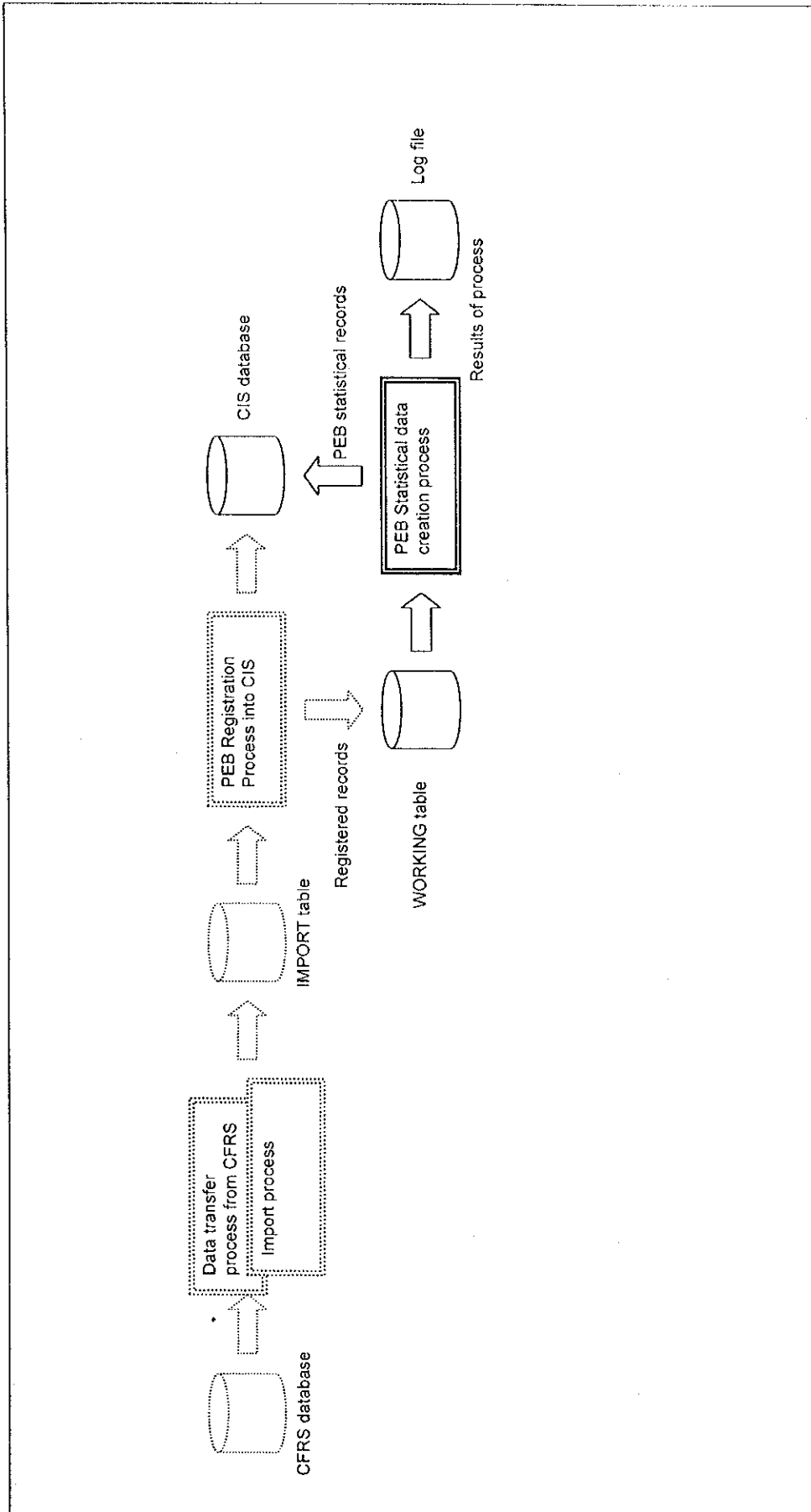


Figure 1.7.4.2-1: Process Overview (PEB statistical data creation)

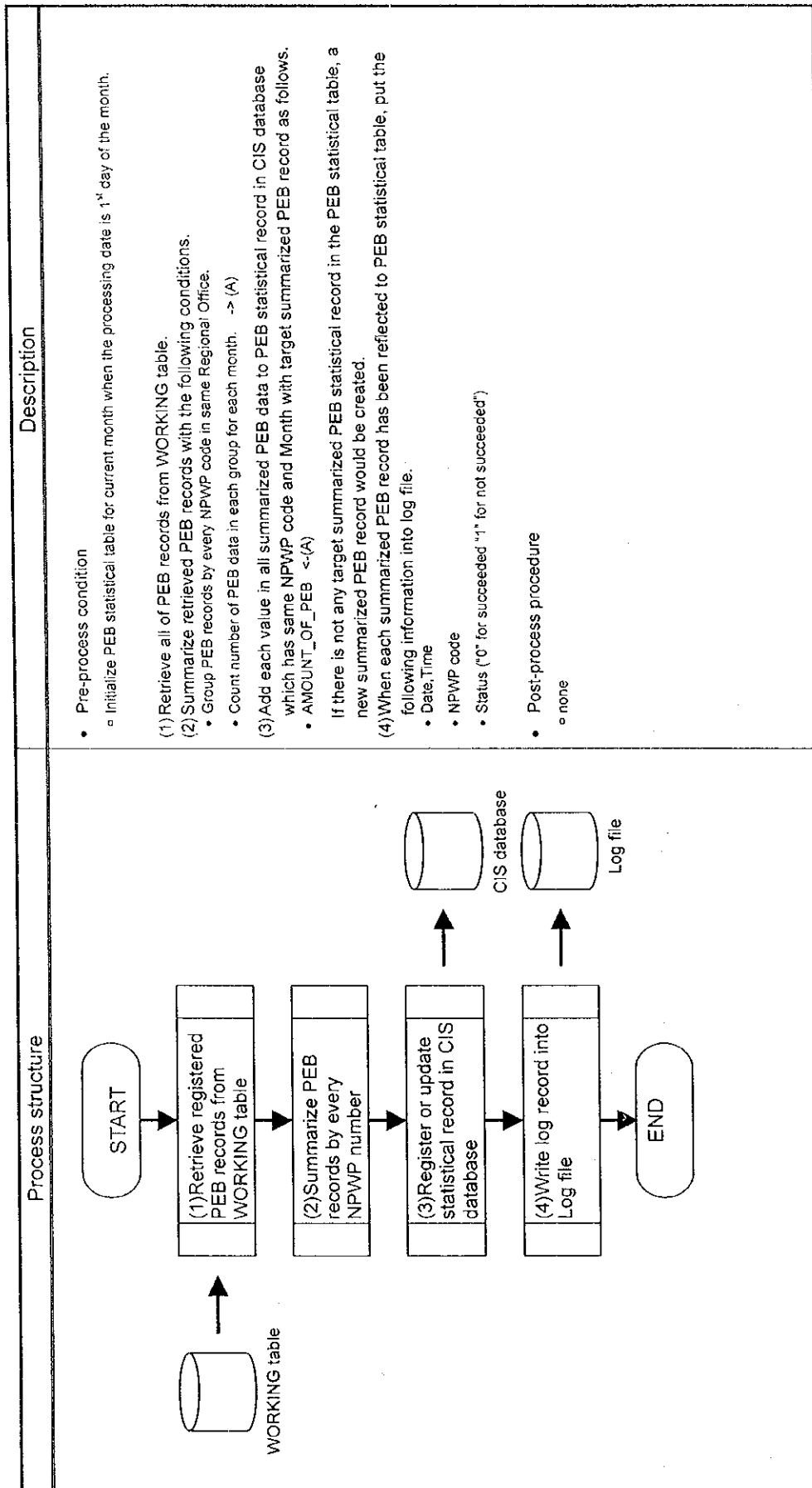


Figure 1.7.4.2-2: Process Structure (PEB statistical data creation)

Table 1.7.4.2-1: File property (PEB statistical data creation)

No	File name	File type	I/O	Unit	Duration	Remarks
1	PEB statistical	ORACLE (CIS database)	INPUT/ OUPUT	1table/system (1record/NPWP/Regional Office/month)	Permanent	—
2	WORKING table for PEB	ORACLE (CIS database)	INPUT	1table/system	Temporary	<ul style="list-style-type: none"> All tables should be initialized before starting of process. PEB registration process stores only registered PEB records into WORKING table. This table has the same structure as CIS-PEB tables in CIS database.
3	Log file	ASCII	OUTPUT	1file/system	Permanent	<ul style="list-style-type: none"> After backup, log file should be recreated to avoid file size become huge.

Table 1.7.4.2-2: Error definition (PEB statistical data creation)

No	Error case	Action	Error level	Remarks
1	Can not allocate WORKING table or can not access WORKING table.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	—
2	Can not allocate CIS database or can not access data CIS database.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	In some cases, the operation must be rolled backed.
3	Can not allocate Log file or can not access data from Log file.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	—
4	No data can be retrieved from WORKING table.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	—

Table 1.7.4.2-3: Preconditions and Restrictions (PEB statistical data creation)

No	Type	Description	Remarks
1	Precondition	When CIS receive the same PEB records from CFRS, the CIS procedure for these records should follow the status flag for updating or discarding..	—
2	Precondition	CIS can get PEB records of previous day from the Service Offices which has online-connection. However, that number of Service Office is limited. Therefore, the PEB statistical data does not include all PEB data of previous day.	—
3	Precondition	Service Offices which has no online-connection are expected to send CIS PEB records by magnetic tape.	—
4	Precondition	None computerized Service Offices has to send the documents to their Regional Offices in order to input the PEB data into computer system such as SE-1, CIS or CFRS. DJBC has to decide the operation rule. Otherwise, CIS can not gather all of PEB data.	—

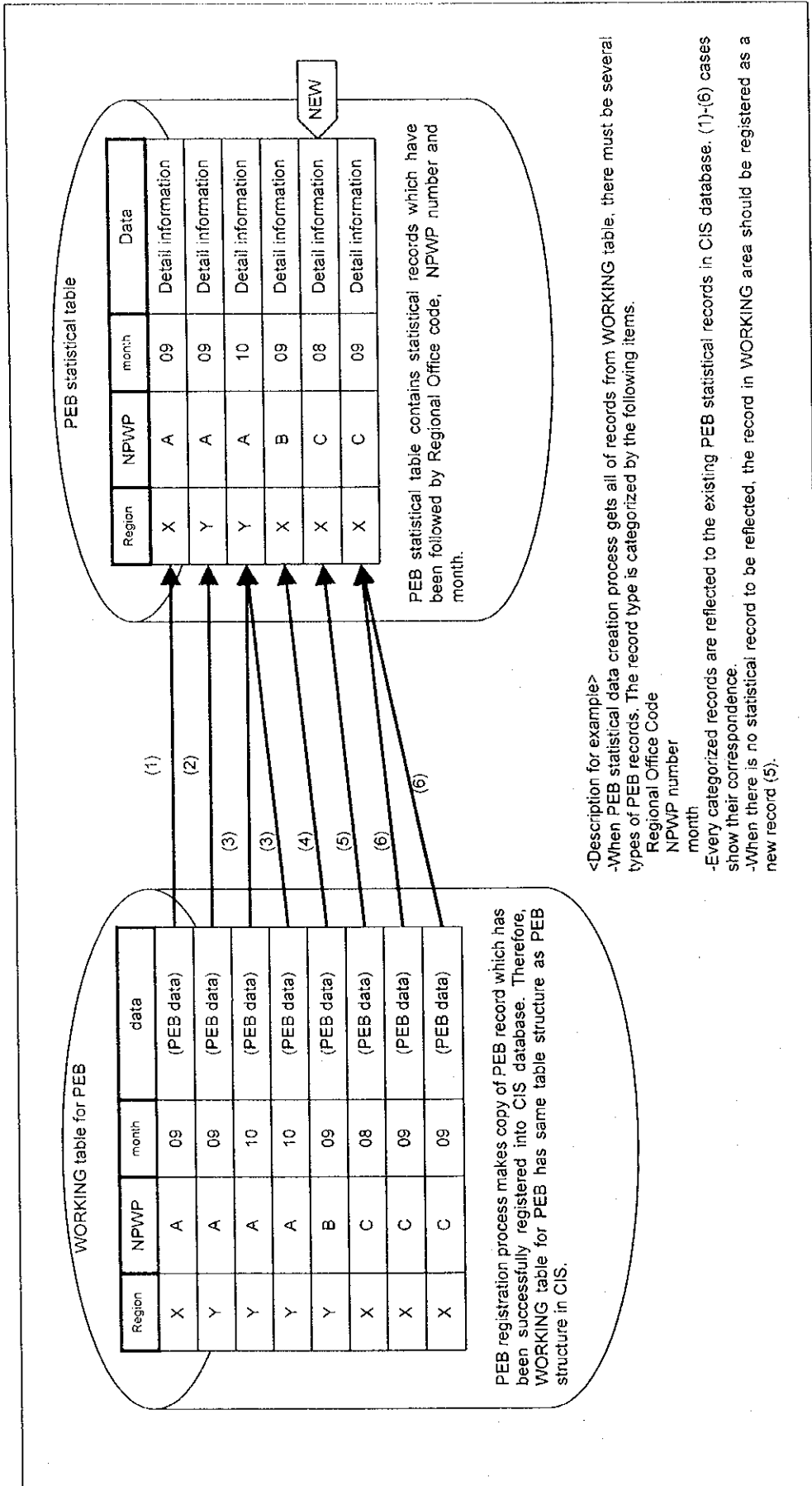


Figure 1.7.4.2-3: Detail mechanism (PEB statistical data registration)

1.7.5 Temporary admission information reporting

1.7.5.1 Design policy and circumstances

Some of PIB and PEB have information about the facilities which are used by importers and exporters. But, sometimes invalid facilities are related to PIB and PEB. For example, some of them have been already expired. When Customs-Technique Directorate inquire into those facilities, they need information of the facilities which are related to PIB and PEB.

This function provides the lists of facilities that are related to the PIB and PEB as the temporary admission information report every day.

1.7.5.2 Specification of processes

As a result of system detail design (Phase II), the following documents are attached.

Conventions for describing formats are explained in Figure 1.7.2.2-1.

Process overview	Figure 1.7.5.2-1
Process structure	
PIB temporary admission reporting	Figure 1.7.5.2-2
PEB temporary admission reporting	Figure 1.7.5.2-3
File property	Table 1.7.5.2-1
Error definition	Table 1.7.5.2-2
Preconditions and Restrictions	Table 1.7.5.2-3
Report Layout	
Report layout for PIB temporary admission information.....	Figure 1.7.5.2-4
Report layout for PEB temporary admission information.....	Figure 1.7.5.2-5

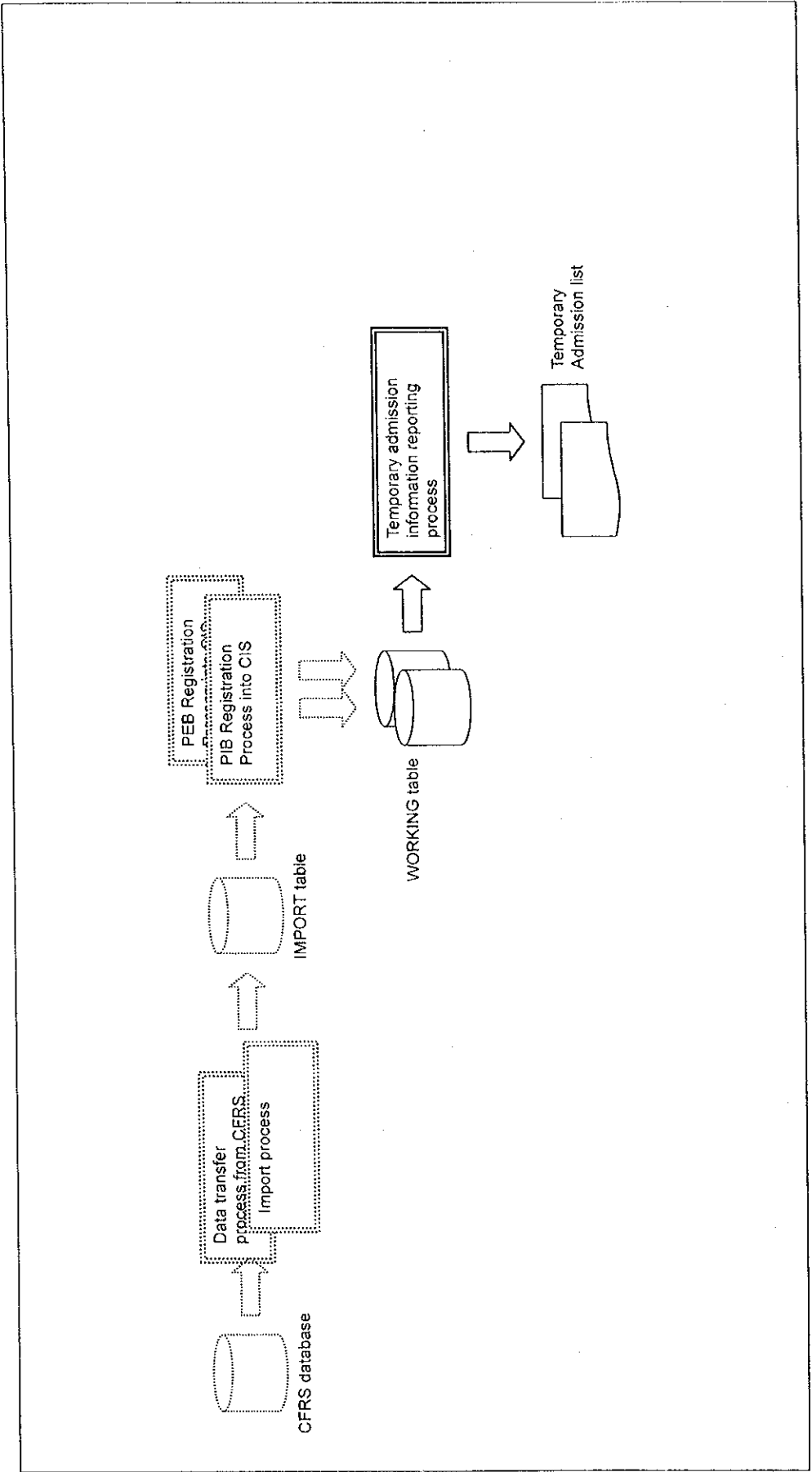


Figure 1.7.5.2-1: Process Overview (Temporary Admission information reporting)

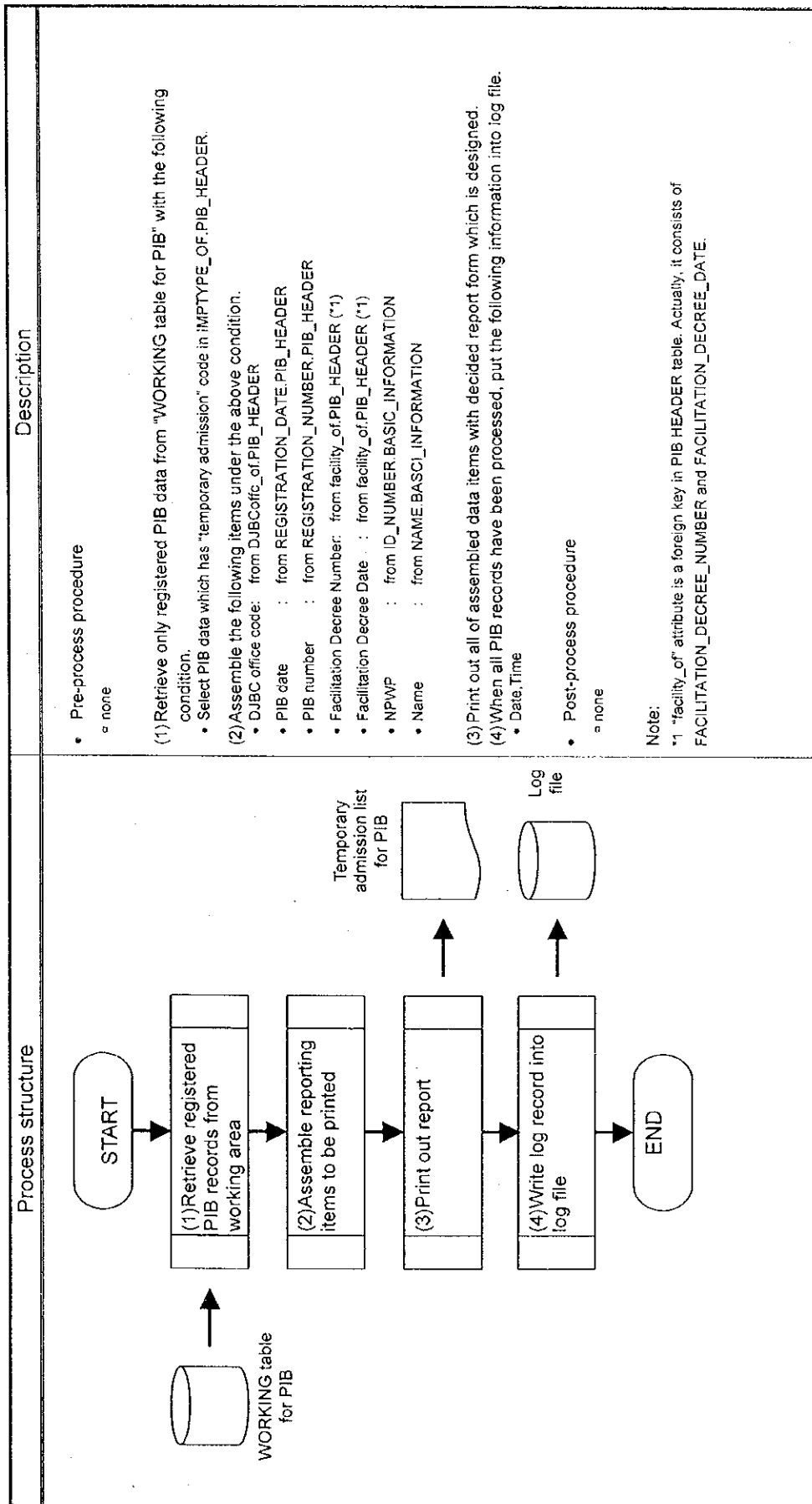


Figure 1.7.5.2-2: Process Structure (PIB temporary admission information reporting)

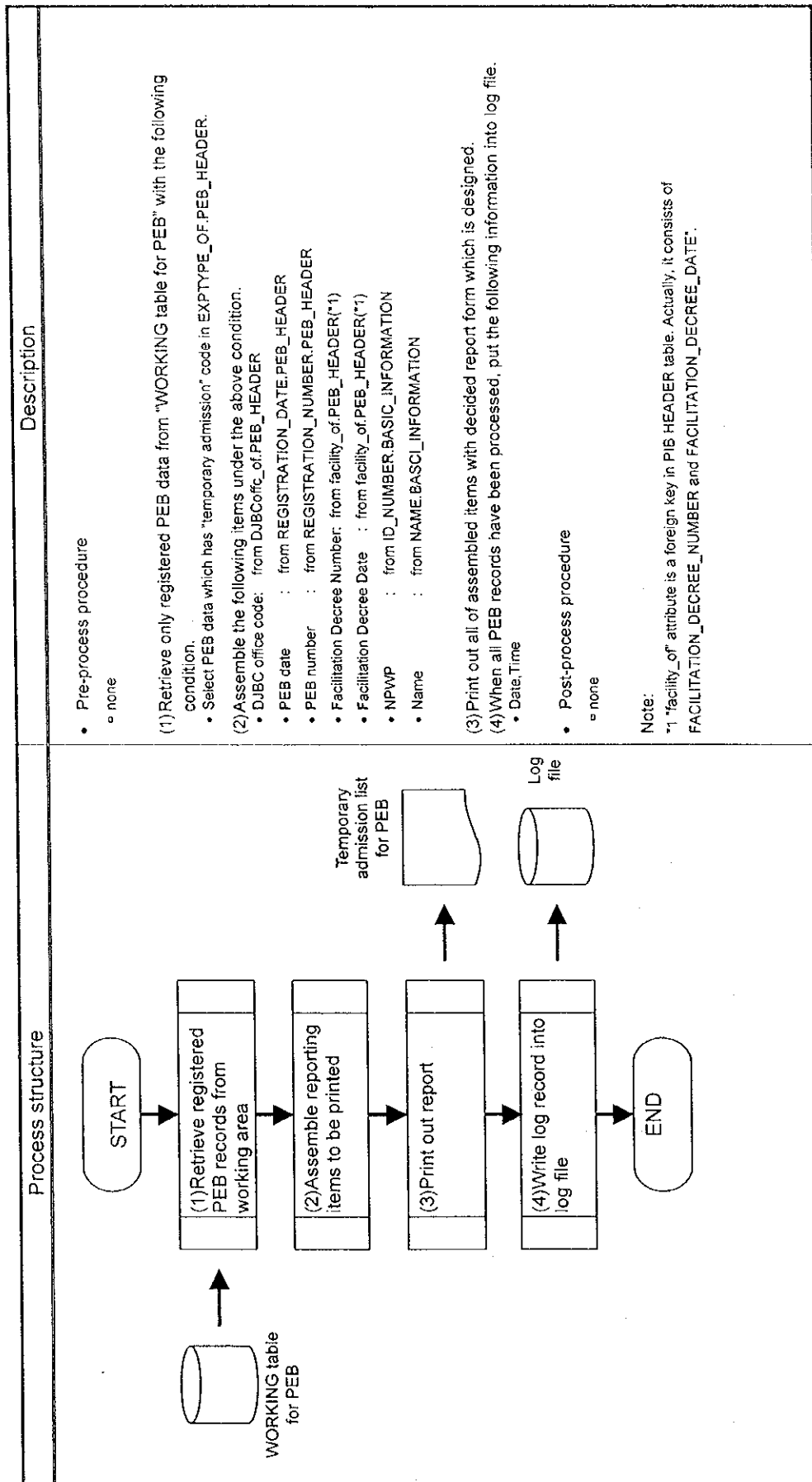


Figure 1.7.5.2-3: Process Structure (PEB temporary admission information reporting)

Table 1.7.5.2-1: File property (Temporary admission information reporting)

No	File name	File type	I/O	Unit	Duration	Remarks
1	WORKING table for PIB	ORACLE (CIS database)	INPUT	1 table/system	Temporary	<ul style="list-style-type: none"> All tables should be initialized before starting of process. PIB registration process stores only registered PIB records into WORKING table. This table has the same structure as CIS-PIB tables in CIS database.
2	WORKING table for PEB	ORACLE (CIS database)	INPUT	1 table/system	Temporary	<ul style="list-style-type: none"> All tables should be initialized before starting of process. PEB registration process stores only registered PIB records into WORKING table. This table has the same structure as CIS-PEB tables in CIS database.
3	Log file	ASCII	OUTPUT	1 file/system	Permanent	<ul style="list-style-type: none"> After backup, log file should be recreated to avoid file size become huge.

Table 1.7.5.2-2: Error definition (Temporary admission information reporting)

No	Error case	Action	Error level	Remarks
1	Can not allocate WORKING table or can not access WORKING table.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	—
2	Can not allocate Log file or can not access data from Log file.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	—
3	No data can be retrieved from WORKING table.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	—

Table 1.7.5.2-3: Preconditions and Restrictions (PIB/PEB temporary admission information reporting)

No	Type	Description	Remarks
1	Precondition	Report form has been designed as A4-landscape type.	---
2	Restriction	This process can print out the report form to printer which connected to server. This report is printed out at the CIS master server.	---
3	Restriction	At the current situation, there are no facilitation decree number to relate between PEB and facilitation information in the PEB which are sent from CFRS. CFRS is expected to send the PEB data with facilitation decree number to relate to facilitation information.	---

Report code: XXnnnnnn

Temporary Admission information for PIB

Date: 99/99/9999
Page: 999/999

No.	DJBC Office Code	PIB date	PIB number	Facilitation Decree number	Facilitation Decree Date	NPWP number	Company name
1	2	3	4	5	6	7	8
1	2	3	4	5	6	7	8

Figure 1.7.5.2-4: Report Layout for PIB temporary admission information

Temporary Admission information for PEB

Report code: XXnnnnnn

No.	DJBC Office Code	PEB date	PEB number	Facilitation Decree number	Facilitation Decree Date	NPWP number	Company name
1	2	3	4	5	6	7	8
1	2	3	4	5	6	7	8

Figure 1.7.5.2-5: Report Layout for PEB temporary admission information

1.7.6 Currency exchange rate table setting

1.7.6.1 Design policy and circumstances

PIB data have “CIF value in Rp”. However, the Revenue Planning Directorate requests to calculate “CIF value in USD” from “CIF value in Rp”. Therefore, The JICA Study Team has designed to get the latest currency exchange rate table from CFRS every day, however this table is updated once a week. Because there is no certainly day for updating. The existing currency exchange rate table is related by the latest table.

Following the rule of CFRS, this currency exchange rate table is used as the fixed rate within a next week in CIS. The specific view-table is prepared for this calculation. This view-table has a definition of calculation. Therefore, each CIS application accesses this table to get “CIF value in USD”.

1.7.6.2 Specification of processes

As a result of system detail design (Phase II), the following documents are attached.

Conventions for describing formats are explained in Figure 1.7.2.2-1.

Process overview	Figure 1.7.6.2-1
Process structure	Figure 1.7.6.2-2
File property	Table 1.7.6.2-1
Error definition	Table 1.7.6.2-2
Preconditions and Restrictions	Table 1.7.6.2-3

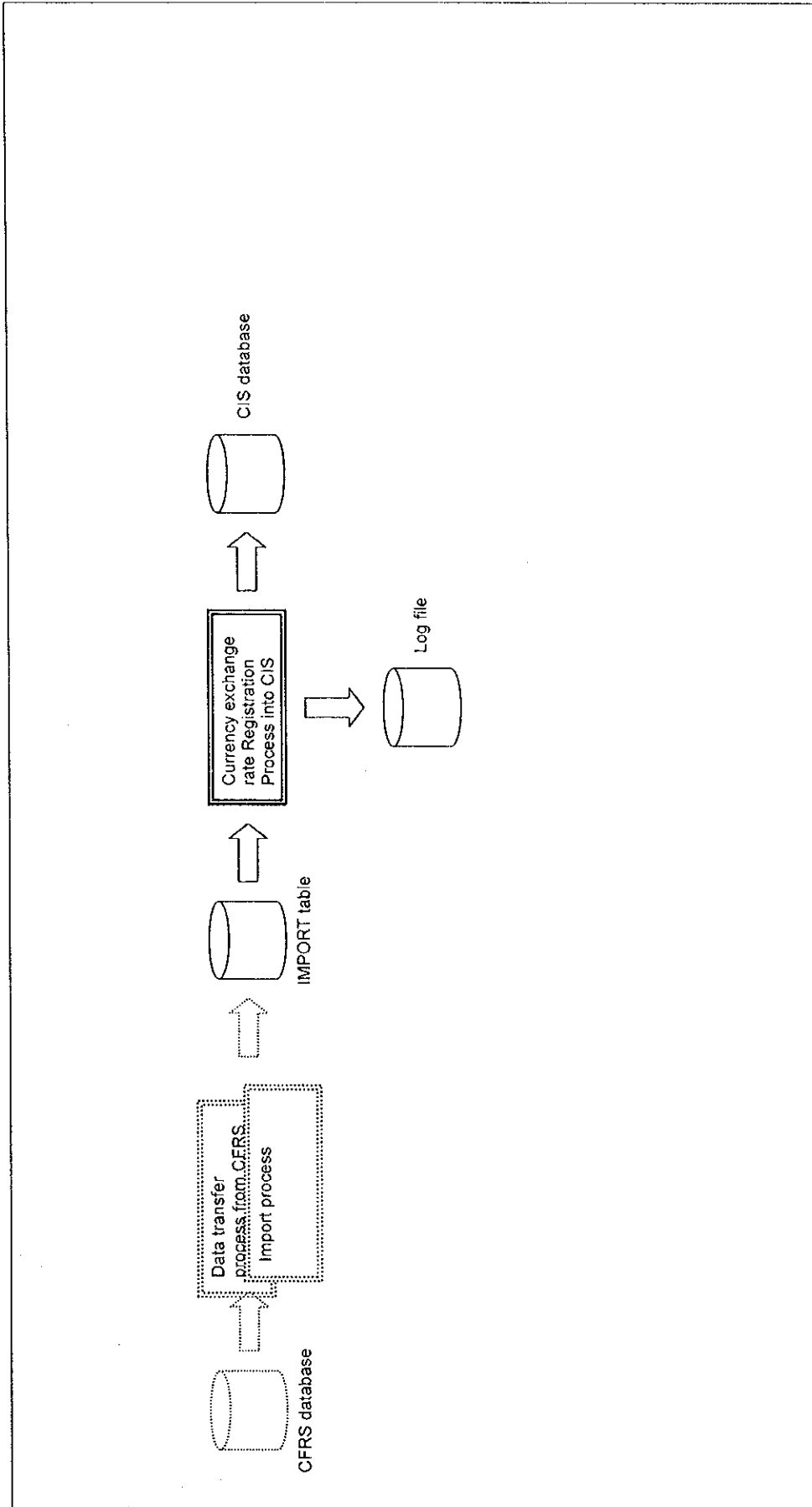


Figure 1.7.6.2-1: Process Overview (Currency exchange rate table transfer)

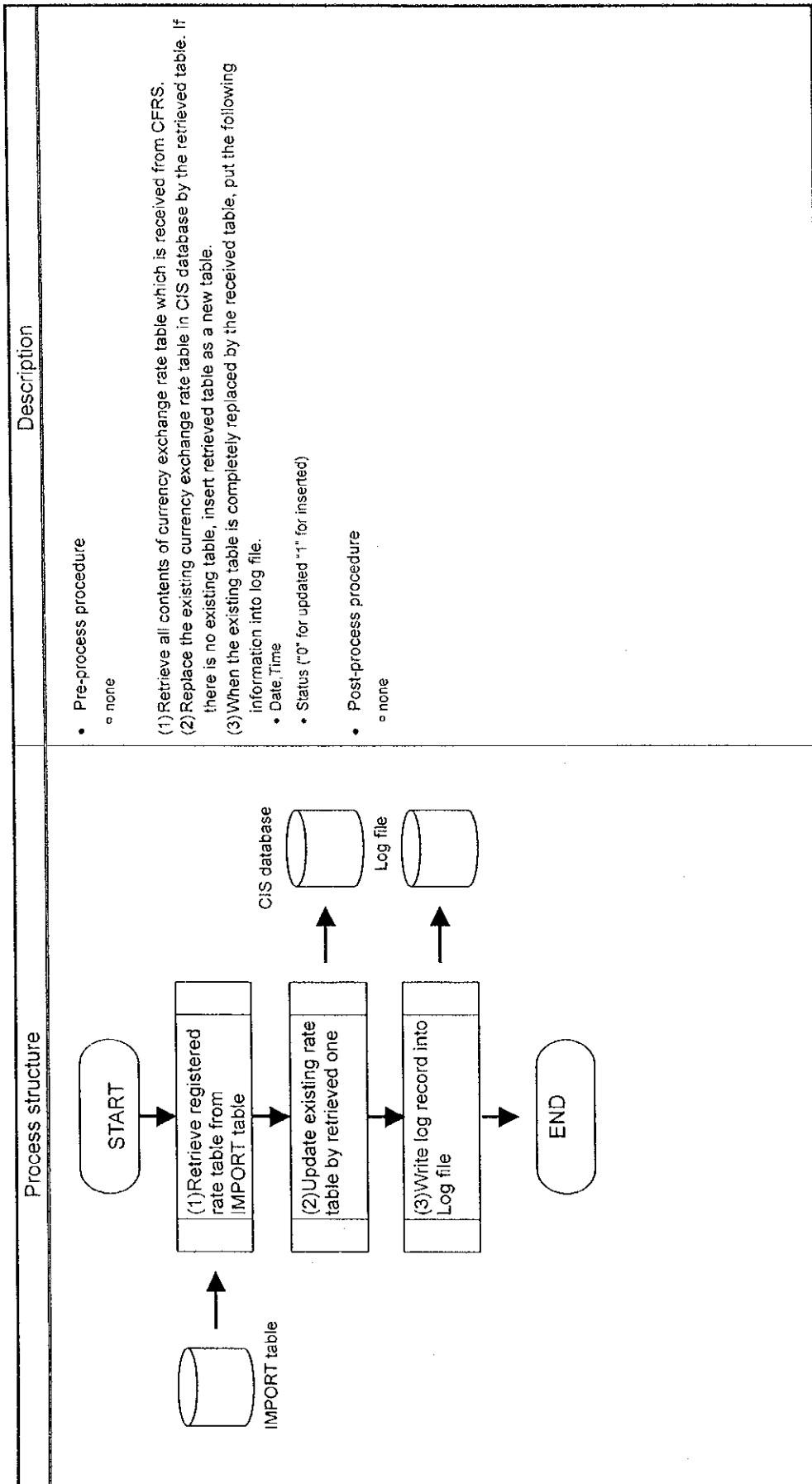


Figure 1.7.6.2-2: Process Structure (Currency exchange rate table transfer)

Table 1.7.6.2-1: File property (Currency exchange rate table transfer)

No	File name	File type	I/O	Unit	Duration	Remarks
1	IMPORT table for currency exchange rate table	ORACLE (CFRS table in CIS)	INPUT	1 table/system	Temporary	<ul style="list-style-type: none"> All tables should be initialized before starting of process This table has the same structure as currency exchange rate table in CIS database.
2	CIS database	ORACLE (CIS database)	OUTPUT	1 table/system	Permanent	<ul style="list-style-type: none"> Existing currency exchange rate table should be replaced by received one.
3	Log file	ASCII	OUTPUT	1 file/system	Permanent	<ul style="list-style-type: none"> After backup, log file should be recreated to avoid file size become huge.

Table 1.7.6.2-2: Error definition (Currency exchange rate table transfer)

No	Error case	Action	Error level	Remarks
1	Can not allocate IMPORT table or can not access IMPORT table.	Exit application and return: caution level code to stop all of processes.	Failed (Unable to retry)	---
2	Can not allocate Log file or can not access data from Log file.	Exit application and return: caution level code to stop all of processes.	Failed (Unable to retry)	---
3	No data can be retrieved from IMPORT table.	Exit application and return: caution level code to stop all of processes.	Failed (Unable to retry)	---

Table 1.7.6.2-3: Preconditions and Restrictions (Currency exchange rate table transfer)

No	Type	Description	Remarks
1	Precondition	CFRS sends all contents of currency exchange table every day.	---
2	Precondition	Only one Service Office which is previously decided can send currency exchange table.	---
3	Precondition	CIS would prepare the specific view-table which has the definition to calculate the "CIS value in USD". This view table has almost same data structure as PIB tables in CIS.	---

1.7.7 Data transfer from SE11

1.7.7.1 Design policy and circumstances

This sub-subsection explains the process of getting the excise information from SE-11. The Excise Directorate has responsibility to register the order of excise stamps including amount of excise to be paid and amount of production. On the other hand, Revenue Planning Directorate needs amount of excise paid to make revenue report.

The problem is that amount of excise paid sometimes different from real revenue when:

- The excise is paid through bank in the previous month (the excise should be paid before ordering excise stamps).
- A factory has facility to have excise payment deferred (the factory is allowed to pay excise after ordering).

Because of the problem, the Revenue Planning Directorate has decide to get the information directly from SE-11,since SE-11 can provide enough information to satisfy the request of Revenue Planning Directorate. Those excise data will be gathered into SE-11 by every 10th day of the following month from every Service Office.

The SE-11 transfer process is designed as one of server common processes, and it runs as one of monthly batch processes to replace the old data with the new one.

1.7.7.2 Specification of processes

As a result of system design (Phase II), the following documents are attached.

Conventions for describing formats are explained in Figure 1.7.2.2-1.

Process overview	Figure 1.7.7.2-1
Process structure	Figure 1.7.7.2-2
File property ..	Table 1.7.7.2-1
Error definition	Table 1.7.7.2-2
Preconditions and Restrictions	Table 1.7.7.2-3

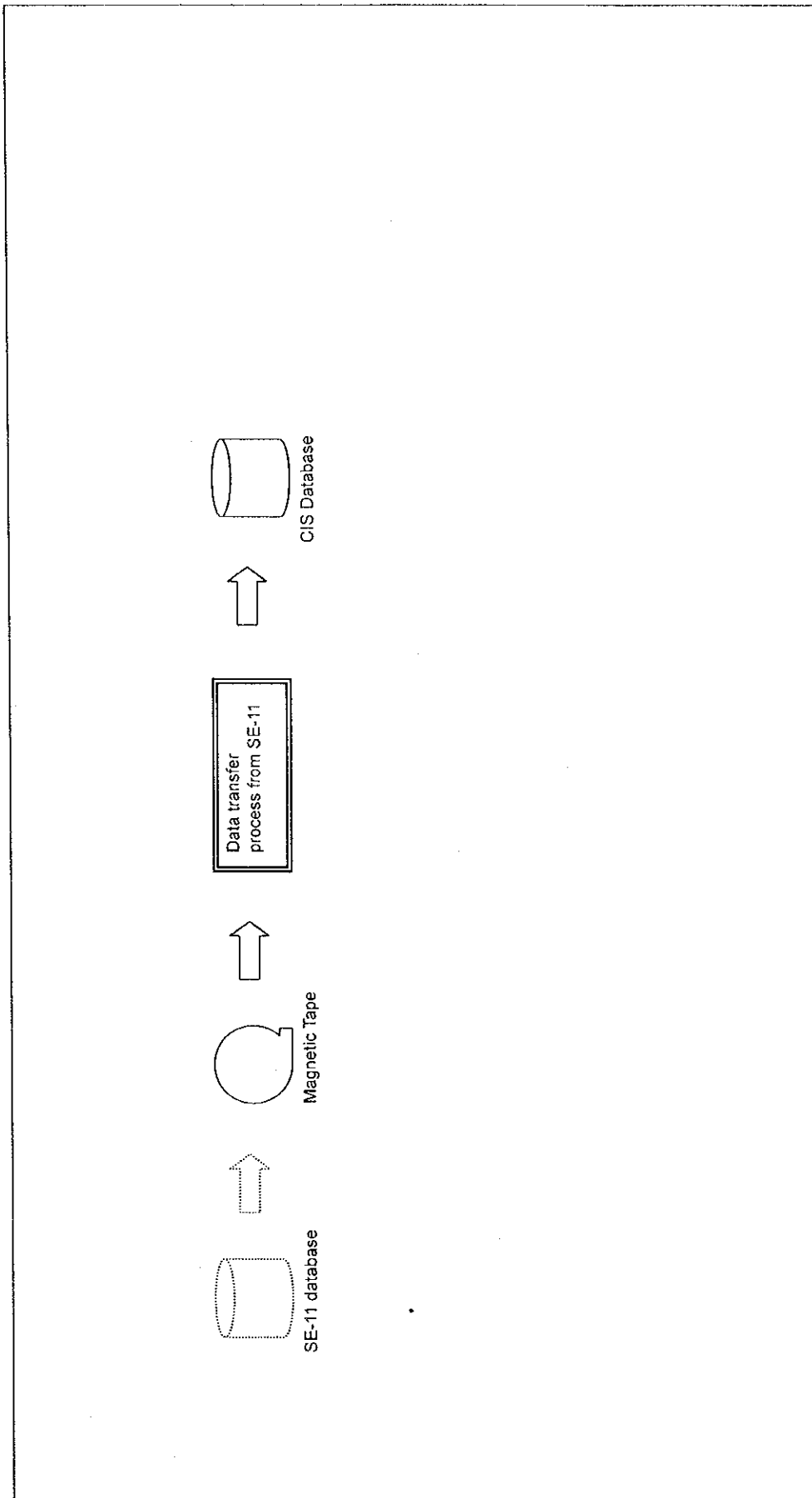


Figure 1.7.7.2-1: Process Overview (Data Transfer from SE-11)

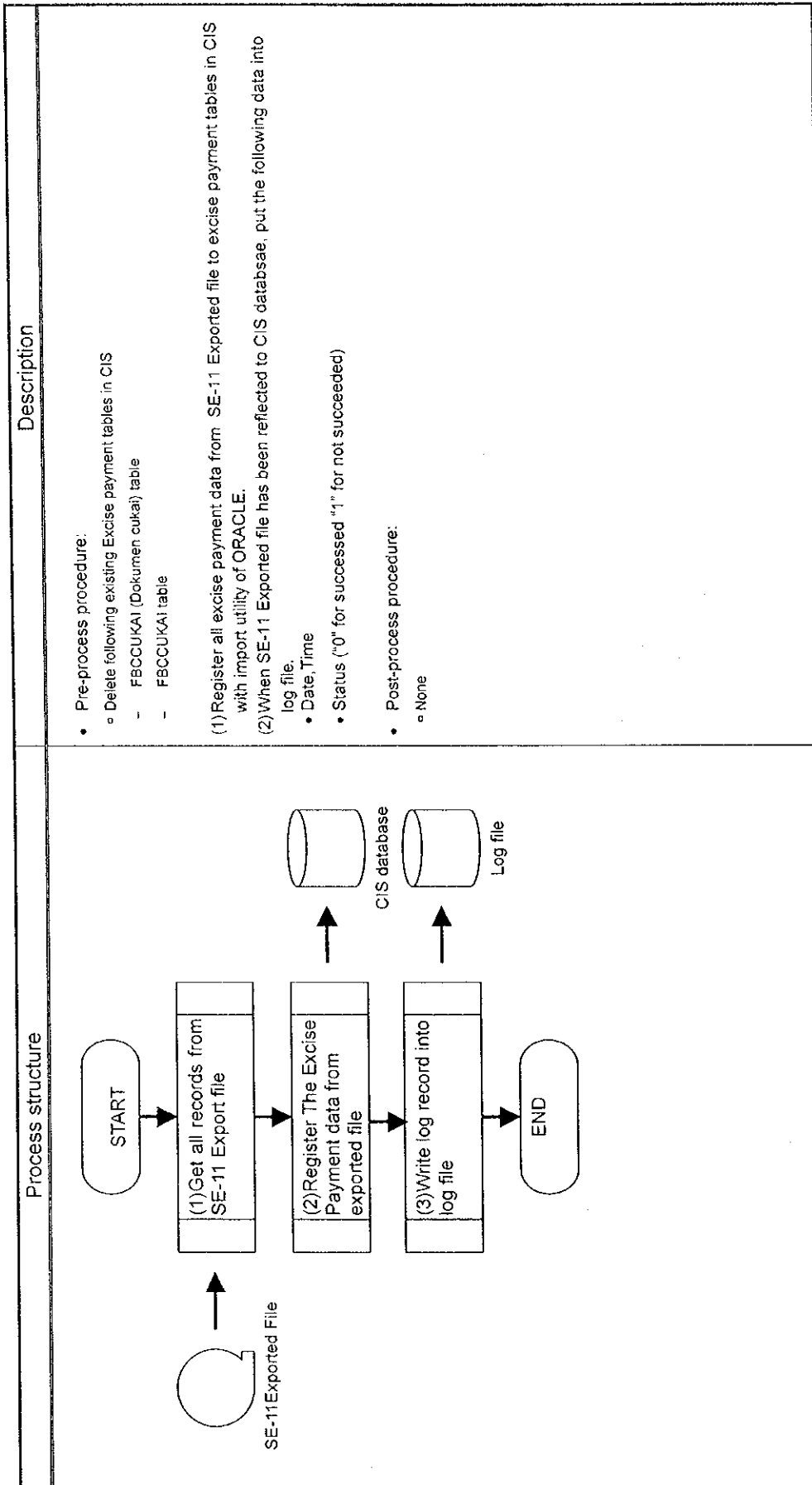


Figure 1.7.7.2-2: Process Structure (Data Transfer from SE-11)

Table 1.7.7.2-1: File property (Data Transfer from SE-11)

No	File name	File type	I/O	Unit	Duration	Remarks
1	Exported File	ORACLE EXPORT FILE (MT)	INPUT	1file/week	Temporary	<ul style="list-style-type: none"> SE11 should use compatible magnetic media to send export data to CIS.
2	CIS database	ORACLE (CIS database)	OUTPUT	1table/system	Permanent	<ul style="list-style-type: none"> Existing Excise payment tables should be replaced by received one.
3	Log file	ASCII	OUTPUT	1file/system	Permanent	<ul style="list-style-type: none"> After backup, log file should be recreated to avoid file size become huge.

Table 1.7.7.2-2: Error definition (Data transfer from SE-11)

No	Error case	Action	Error level	Remarks
1	Can not allocate EXPORT file or can not access EXPORT file.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	—
2	Can not allocate Log file or can not access data from Log file.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	—
3	No data can be retrieved from EXPORT file.	Exit application and return caution level code to stop all of processes.	Failed (Unable to retry)	—

Table 1.7.7.2-3: Preconditions and Restrictions (Data Transfer from SE-11)

No	Type	Description	Remarks
1	Precondition	ORACLE exported file from SE-11 has to be imported in CIS.	—
2	Precondition	SE-11 has to send all contents of excise payment data. Because CIS will replace the contents of excise payment tables with the new data.	—
3	Precondition	SE-11 has to have the same code reference with CIS such as: <ul style="list-style-type: none"> • DJBC Office code • Manufacturer Type code • Manufacturer code • Bank code • Document code • Excisable goods type • Kind of tobacco produced 	—
4	Precondition	Oracle exported file from SE-11 will send to CIS in magnetic tape.	—
5	Precondition	This process is to be done in every month. Before sending data, SE-11 has to finish to gather the information from all of Service Offices. Otherwise, there might be inconsistency between the information from SE-11 and CIS database.	—

1.8 Database Design

1.8.1 Design policy and circumstances

Database design is a set of activities of finding a way to organize data. The design is comprised of:

- Structure design
- Logical design
- Physical design
- Security design
- Operation design

Structure design defines how to configure the database in one system. There are two types of database structures as follows:

- 1) Centralized Database Structure
- 2) Distributed Database Structure

Logical design is a set of activities to gather, analyze, and organize data in view of the CIS user. The result of logical design is the well-defined data. The activities in logical design are:

- 1) To analyze gathered data and group into reference data, master data and transaction data.
- 2) To refine the analyzed data with normalization process.
- 3) To code reference data to simplify its access.
- 4) To make definition of key and index for each data. This definition is needed to make data access performance highly.

Physical design is a set of activities to prepare for the actual organization of data on a storage device. The activities in physical design are:

- 1) To estimate the size of the database at the start and plan the future capacity of the hardware.
This activity takes into account the spaces, processes, and shared memories.
- 2) To plan the physical layout of the database to ensure optimal performance. This activity concerns with the integrity of the database, performance, and startup speed.

Security design provides activities to control how database is accessed and used. The activities in security design are:

- 1) To protect data. This activity concerns with grant and revoke of data objects.

- 2) To manage data access right.

Operation design is activities to prepare database-maintaining plan. The activities in operation design are:

- 1) To plan to backup mechanism.
- 2) To plan to restore mechanism.

1.8.2 Database structure

The database structure would be categorized into the Centralized Database Structure and the Distributed Database Structure. At the first stage, CIS will adopt the Centralized Database Structure. At the second and later stages, CIS will adopt the Distributed Database Structure. This is because the CIS Regional Servers installed at the Regional Offices will include their own CIS database.

This subsection explains the CIS database structure at the first stage. The CIS database is categorized into reference data, master data, and transaction data. The master data and the transaction data, which are frequently updated during the CIS operation, should be installed in the server machine. The reference data, such as port code and office code, would not be frequently updated and would only consist of a small amount of data. Therefore, the reference data should be located in the client in order to reduce transactions from the CIS clients to the server machine.

It is necessary to synchronize the reference data in the client and the server. Oracle provides "Symmetric Replication Function" to synchronize the different sites of Oracle database. In updating the reference data, original reference data should be updated in server first, then it would be copied to each client by Oracle replication function. To realize the above structure, each client has a Personal Oracle for reference database, and server machine has a Oracle Enterprise (see Figure 1.8.2-1 and Table 1.8.2-1).

In this database structure, an application has to access both server database and client database. It seems that client application has to control complicated database access. In fact, the SQL*Net is responsible for controlling access. Therefore, each client application does not need to know the physical database layout. There is only one logical database to be accessed by each client application.

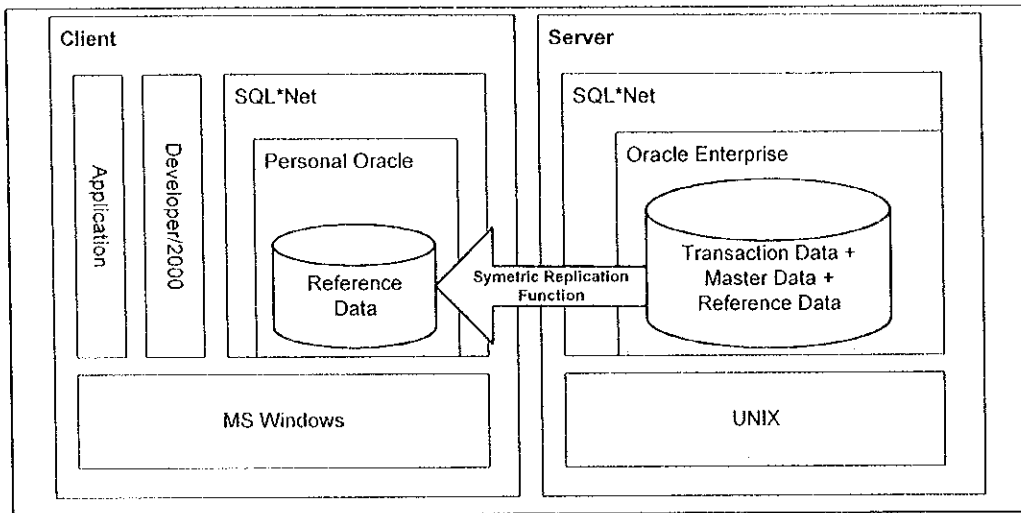


Figure 1.8.2-1: The CIS first stage database structure

Oracle "Symmetric Replication Function" can send copies of reference data in server to client, whenever reference data updated.

Table 1.8.2-1: The CIS first stage data distribution

Server (Oracle Enterprise)	Client (Personal Oracle)
Reference Data (Original) <ul style="list-style-type: none"> • Code • DJBC Office • DJBC Officer • DJBC Position • Message 	Reference Data (Copy) <ul style="list-style-type: none"> • Code • DJBC Office • DJBC Officer • DJBC Position • Message
Transaction/Master Data <ul style="list-style-type: none"> • Basic Information • PIB • PEB • PIBT • and so on. 	

Client PC can access the reference data without accessing server, because each client PC has data in its own disk managed by Personal Oracle database. In this way, CIS can provide faster response to several reference data access.

1.8.3 Standardization

1.8.3.1 Standardization for Designer/2000

In designing CIS, Designer/2000 is used as a system design tool. When a large group of designers design system, standardization of a tool is necessary. The JICA Study Team has prepared standardizations for Designer/2000 such as basic rule, naming rule, and code standard. The results of standardization are shown in Supplement D.

1.8.3.2 Definition of domain

To define each item in each table would take much time and increase the risk of inconsistent definition. To solve this problem, domains are used. A domain is a named collection of properties for attributes and columns, including datatype, size, decimal places, and the set of valid values. When a domain is defined as an original attribute, the attribute of the related items is set to follow the properties of that domain.

Benefits of using domain are:

- Easy to manage the characteristics of a group of attributes that are assigned to the same domain by changing the underlying domain definition
- Enforce standards on datatypes for particular uses.

Designer/2000 helps to define domains in the repository in advance. Current Definitions of domains are shown in Table 1.8.3.2-1.

Table 1.8.3.2-1: Definitions of Domains (1/3)

Domain Name	Data Type	Size	Decimal	Value
AMOUNT OF MONEY	NUMBER	20	2	—
CITY	VARCHAR2	30	—	—
FAX	VARCHAR2	12	—	—
FLAG	VARCHAR2	1	—	—
GENDER	VARCHAR2	1	—	M (Male) F (Female)
GOODS CONDITION	VARCHAR2	1	—	B (New) P (Use)
GROSS WEIGHT	NUMBER	15	—	—
INSURANCE VALUE	NUMBER	19	2	—
INVOICE DATE	DATE	—	—	—

Table 1.8.3.2-1: Definitions of Domains (2/3)

Domain Name	Data Type	Size	Decimal	Value
INVOICE NUMBER	VARCHAR2	25	---	---
KIND OF EXCISABLE GOODS	VARCHAR2	1	---	1 (EA) 2 (MMEA) 3 (HT)
LAST OPERATOR	VARCHAR2	12	---	---
LAST UPDATE	DATE	---	---	---
NET WEIGHT	NUMBER	15	---	---
NIP	VARCHAR2	9	---	---
NI_NHI_ACTION	VARCHAR2	1	---	C (Complete) D (Detention) A (Arresting) H (Handling)
NI_NHI_CLASS	VARCHAR2	1	---	B (Regular) R (Urgent) S (Very Urgent)
NI_NHI_OBJECT	VARCHAR2	1	---	I (Imported Goods) E (Exported Goods) C (Excise Goods)
NI_NHI_TYPE	VARCHAR2	2	---	N (Normal) S (Confidential) SS (Very Confidential)
NPWP	VARCHAR2	12	---	---
PAYMENT TYPE	VARCHAR2	1	---	T (Cash) K (Credit)
PERSON NAME	VARCHAR2	45	---	---
PHONE	VARCHAR2	12	---	---
POSTAL CODE	VARCHAR2	5	---	---
QUANTITY OF GOODS	NUMBER	3	---	---
REFERENCE	VARCHAR2	30	---	---
RESULT	VARCHAR2	1	---	S (Correct) T (Incorrect)
SHEET	VARCHAR2	3	---	---
SIUP	VARCHAR2	25	---	---
STATUS	VARCHAR2	1	---	---
STREET	VARCHAR2	100	---	---
TARIFF CODE	VARCHAR2	10	---	---
TELEX	VARCHAR2	20	---	---
TRANSPORTATION TYPE	VARCHAR2	1	---	R (Railway) H (Highway) S (sea) A (Air)
TYPE OF GOODS	VARCHAR2	2	---	---
VERSION	INTEGER	---	---	---

Table 1.8.3.2-1: Definitions of Domains (3/3)

Domain Name	Data Type	Size	Decimal	Value
WAREHOUSE TYPE	VARCHAR2	1	—	Z (Bonded Zone) W (Bonded Warehouse) D (Duty Free Shop) T (Temporary Storage outside of customs area)
WEIGHT	NUMBER	15	—	—

1.8.3.3 Definition of View

View is a mean for accessing a subset of the database as if it were an actual table. Each program can access the virtual table as a "view" instead of accessing the actual table. It can be restricted to just selected columns and/or specific rows only. It can change column names or new columns derived. It can be used to access related tables and/or views. The explanation for view is shown in Figure 1.8.3.3-1. Views are useful mainly for reports to reduce the number of tables required.

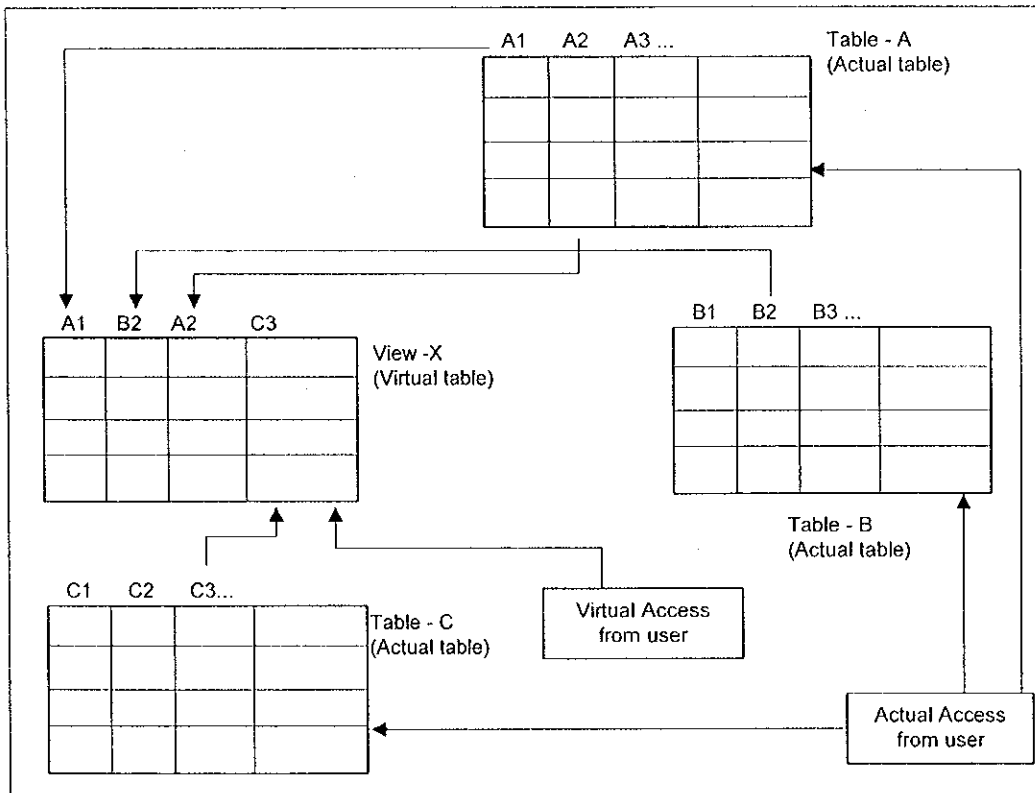


Figure 1.8.3.3-1: The explanation of View

In designing of CIS, the JICA Study Team has designed only few views, because there are not so many functions to retrieve records from several tables at same time in CIS application for the first stage.

1.8.4 Logical Design

1.8.4.1 Table definition

Table is a logical data structure for holding data in relational database management system such as Oracle. Methods of designing table are as follows:

- 1) To gather data from DJBC as much as possible.
- 2) To classify gathered data into several groups by their meanings.
- 3) To consider and define prime key to each group.
- 4) To consider and define attribute for each data.

The JICA Study Team has designed tables based on the gathered data from DJBC.

The list of tables in the CIS database is shown in Table 1.8.4.1-1.

Table 1.8.4.1-1: List of Tables (1/4)

No	Table Name	Description
1	AUDIT RESULT	Information of imported goods audit processing
2	BASIC INFORMATION	Basic information for importer, exporter, customs-broker, operator, excise company, shipping line and means of transportation
3	BONDED STORAGE	Bonded storage detail profile consists of: Bonded Zone, Bonded Warehouse, Duty Free Shop
4	BUYER	Buyer of exporter
5	CK-1 (EXCISE STAMP ORDER)	Information of Excise stamp order
6	CK-1 DETAIL	Detail Information of Excise stamp order
7	CK-8 (DECLARATION OF EXPORT)	Header information of export declaration form for tobacco product
8	CK-8 DETAIL	Detail information of export declaration form for tobacco product

Table 1.8.4.1-1: List of Tables (2/4)

No	Table Name	Description
9	CLIENT	Client of customs-broker
10	CODE	Consist of all codes that used in CIS
11	COMPANY COMMON INFORMATION	Company common information for importer, exporter, customs-broker, operator, excise company, shipping line and means of transportation
12	CONTAINER HAS BEEN CONDUCTED	Container information that has been conducted by physical examination
13	CONTROL IMPLEMENTATION	Comparison of PIB document with Physical examination result
14	CORRECTION NOTE	PIB correction notes
15	COUNTRY RISK INDICATOR	Risk Indicator for intelligence
16	CUSTOM BROKER	Custom Broker detail profile
17	DECL-DETAIL	Detail of declaration
18	DJBC OFFICE	DJBC Office (Regional Office and Service Office)
19	DJBC OFFICER	DJBC officer information
20	DJBC POSITION	DJBC office position
21	EXAM-DETAIL	Detail of physical examination result
22	EXCISE	Factory, storage, and retail shop of goods subject to excise
23	EXPORTER	Exporter detail profile. this profile has: foreign exporter flag that differentiates local exporter and foreign exporter
24	FACILITATION	Government facilitation for company
25	FACTORY	Profile of excisable goods factory
26	FACTORY COMMON INFORMATION	Factory information for profile
27	FACTORY LOCATION	Factory location
28	FSSBCS	FSSBCS of PIB
29	IMPORTER	Importer detail profile
30	INTER ISLAND TRANSPORTATION	Inter-island transportation information
31	LACK-1 (MMEA)	Alcohol beverages Report on utilizing / stock of excisable goods with unimposed facility
32	LACK-1 DETAIL	Detail of alcohol beverages Report on utilizing / stock of excisable goods with unimposed facility
33	LACK-2 (MMEA)	Alcohol beverages Report on sales/release excisable goods without excise
34	LACK-4 (EA)	Ethyl alcohol Report on utilizing excise exempted ethyl alcohol with facility through non-integrated production process
35	LACK-4 DETAIL	Detail of Report on utilizing excise exempted ethyl alcohol with facility through non-integrated production process
36	LACK-9 (EA)	Ethyl alcohol Report on sales/release excisable goods without excise facility

Table 1.8.4.1-1: List of Tables (3/4)

No	Table Name	Description
37	MEANS OF TRANSPORT MOVEMENT	Movement of shipping lines and means of transportation that deliver goods
38	NI/NHI	NI/NHI header
39	NI/NHI CONTAINER	Container information of NI/NHI
40	NI/NHI FOR EXCISE GOODS	NI/NHI for excisable goods
41	NI/NHI FOR EXPORTED GOODS	NI/NHI for exported goods
42	NI/NHI FOR IMPORTED GOODS	NI/NHI for imported goods
43	NI/NHI PACKAGE	Package information of NI/NHI
44	OPERATOR	Company with license of Operator
45	OWNER	Owner of the company
46	PACKAGE HAS BEEN CONDUCTED	Package information that has been conducted by physical examination
47	PACKAGE OF CONTAINER	Package in container
48	PAST RECORD AND BLOCKED IMPORTER	Past record and blocked importer information
49	PEB CONTAINER	Container information of PEB
50	PEB DETAIL	PEB detail
51	PEB HEADER	PEB header
52	PEB STATISTICAL	PEB Statistical
53	PERSONAL COMMON INFORMATION	Passenger and border crosser common information
54	PHYSICAL EXAMINATION RESULT	Information of Physical Examination Result
55	PIB CONTAINER	Container detail used to deliver goods in PIB
56	PIB DETAIL	Detail goods in PIB
57	PIB HEADER	Import declaration header (PIB header)
58	PIB PAYMENT	Payment information of PIB
59	PIB PROCESS	PIB process history
60	PIB STATISTICAL	PIB statistical information
61	PIB VERIFICATION RESULT I	Result of PIB verification that check information entered in PIB document
62	PIB VERIFICATION RESULT II	Result of PIB verification that check performance of document service
63	PIB VERIFICATION RESULT STATISTICAL	PIB Verification Result Statistical
64	PIBT CORRECTION NOTE	PIBT correction notes
65	PIBT DETAIL	Goods detail information of PIBT
66	PIBT FSSBCS	FSSBCS of PIBT
67	PIBT HEADER	PIBT header
68	PIBT PAYMENT	Payment of PIBT
69	PIBT PROCESS	PIBT process history
70	PORT RISK INDICATOR	List of port that have risk indication
71	RECEIVER	Receiver of Inter-island transportation

Table 1.8.4.1-1: List of Tables (4/4)

No	Table Name	Description
72	SE-16 (EA)	Monthly report on production and release of ethyl alcohol with its receipts
73	SE-16 (MMEA)	Monthly report on production and release of alcohol beverages with its receipts
74	SENDER	Sender of Inter-island transportation
75	SHIPPING LINES AND MEANS OF TRNS	Detail profile of Shipping lines and means of transportation
76	STORAGE COMMON INFORMATION	Storage information for profile
77	SUPPLIER	Supplier of importer
78	SUPPLIER FACTORY	Supplier factory for excise company
79	TEMPORARY ADMISSION	Detail location of Temporary Admission
80	VESSEL	Vessel information
81	VESSEL HISTORY	Vessel history
82	VIOLATION AND INVESTIGATION	Violation Transaction based on result of physical examination
83	VIOLATION OF DUTY FREE SHOP	Violation information for duty free shop
84	VIOLATION OF EXCISE	Violation information for excise company
85	VIOLATION OF IMP/EXP/CUST BRKR	Violation information for importer
86	VIOLATION OF PASSENGER	Violation information for passenger and border crosser
87	VIOLATION OF SHIPPING LINE	Violation information for shipping line
88	VIOLATION OF STORAGE	Violation information for warehouse

1.8.4.2 Relationship definition

In relational database model such as Oracle, each table has several relationships with other tables. The relationship is a logical connection between two tables. For example, PIB, PIB Header and PIB Detail are defined as different table, but they have a logical connection by PIB registration number. Therefore, PIB detail can be specified from PIB Header by PIB registration number.

In logical design phase, Entity Relationship Diagram (ERD) can explain relationships between two tables. Figure 1.8.4.2-1 shows example of relationship describing between PIB header and PIB details.

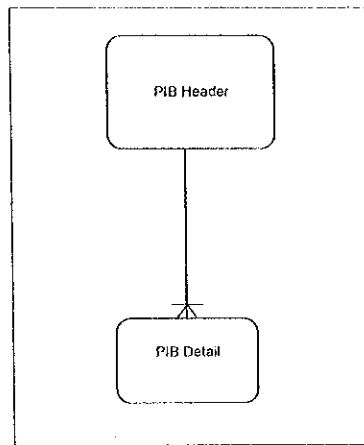


Figure 1.8.4.2-1: Sample of Relationship

This model describes that one PIB header record has to have several PIB detail records. Moreover, each PIB detail record contains its parent PIB header record's identifier such as primary key. Supplement E1 explains about entity relationship diagram describing rules.

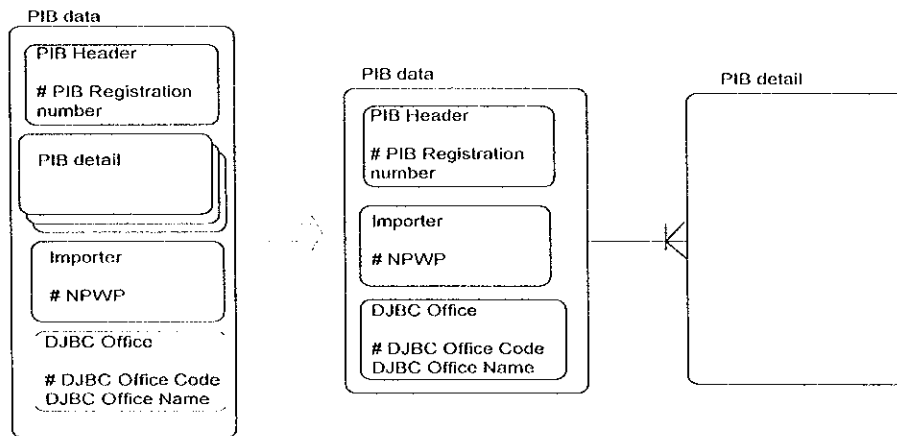
1.8.4.3 Normalization

Normalization is the process of organizing data to minimize duplication. Normalization usually includes division of a database into two or more tables and definition of relationships between the tables.

The CIS database has been normalized by definition of tables and definition of relationships. The normalization process of the JICA Study Team is divided into three levels:

1) First Normal Form (1NF)

There should not be any repeating data item in the tables. For example, one PIB data consists of one PIB Header, one importer, one DJBC Office and several PIB Details. (Actually, there are some other data, but they are disregarded in this example.) To be 1NF, several PIB Details should not be defined as PIB data, because they are repeating data. PIB Detail has been separated from PIB data and defined as a new table.

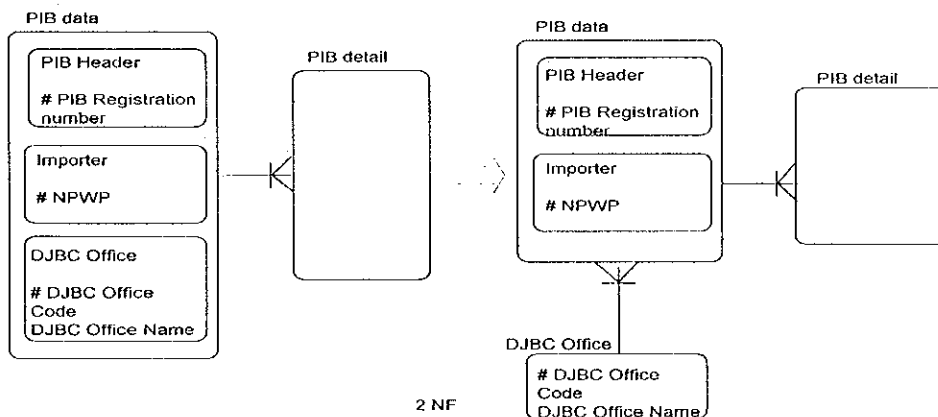


1 NF

Figure 1.8.4.3-1: First Normal Form

2) Second Normal Form (2NF)

If primary key consists of several data items, then all of data items must depend on all of the data items from the primary key. For example, primary key of PIB data consists of PIB registration number and DJBC Office Code. However DJBC Office name does not depend on primary key. It depends on DJBC Office Code which is only a part of primary key. Therefore, DJBC Office Code and DJBC Office name are separated from PIB data and defined as a new table.



2 NF

Figure 1.8.4.3-2: Second Normal Form

3) Third Normal Form (3NF)

There should not be non-related data items with primary key. For example, PIB data still contains importer who has issued the PIB data, but importer does not depend on PIB. To be 3NF, importer must be separated from PIB data. Therefore, importer is defined as a new table with primary key such as NPWP.

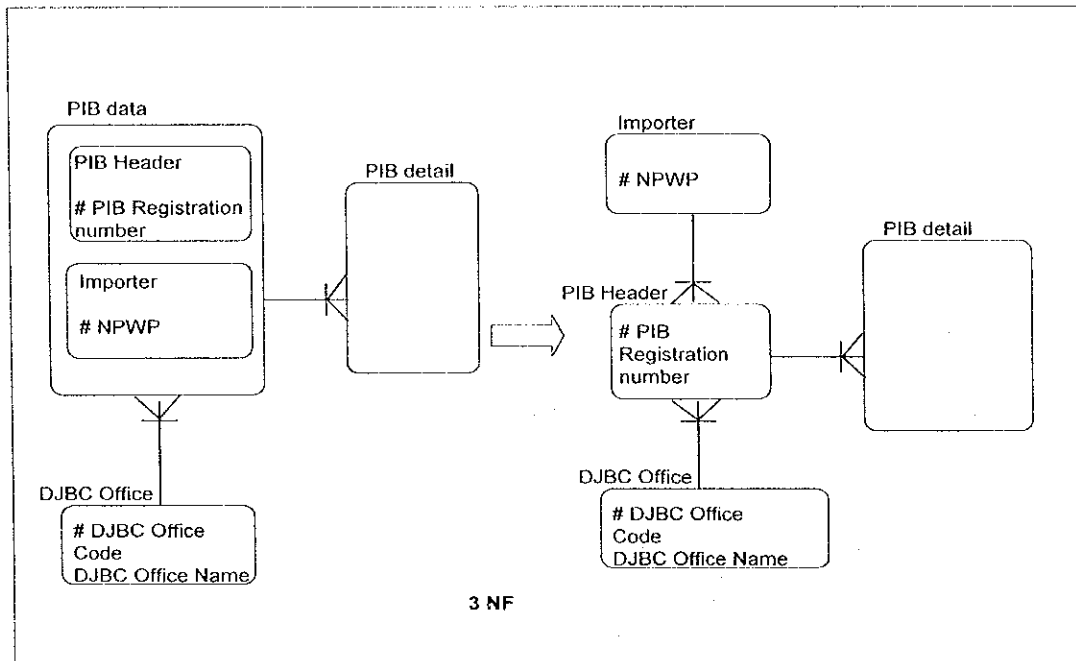


Figure 1.8.4.3-3: Third Normal Form

1.8.4.4 Entity Relationship Diagram(ERD)

The JICA Study Team has defined Entity Relationship Diagram for the CIS database which is the result of logical design. ERD includes tables, relationships and all data items.

ERD is shown in Supplement E.2. List of entities is shown in Supplement F.

1.8.5 Physical Design

1.8.5.1 Outline of physical database design

Physical database design means to determine location of database file on physical components such as disks and memory based on logical database design. Figure 1.8.5.1-1 shows physical components of database server.

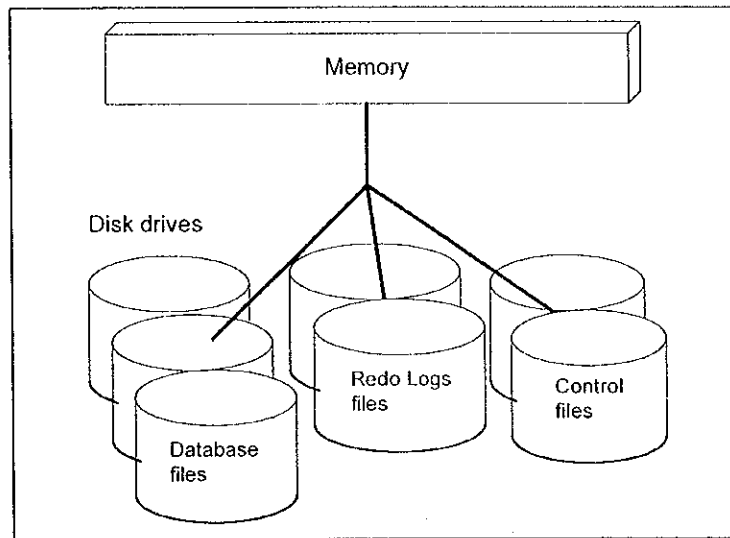


Figure 1.8.5.1-1: Configuration of physical database server

Well-designed physical database structure can provide:

- High performance to access
- Easy to recover on disk crash

In this subsection, location of database file in physical disk is focused on.

1.8.5.2 Relationship between logical structure and physical structure

The database has logical structures and physical structures. Both of them consist of the following components. Table 1.8.5.2-1 describes every components of both logical and physical structure.

Table 1.8.5.2-1: Component of logical and physical structure (1/2)

	Component	Description
Logical	Tablespaces	A database consists of one or more logical storage units called tablespaces. A tablespace is used to group related logical structures together. For example, tablespaces commonly group all of objects of application to simplify certain administrative operations.

Table 1.8.5.2-1: Component of logical and physical structure (2/2)

	Component	Description
Logical Structure	Schema objects	Schema objects are the logical structures that directly refer to the database's data. Schema objects include such structures as tables, views, sequences, stored procedures, synonyms, indexes, clusters, and database links.
	Segments	Segments are the physical counterpart of logical database object that store data. There are four types of segment as follows:
	Data segment	All of the data of table store in the data segment.
	Index segment	Index segment store the data associated with indexes.
	Rollback segment	Rollback segment store "undo" information to rollback uncommitted transactions for users.
	Temporary segment	Temporary segment store temporary data for SQL statement execution.
	Extents	An extent is a specific number of contiguous blocks, obtained in a single allocation, used to store a specific type of information. A segment is made up of extents.
Data block	A block is the finest level of granularity; data is stored as blocks in Oracle. One data block corresponds to a specific number of bytes of physical database space on disk. A block size is specified for each Oracle database when the database is created.	
Physical Structure	Datafiles	Every Oracle database has one or more physical datafiles. A database's datafiles contain all the database data. The data of logical database structures such as tables and indexes is physically stored in the datafiles allocated for a database.
	Redo log files (online log files)	Every Oracle database has a set of two or more redo log files. The set of redo log files for a database is collectively known as the databases redo log. The primary function of the redo log is to record all changes made to data. This log file is always accessible by Oracle database, so it calls online log files. The files write in cyclical manner, the first file begin overwrite if the last file is full.
	Archive log files (off line log files)	Archive log files are optional on physical database structure. These files are created if Oracle database run on ARCHIVELOG mode, on which all transaction logs are written to these files.
	Control files	Every Oracle database has a control file. A control file contains entries that specify the physical structure of the database, which contains the following types of information: <ul style="list-style-type: none"> • Database name • Names and locations of a database's datafiles and redo log files • Time stamp of database creation

Logical structure contains many schema objects, which have been designed as ERD. Physical structure contains datablocks, which are related to tablespaces. All of schema objects are stored in tablespaces, which have been designed as logical container units.

The relationship between logical and physical structure is described in figure 1.8.5.2-1.

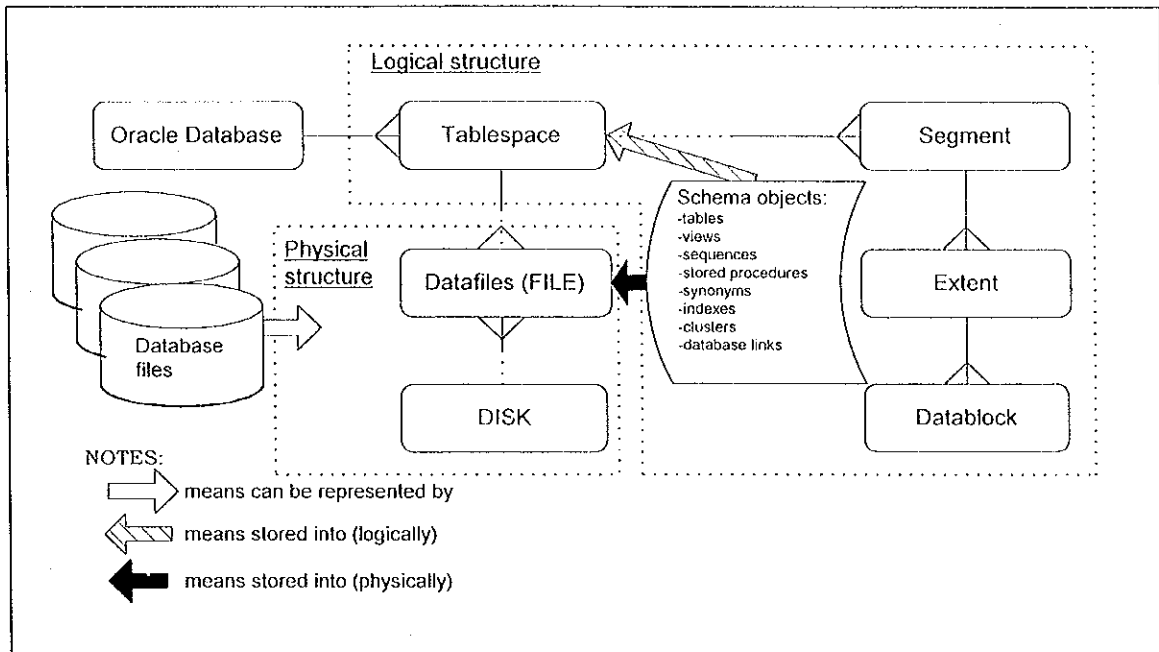


Figure 1.8.5.2-1: Relationship between logical and physical database structure

Both logical and physical structures have a close relationship in system activities. Table 1.8.5.2-2 shows relationship between system activity and both of logical and physical structures.

Table 1.8.5.2-2: Relationship between system activities and structures (1/2)

Activity	Logical Structure	Physical Structure	Description
Data accessing	<ul style="list-style-type: none"> • Schema objects: <ul style="list-style-type: none"> □ Tables □ Indexes • Tablespace 	Data files have four type segment/usage: <ol style="list-style-type: none"> 1) Data 2) Index 3) Rollback 4) Temporary 	<ul style="list-style-type: none"> • The main function of these data files is storing data. • Background process for accessing is DBWR (database writer). • Access manner of DBWR is randomly. • Minimum number of data file is one.
Recovery	---	Log file have two types include:	<ul style="list-style-type: none"> • The main function of these log files is recovery preparation for fail transaction on disk crash. • Access manner both of LGWR and ARCH is sequentially. • Minimum number of redo log files is two.
		Redo logs (online log)	LGWR (log writer) background process maintains redo logs files.
		Archive logs (off line log)	ARCH (archiver) background process maintains archive logs files.

Table 1.8.5.2-2: Relationship between system activities and structures (2/2)

Activity	Logical Structure	Physical Structure	Description
Control	---	Control files	<ul style="list-style-type: none"> The main function of these data files is controlling the database on startup, physical structure modification, and shutdown. Related process to control file is database instance. Minimum number of data file is three, and should store in different disk.

1.8.5.3 Guideline for physical design

Physical layout may be changed based on system environment, application specification of database usage, the hardware configuration and so on. Therefore, in this subsection, general guidelines are explained for physical design. Three guidelines are described in figure 1.8.5.3-1.

	Figure	Description
Guideline-1	<p>Avoid contention among physical database files such as: datafiles, redo logs, and archive logs</p>	<ul style="list-style-type: none"> Contention among physical database file can minimize by placing different file into different disk. Merit of this layout is to increase performance (because of minimal contention) and easy to recover on single disk crash
Guideline-2	<p>Avoid contention among the tablespaces and their datafiles with different function or access manner</p>	<ul style="list-style-type: none"> Separate tablespace and datafile of table data, which is accessing in different access manner, such as: read-intensive, write-intensive, and low access (read/write) Separate physical file of tablespace with different function such as index and rollback.
Guideline-3	<p>Use Oracle mirroring function to make copy of control file to different disk.</p>	<ul style="list-style-type: none"> The database cannot startup if this file corrupt or missing.

Figure 1.8.5.3-1: General guideline for placement of physical file

1.8.5.4 Physical layout for CIS

The JICA study team has designed CIS physical database layout based on guidelines and result of investigation.

At first, CIS tables for user data as the Data file have been categorized into the following three types.

- Read-intensive table
- Write-intensive table
- Low access table

Table 1.8.5.4-1 shows description for each type.

Table 1.8.5.4-1: Type of user data

Type	Description	Example
Read-intensive	Read-intensive means number of access to table at certain time (eg. monthly) for reading information is greater than for writing.	<ul style="list-style-type: none">• PIB• Basic Information
Write-intensive	Write-intensive means number of access to table at certain time (eg. monthly) for writing information is greater than for reading.	<ul style="list-style-type: none">• Audit Result• PIB Verification I Result
Low access	Low access means number of access to table at certain time (eg. monthly) for both reading or writing information is low in comparison with read-intensive or write-intensive table.	<ul style="list-style-type: none">• Violation and Investigation• NI/NHI.

For next, tablespace has been categorized into following seven types, by use of each tablespace.

- Data dictionary
- User data
- Index
- RDMBS tools
- Rollback segment
- Temporary
- User objects

Table 1.8.5.4-2 shows description for each category.

Table 1.8.5.4-2: Category of tablespace

Usage of tablespace	Tablespace name	Description
Data dictionary	SYSTEM	This is default tablespace for Oracle database.
User data	<ul style="list-style-type: none"> • DATA_R • DATA_W • DATA_A 	User data will be separated into read-intensive, write-intensive, and low-access data. This separation is useful to separate tablespaces' datafiles on separate disk drives to reduce I/O contention.
Index	<ul style="list-style-type: none"> • INDEX_R • INDEX_W • INDEX_A • TOOLS_I 	Index tablespace will be created for each user data, and other intensive usage tablespace such as RDMBS tool.
RDMBS tools	TOOLS	The default tablespace of database is data dictionary tablespace. This tablespace create to avoid RDBMS tool store data in the default tablespace, when their operation.
Rollback segment	<ul style="list-style-type: none"> • RBS_R • RBS_W • RBS_A 	Rollback segment tablespace will be created for each user data, to prevent a single disk failure from causing permanent loss of data.
Temporary	<ul style="list-style-type: none"> • TEMP • TEMP_EXC 	Temporary tablespace is created for store dynamically created objects within the database that store data during large sorting operation such as SELECT DISTINCT, UNION, and CREATE INDEX. Special temporary tablespace can be created for specific requirement such as temporary segment for export / import data.
User objects	USERS	Special tablespace is created for users in development database, to minimize the impact of user experimentation on the functioning of the database.

Finally, every tablespace has been located on physical disk under the general guidelines (see Figure 1.8.5.3-1). Figure 1.8.5.4-1 shows result of design.

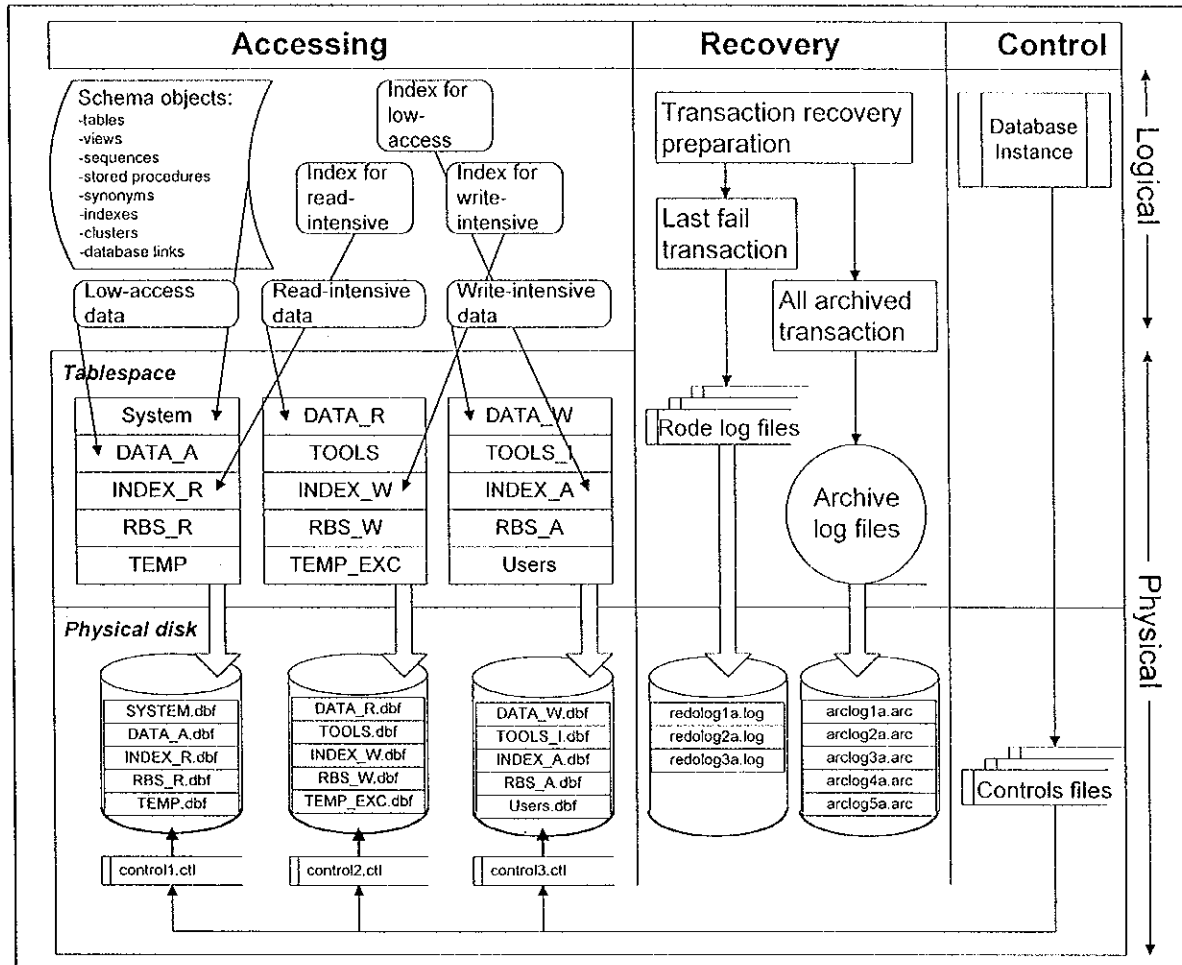


Figure 1.8.5.4-1: Physical layouts for CIS database server

"Physical disk" in Figure 1.8.5.4-1 usually consists of several actual disk devices.

Based on physical location, the JICA Study Team has designed CIS physical map. Table 1.8.5.4-3 shows details of map.

Table 1.8.5.4-3: Physical map for the CIS database (1/2)

Disk	Contents	Tablespace	Remark
1	CIS Verification Transaction	DATA_W	Detail investigation is required to create one or more datafiles for DATA_W tablespace.
	CIS Physical Examination Result		
2	CIS Master	DATA_R	Detail investigation is required to create one or more datafiles for DATA_R tablespace
	CIS PEB		
	CIS PIB		

Table 1.8.5.4-3: Physical map for the CIS database (2/2)

Disk	Contents	Tablespace	Remark
3	CIS Temporary Admission	DATA_A	Detail investigation is required to create one or more datafiles for DATA_A tablespace
	CIS Excise		
	CIS PIBT		
	CIS NI/NHI		
	CIS Inter Island Transportation		
	CIS Common		
	CIS Violation Transaction		
	CIS Manifest		
	CIS Risk Indicator		
4	Redo log files	—	Redo log file does not have logical structure such as tablespace. These file directly implement to physical files.
5	Archive log files	—	Archive log file does not have logical structure such as tablespace. These file directly implement to physical files.

1.8.5.5 Index Definition

An index is an optional structure associated with tables and clusters, which can be created to increase the performance of data retrieval. An index in this document helps reader locate information faster than the case without index, an index in database provides a faster access path to table data.

To achieve faster access to the CIS database, indexes can be defined for any columns of tables in the CIS database. Usually, indexes should be defined for every key item, which is used for retrieving data from database.

However, the more indexes there are, the more overhead is incurred because the table is modified. Specifically, when rows are inserted or deleted, all indexes on the table must be updated as well. Thus, there is a trade-off between the speed of retrieving data from a table and the speed of updating the table.

In CIS, almost all key items are corresponding to primary key items, which are already defined as indexes automatically. Therefore, there are no additional indexes, except for primary key items.

To define indexes for another key items, furthermore discussions are needed in development phase.

1.8.6 Security

For discussion on database security, please see 1.7.1.2.

1.8.7 Backup & Recovery

If a hardware failure, an operating system error, or an unexpected process termination interrupts CIS, the database might be damaged. To recover, Oracle provides backup and recovery features. Figure 1.8.7-1 shows a basic schedule for CIS backup duties. The CIS operator would be in charge of these duties that can change this schedule.

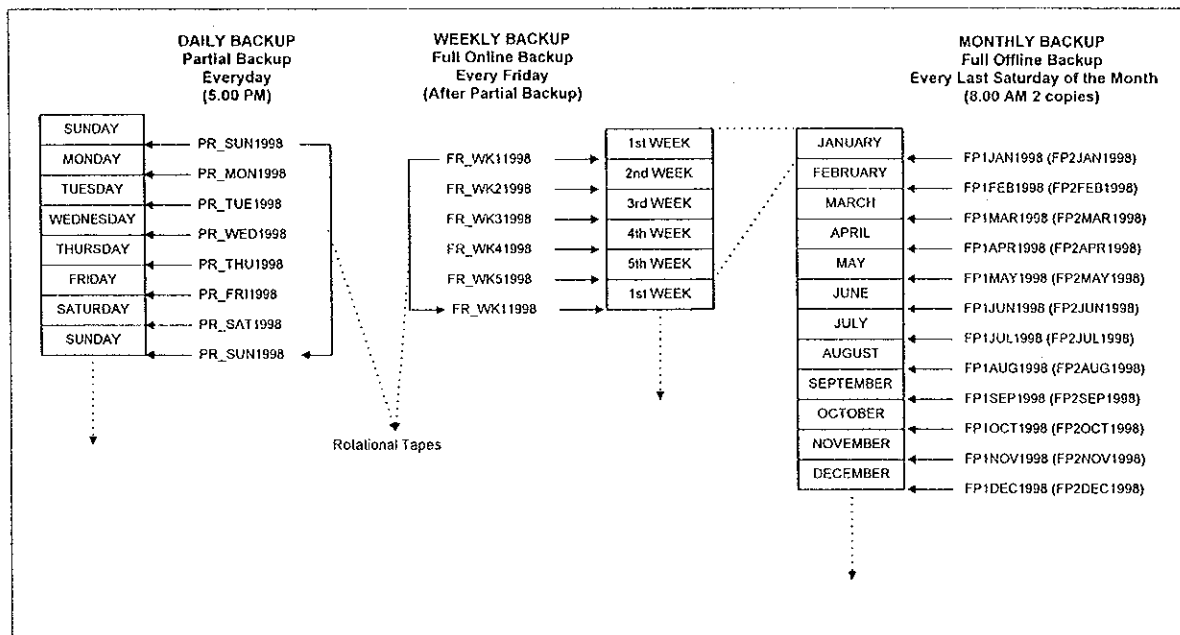


Figure 1.8.7-1: Example of the CIS backup schedule

In this sub-subsection, backup and recovery procedures are described as follows:

- Daily Backup: Partial backup (used "export backup" of Oracle) will be done everyday (e.g. 5.00 PM)
- Weekly Backup: Full backup (used "online backup" of Oracle) will be done every week (e.g. Friday evening) after partial backup
- Monthly Backup: Full backup (used "offline backup" of Oracle) will be done every month (e.g. on the last Saturday 8.00 AM), and will use permanent backup tapes. The JICA Study Team recommends creating two copies for each backup.

- It is recommended to stop the CIS database once a month for full offline backup and maintenance of database system
- Test backup media regularly to ensure successful recovery.

Recovery processes depend on the type of failure and the damaged files. Database Administrator (DBA) should be aware of various kinds of failure that can occur in CIS, and should have a strategy for handling each kind of failure. Figure 1.8.7-2 shows various kinds of failure.

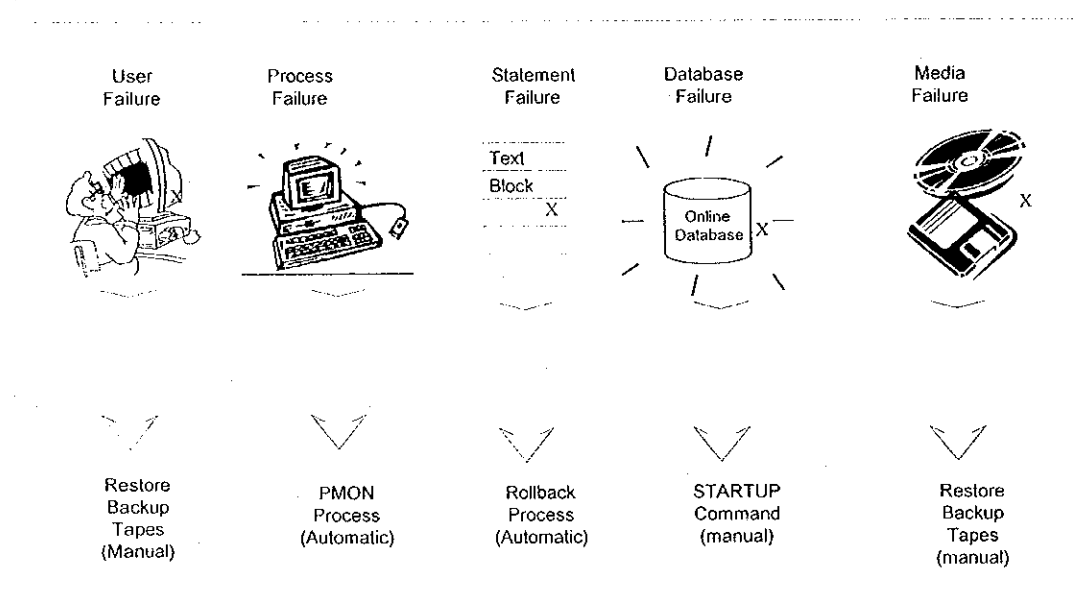


Figure 1.8.7-2: Kinds of failure and recovery method

Oracle provides automatic recovery procedure, such as process failure and statement failure. In case of database failure, DBA has to shut down the database and startup the database manually. Oracle automatically does several recovery procedures when the database starts running. This sub-subsection is focused on recovery that DBA must do based on the CIS backup strategy such as user failure and media failure. Depending on the CIS backup procedure, data can be restored in the following fashion:

- 1) If file system is broken or lost, operator has to restore all files from the latest Off-line Full Backup Tape (monthly backup tape). The operator has to restore process copy of all files from the tape to the correct locations. The operator, then, has to continue to second procedure.
- 2) If the data are not consistent but database is accessible, then the operator needs to perform following recovery procedure:

- a) Restore data from the latest Online Full Backup Tape (weekly backup tape).
- b) Restore data from the Online Partial Backup Tapes (daily backup tapes) one-by-one from Saturday until the day just before the day when the failure happened.

To clarify the CIS recovery procedure, there are two examples of failure and how to perform recovery action. They are as follows:

1) Database has some failures on Wednesday at 08.00 AM, but the database is not broken. The steps to repair the database are:

- To stop the CIS service
- To restore the latest Online Full Backup Tape
- To import the Saturday Online Partial Backup Tape
- To import the Sunday Online Partial Backup Tape
- To import the Monday Online Partial Backup Tape
- To import the Tuesday Online Partial Backup Tape

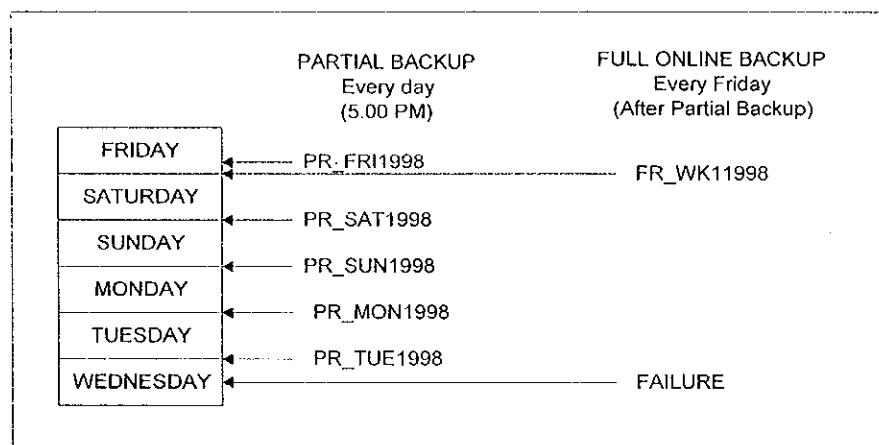


Figure 1.8.7-3: Example 1 of recovery step

2) Database has some failures on Monday at 08.00 PM (first Monday on March 1998). The database is broken. The steps to repair the database are:

- To stop the CIS Service
- To copy all files from the latest Off-line Full Backup Tape to the correct directory
- To startup the database
- To import the Saturday Online Partial Backup Tape
- To import the Sunday Online Partial Backup Tape
- To import the Monday Online Partial Backup Tape

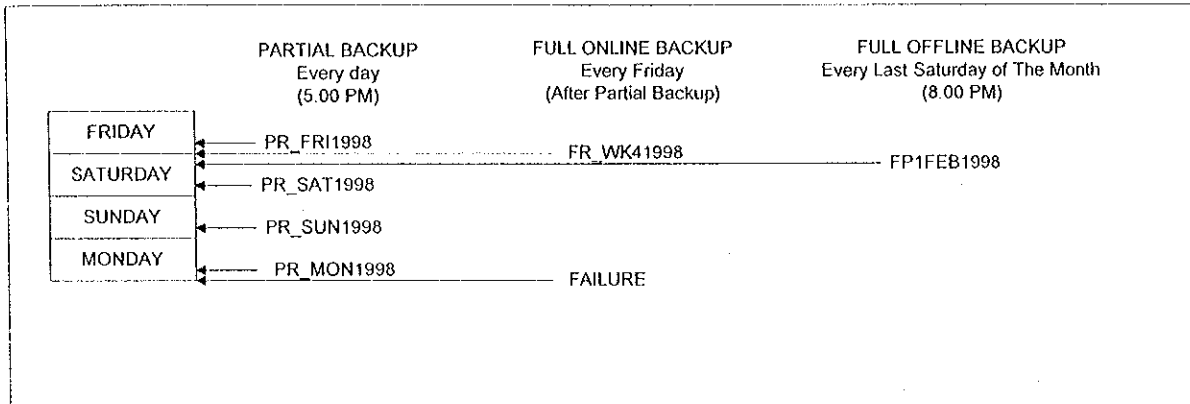


Figure 1.8.7-4: Example 2 of recovery step

1.8.8 Capacity planning

In estimating capacity of both memory and disk storage, Oracle database is to be used for database management system of CIS. Therefore, every estimation is based on characteristics of Oracle. If CIS uses another products for database management system, then there must be different results of estimation.

1.8.8.1 Memory storage

At the beginning of estimation, memory storage has been divided into several parts by use of Oracle. Table 1.8.8.1-1 shows usage of memory storage.

Table 1.8.8.1-1: Usage of memory storage

No	Storage name	Description
1	SGA (System Global Area)	An area in memory is used by Oracle users to share information among them.
2	Software area	An area in memory is used by Oracle database system to run the database background processes.
3	PGA (Program Global Area)	An area in memory is used by a single Oracle user process.

The JICA Study Team has estimated capacity of memory for each storage under the following conditions.

- Shared pool size, DB buffer size and software area are been estimated by the actual memory size of other applications that have the similar scale and usage to CIS (not actual business operation).
- REDO log buffer has been estimated as update type database.
- Each user is supposed to have 2MB in PGA.
- Each user is supposed to have 5 processes for sort procedure.
- Maximum number of terminals is supposed to be 100 in Main Server.
- Hash join area size is supposed to be two times of sort area.

Table 1.8.8.1-2 shows the result of memory estimation.

Table 1.8.8.1-2: Result of memory estimation

No	Storage Name	Storage size
1	SGA(System Global Area)	552MB
	Shared pool size	100MB
	DB buffer size	300MB
	REDO log buffer size (sort area size)	2MB
	(Hash join area size)	50MB
		100MB
2	Software area	20MB
3	PGA(Program Global Area)	200MB
Total amount		772MB

This result shows that CIS needs 772MB memory for Oracle database at least. Actually, there should be many applications in the CIS Main Server, and also every application needs memory storage. Therefore, more than 772MB memory might be needed for CIS server.

1.8.8.2 Disk storage

To estimate disk storage, the JICA Study Team has investigated into quantity of data which should be included in the CIS server. The data have been divided into twelve parts which are corresponding to ERD categories. (See Supplement E.2)

Table 1.8.8.2-1 shows the result of investigation.

Table 1.8.8.2-1: Estimation of CIS data

Data name	Expected number of transactions	Amount of data(MB/year)
CIS EXCISE [Tobacco/year]	13,200	21.9
[Alcohol beverage/year]	10,800	
[Ethyl alcohol/year]	2,400	
CIS Interisland Transportation [person/year]	2,472	3.4
CIS Master [NPWP/year]	1,440	25.0
CIS NI/NHI [NHI/year]	28,800	15.4
CIS PEB [PEB/year]	1,000,000	1,040.9
CIS PIB [PIB/year]	1,000,000	987.6
CIS Physical Examination Result [Result/year]	125,000	528.0
CIS PIBT [PIBT/year]	50,000	17.4
CIS Violation Transaction [Importer violation/month]	1,404	0.1
CIS Verification Transaction [Verification result/year]	730,000	3,145.1
CIS Temporary Admission [admission/month]	120,000	157.1
CIS Common	—	2.0
Total amount		5,943.9

According to the result of investigation, approximately 6GB disk capacities are needed for net volume of data area. Nevertheless, Oracle requests more disk spaces to manage the CIS data, and expansion area should be considered for estimation of disk capacity.

The JICA Study Team has estimated capacity of disk storage for each storage under the following conditions.

- Data storage has 40% of net volume of data area in estimated size for free spaces to prepare for data expansion.
- Another storage, such as Index, Rollback, Data dictionary and Temporary segment, has 20% of net volume of data area in estimated size for free spaces to prepare for data expansion.
- Each CIS data table might have five indexes.
- Maximum rollback segment size is estimated at a half of the biggest table.
- Maximum temporary segment size is estimated at two times of the biggest table.

Table 1.8.8.2-2 shows usage of disk spaces and result of estimation for each year.

Table 1.8.8.2-2: Usage of disk storage and estimated CIS database size

No	Storage name	Description	Estimated size (GB/year)	
			1 st year	5 th year
1	Data	A database structure is used to store data	8.4	10.5
2	Index	A database structure is used by the server to quickly find data in database	1.7	2.2
3	Rollback	A database structure is used to maintain read consistency among multiple users in the database and to be able to roll back transactions	1.9	2.4
4	Data dictionary	A database structure is used by Oracle to store information about database objects	0.1	0.1
5	Temporary segment	A database structure is used to store temporary data during sorting operations	7.5	9.5
Estimated total capacity			19.6	24.7

In this estimation, the capacity in the 5th year has been estimated on the basis of an 6% of annual growth rate of 6%. Therefore, the CIS database requests more than 25GB disk capacities in the 5th year and total size of the CIS database amount to approximately 110.2GB for 5 years.

