DB2 Recovery Expert for z/OS V1.1

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Presentation Agenda

- **DB2 z/OS recovery**
- **Current IBM products for recovery**
- **DB2 Recovery Expert z/OS function**
- **DB2 Recovery Expert z/OS architecture**
- **DB2 Recovery Expert z/OS demonstration**

DB2 Recovery

- **DB2 recovery is perhaps the most complex activity that DBAs participate in**
- **There are many different potential scenarios**
- **Recoveries are not an everyday thing**
  - most people don't practice recovery enough
  - skills are often not sharp when they are needed
- **There is a need for an Expert type product to assist DBAs in recovery activities**

DB2 Recovery

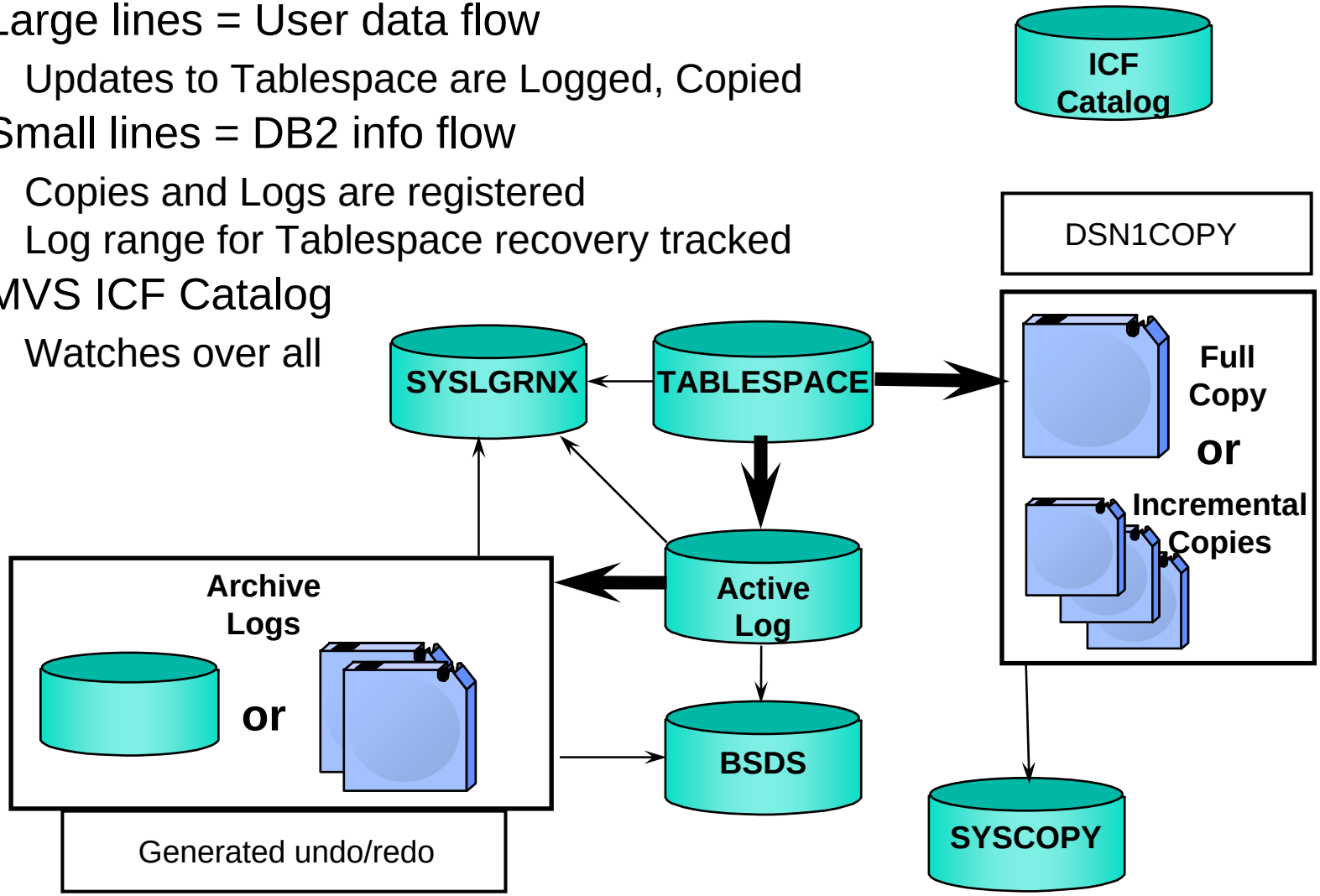
- **Different types of recovery situations all requiring different recovery solutions**
  - Hardware failures
  - Application failures
  - Accidentally dropped objects
  - Application System recovery
  - Disaster recovery
- **Different recovery choices**
  - Recover to
    - Current, IC, PIT, LRSN, Timestamp (quite time)
  - Recover using
    - IC, log, DSN1COPY, undo, redo
  - Recover related objects

What are your DB2 Recovery Assets

- **DB2 Active and Archived Log**
  - Generated Undo/Redo
- **Bootstrap Dataset – BSDS**
- **SYSLGRNX**
- **SYSCOPY**
- **Full and Incremental copies**
  - DSN1COPY
- **Tablespace to be recovered**
- **ICF Catalog**

DB2 Recovery Asset Review

- Large lines = User data flow
  - Updates to Tablespace are Logged, Copied
- Small lines = DB2 info flow
  - Copies and Logs are registered
  - Log range for Tablespace recovery tracked
- MVS ICF Catalog
  - Watches over all



Current IBM products for DB2 z/OS recovery

- **DB2 COPY Utility**
  - Make backups of application and catalog objects
- **DB2 RECOVER Utility**
  - Primary recovery tool for application and catalog objects
- **Log Analysis Tool**
  - Selective backout and recovery
- **Object Restore**
  - Dropped object recovery (and more)
- **Change Accum Tool**
  - Speed recovery by producing log subset files or using log records to update image copies
- **Automation Tool**
  - Disaster recovery support
- **V8 – SYSTEM BACKUP and RESTORE Utilities**
  - Backup and restore complete application subsystems
- **DB2 RECOVERY EXPERT for z/OS**

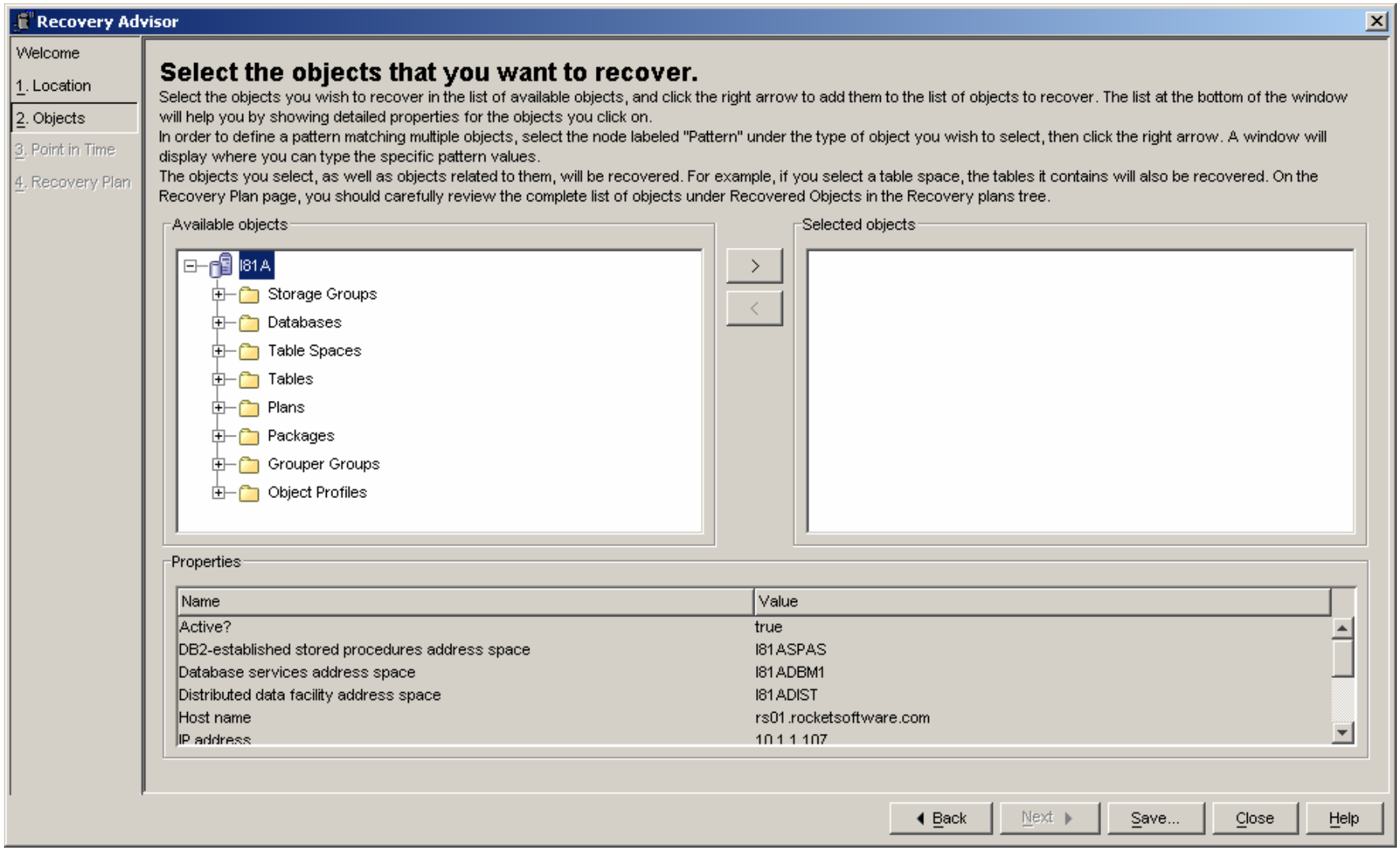
DB2 Recovery Expert for z/OS V1.1

- **Provide Expert assist for performing many types of DB2 recoveries**
- **DB2 Recovery Expert analyses the requested recovery**
  - Providing a selection of possible recovery plans
    - Selecting for you, the needed recovery assets and utilities
    - Assists in selecting recovery points
    - Builds required JCL

Select objects to recovery

- **Selecting Groups of Objects to Recover**
  - Recovery Expert provides 4 ways to specify a group of objects to be recovered
    - Explicit selection (one by one)
    - By pattern
    - Via RI relationships (Grouper and catalog RI)
      - Grouper groups can be selected in the object tree
    - If Automation Tool is available, via Automation Tool object profiles
      - Automation Tool profiles can be selected in the object tree

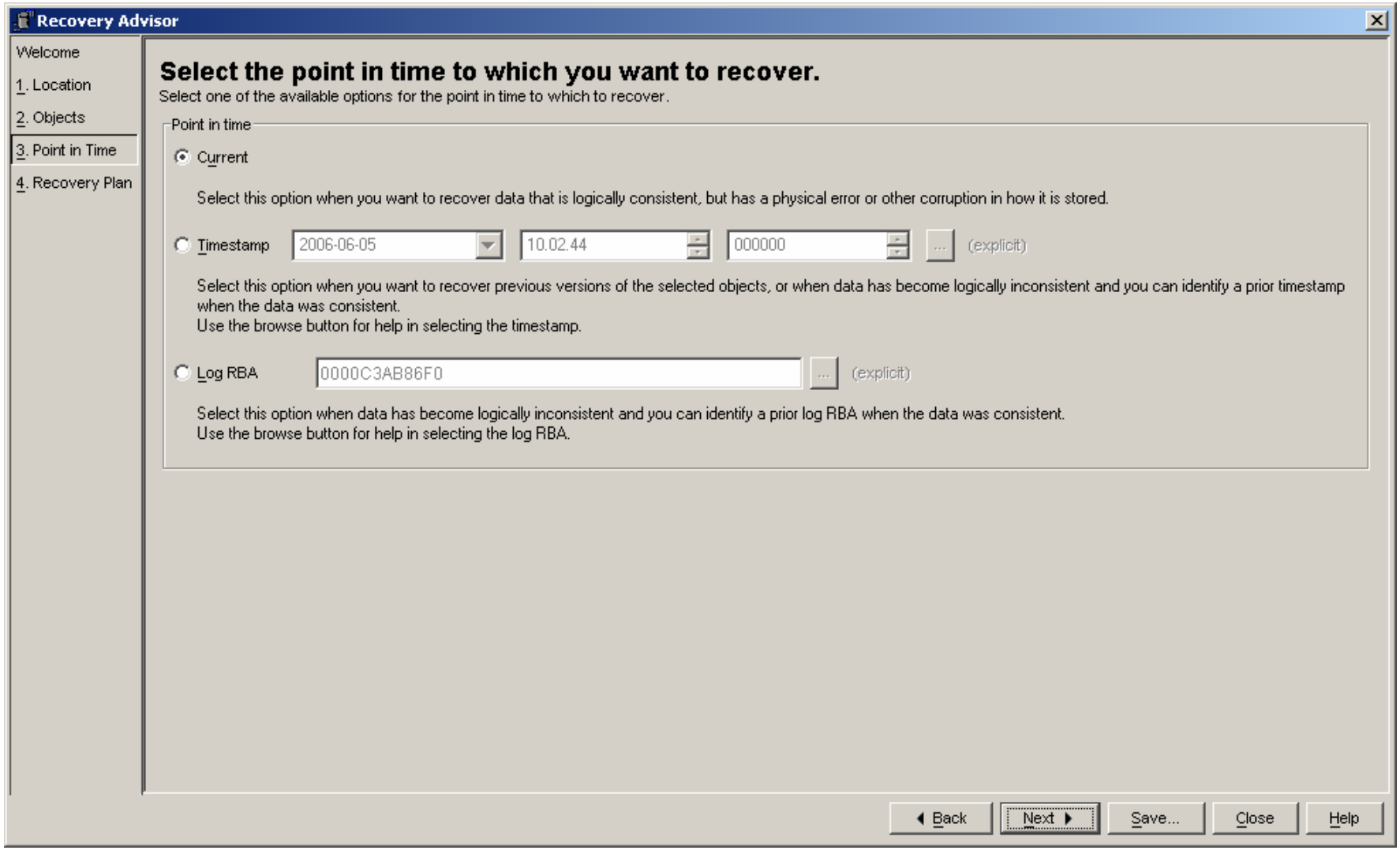
Select objects to recovery



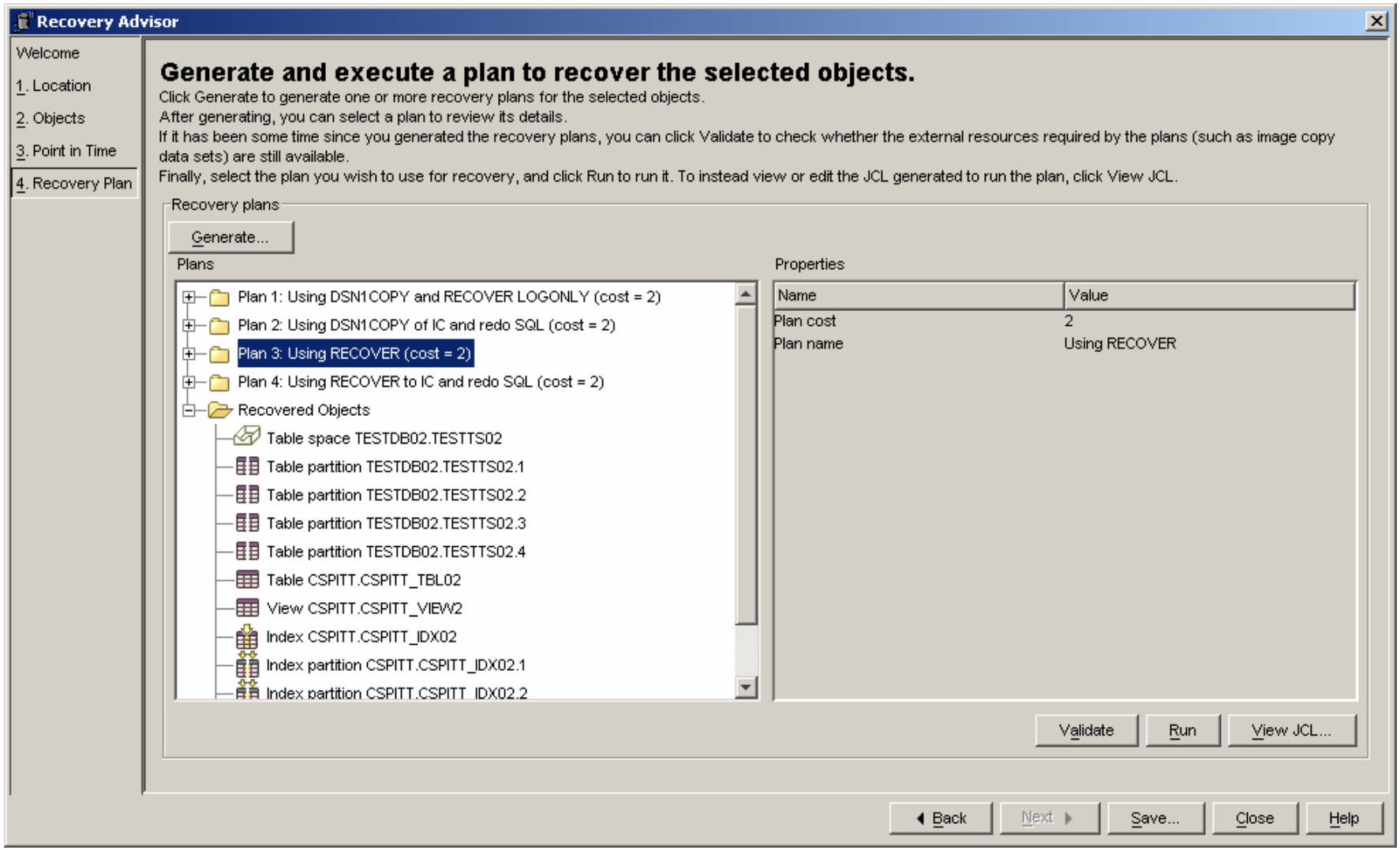
Recover Points

- **There are 3 choices when specifying a recovery point**
  - Recover to current
  - Recover to a timestamp
    - Can be selected from
      - Object version
      - Recovery history events
      - Quiet points
  - Recover to an RBA/LRSN
    - Can be selected from
      - Recovery history events
      - Quiet points

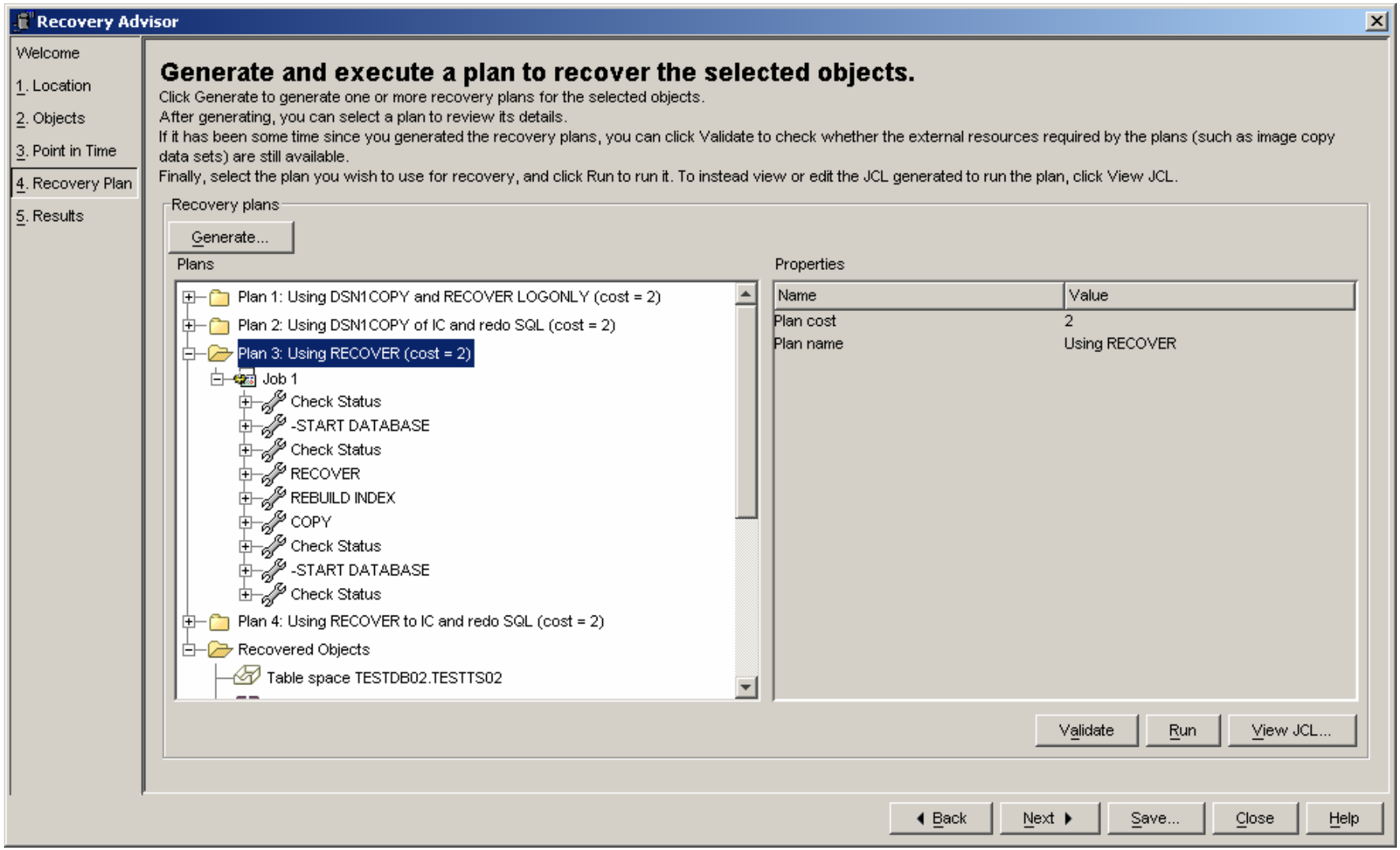
Select Recovery Point



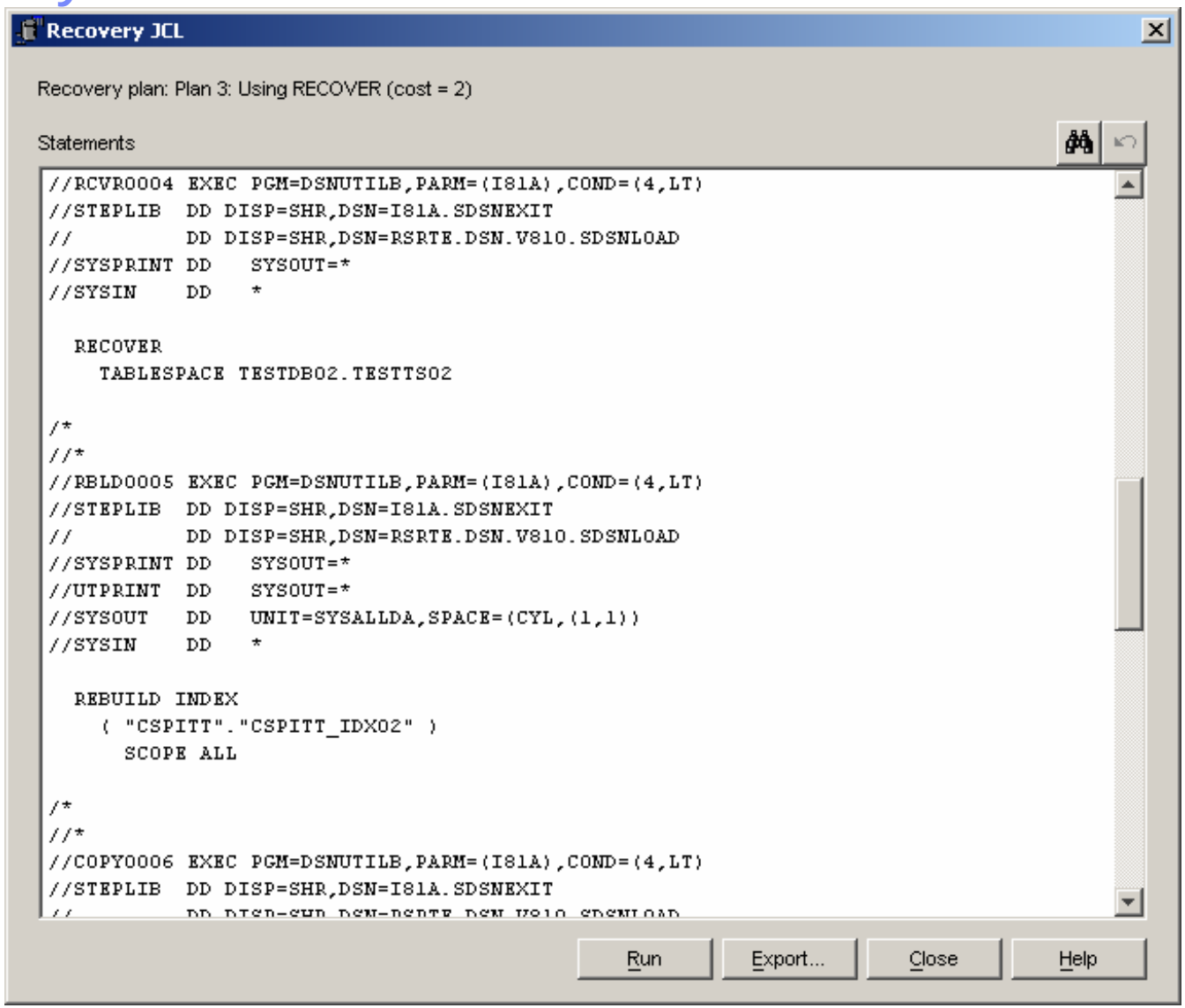
Recovery Plans



Recovery Plans steps



Recovery JCL



DB2 Recovery Expert for z/OS V1.1

- **Recovery Expert V1.1 provides**
  - Application recovery
  - Drop recovery
  - Single or multiple objects
  - Dependency analysis
  - Quiet point analysis
  - SYSTEM RESTORE

DB2 Recovery Expert for z/OS V1.1

- **Includes functionality from:**
  - Log Analysis Tool
  - Object Restore
    - NO pre-reqs for LAT or OR
- **Recovery Expert can utilize Automation Tool Object Profiles for object selection IF:**
  - the customer has Automation Tool
  - the customer already has object profiles set up in Automation Tool

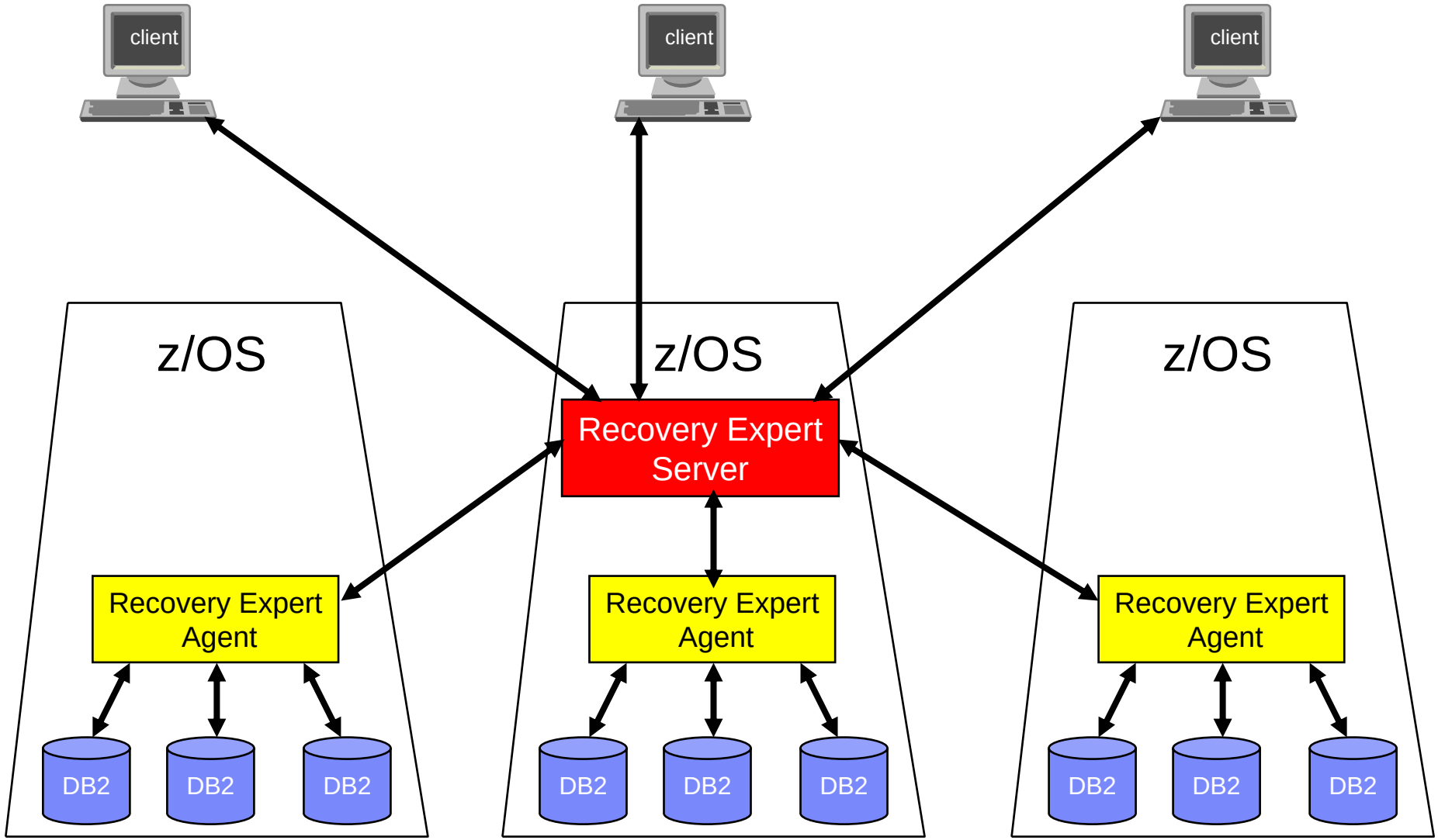
DB2 Recovery Expert for z/OS V1.1

- **V1.1 does not include functionality from:**
  - Change Accum
- **V1.1 does not do backup management**
  - Customers can use Automation Tool to perform the backups
- **V1.1 does not support**
  - Disaster recovery
  - Hardware assisted recovery
  - Integration with RE MP

Product Architecture

- **3 Tier Architecture**
  - UI – Windows - Java (no ISPF interface)
  - SERVER
    - z/OS - C/C++
  - AGENT
    - z/OS - C/C++ and assembler
- **Server and Agent run as started tasks or batch jobs**
- **Communication via TCP Sockets**
- **One UI can log onto any number of Servers across an Enterprise (one at a time)**
- **Servers can talk to any number of agents across an Enterprise**
  - Servers can talk to agents on different LPARs or systems

The DB2 Recovery Expert for z/OS environment



Schema Level Repository

- **Schema Level Repository (SLR)**
  - Enhanced version of Object Restore's Version Repository
  - Stored in DB2 tables
  - Updated via batch job
    - like Object Restore today
- **The SLR update program**
  - goes through the DB2 catalog and builds the base for the Schema Level Repository
- **The SLR update needs to be scheduled on a regular basis to insure that the SLR is up to date**

DB2 Recovery Expert for z/OS

DB2 Recovery Expert V1.1 Recovery Scenarios

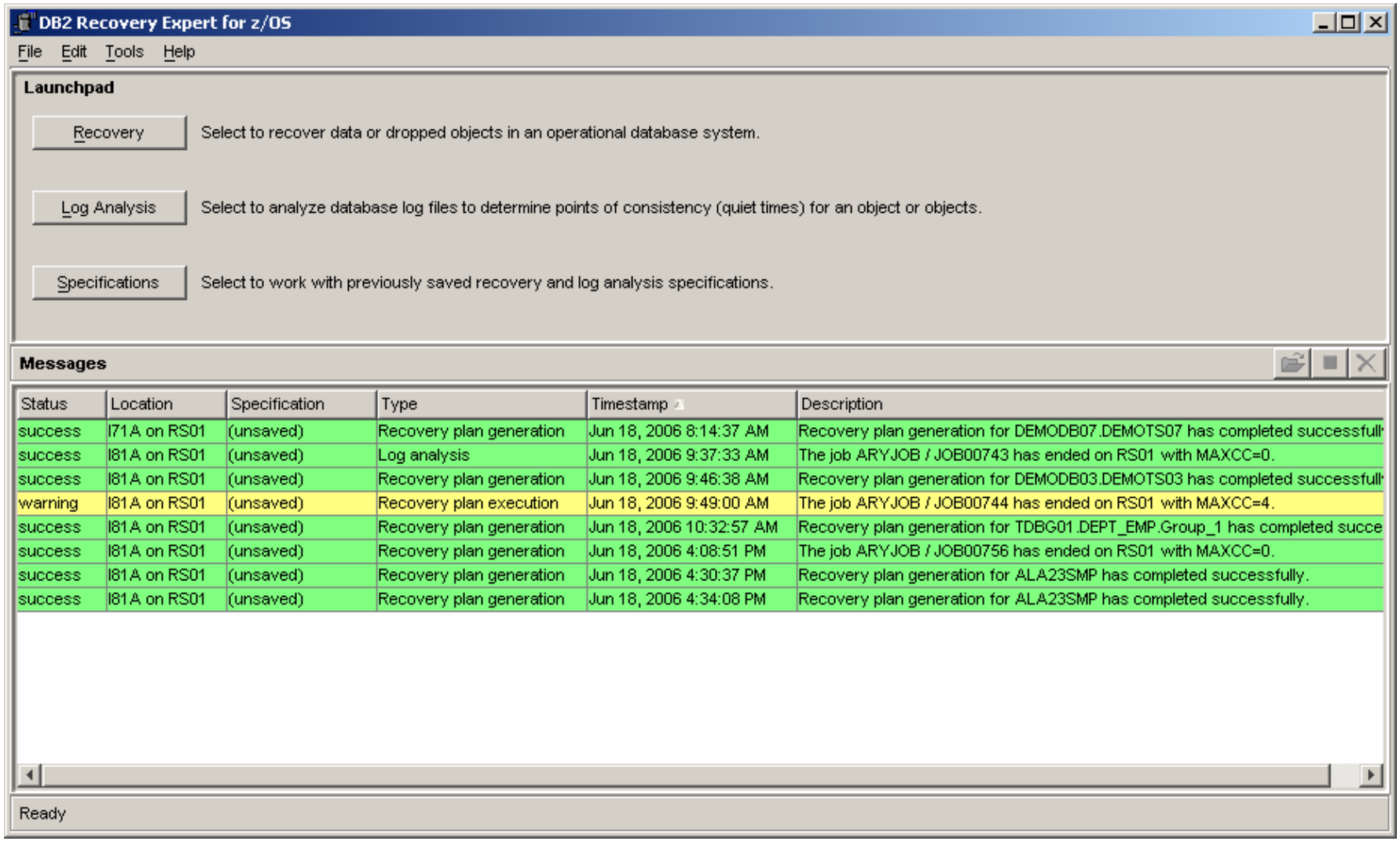
Scenarios

- Scenario 1 – Recovery of table space to current
- Scenario 2 – Recovery of table space to a selected timestamp point-in-time from quiet time
- Scenario 3 – Selection of an RBA or LRSN from recovery history events or quiet times – dropped object
- Scenario 4 – Recovery of a set of related table

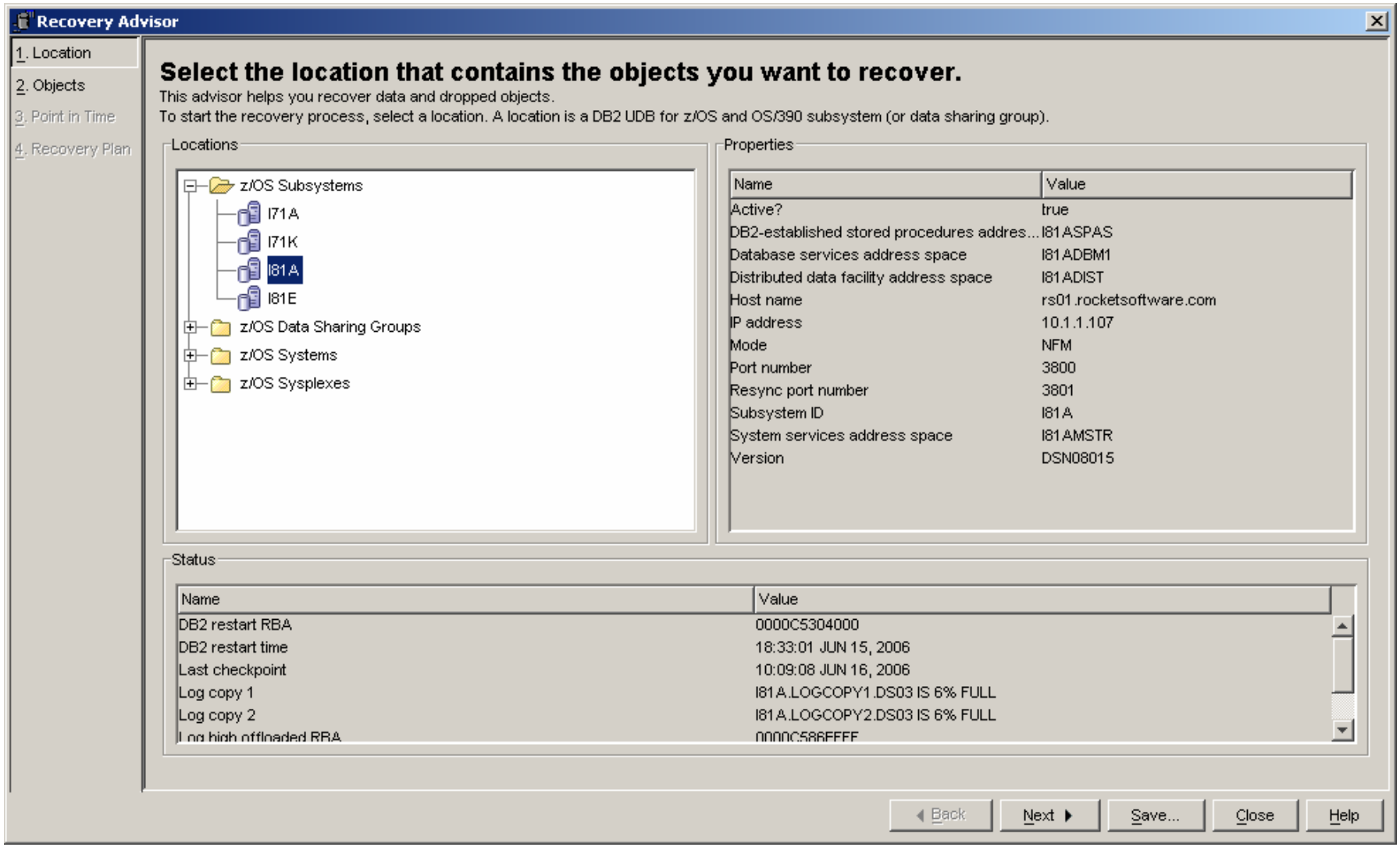
Scenario 1 – Recover TS to Current

- **Description**
  - TS DEMODB07.DEMOTS07
    - Updates to table
    - Full image copy
    - Perform SLR update
    - Updates to table
    - Selects from table
  - Recover to current
    - Using Recovery Utility

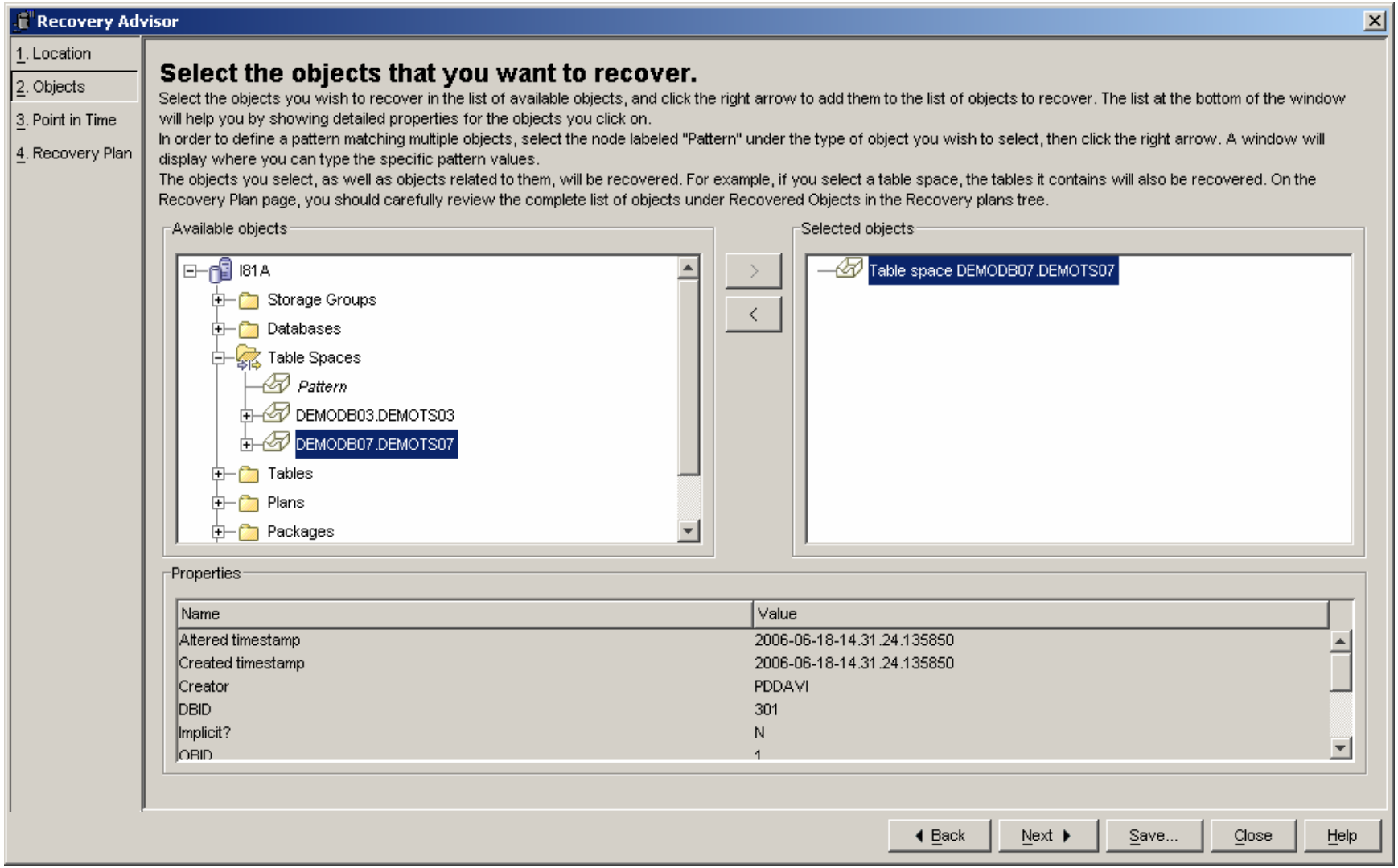
RE z/OS starting screen



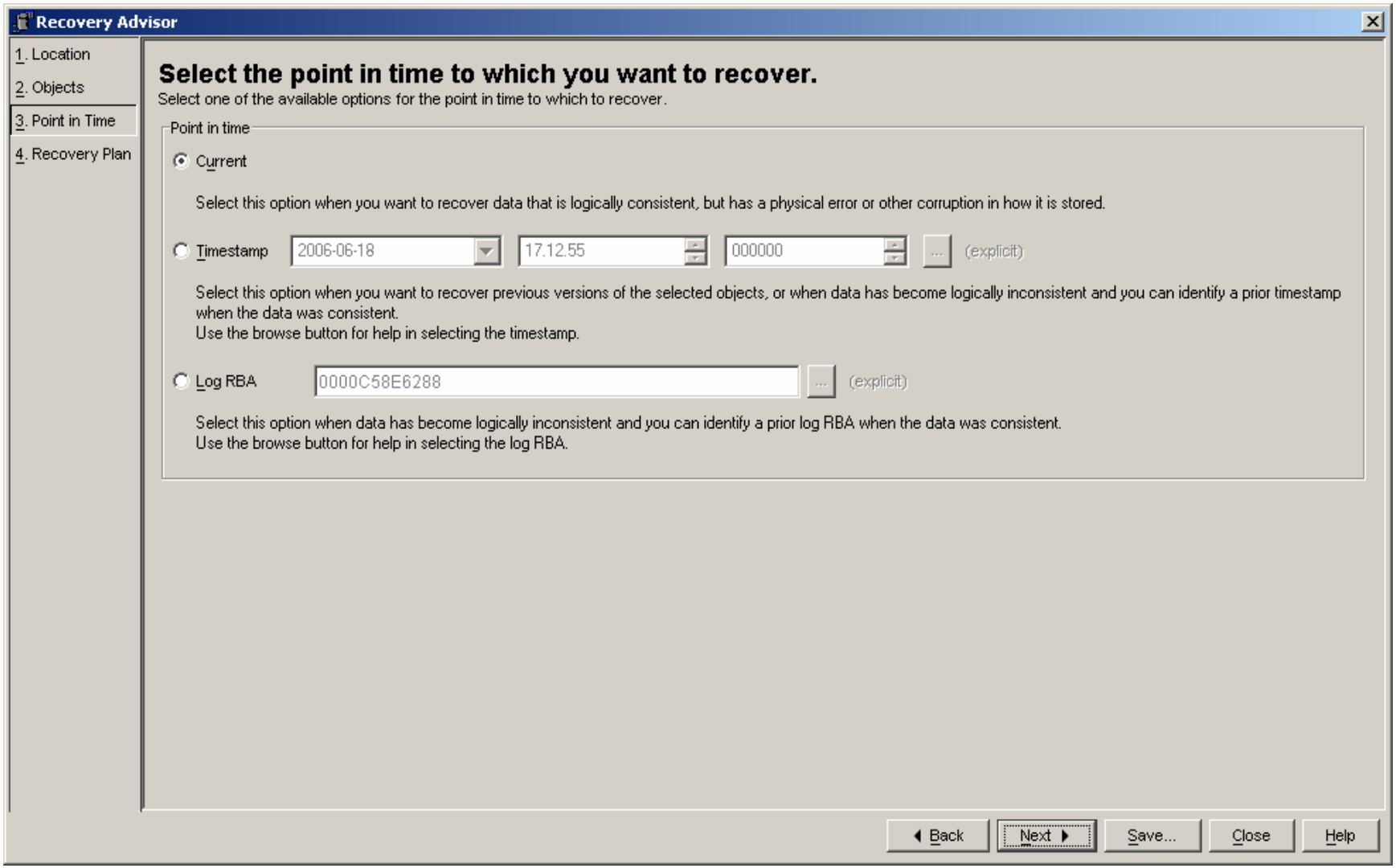
Select Location



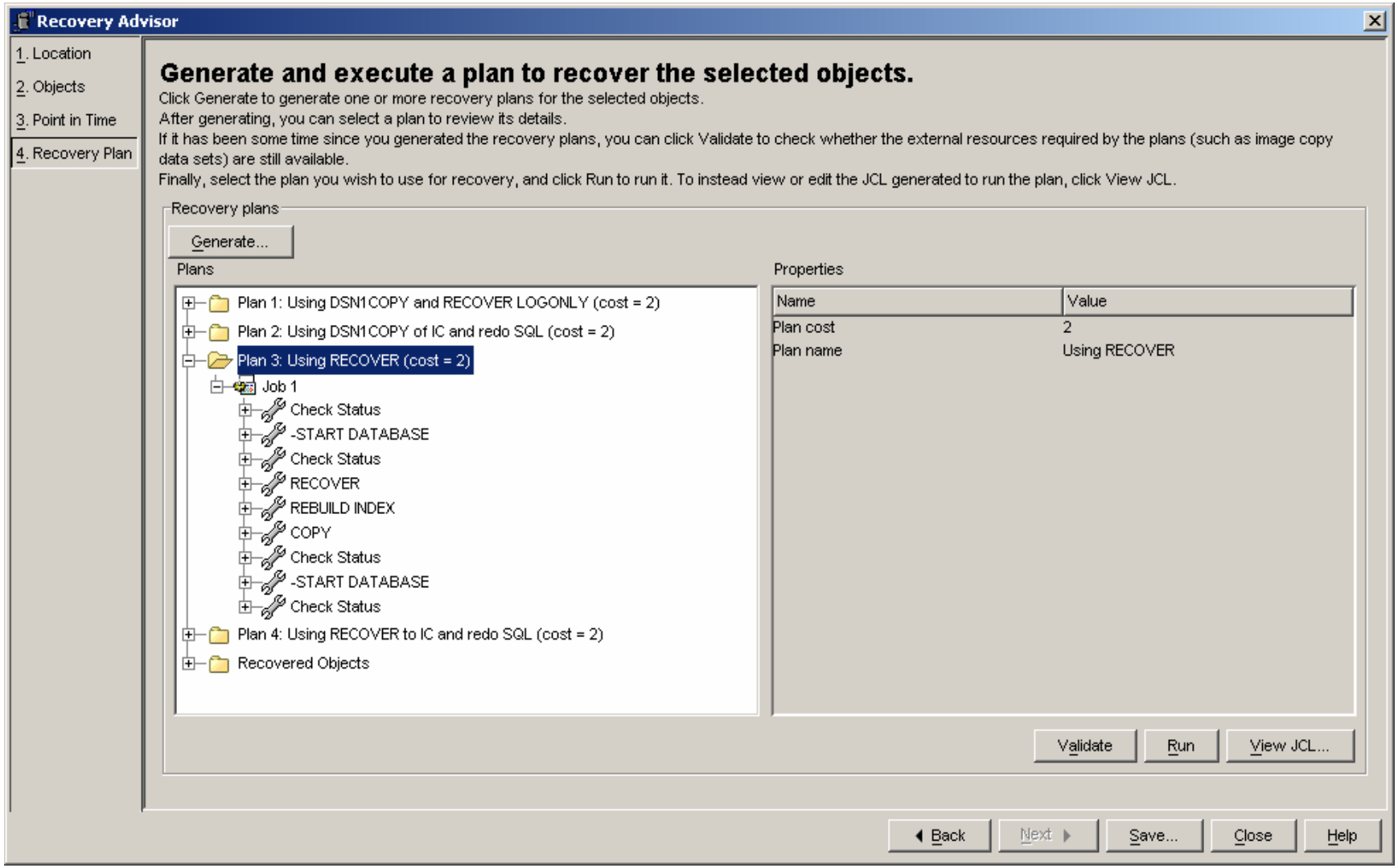
Select object/objects or group



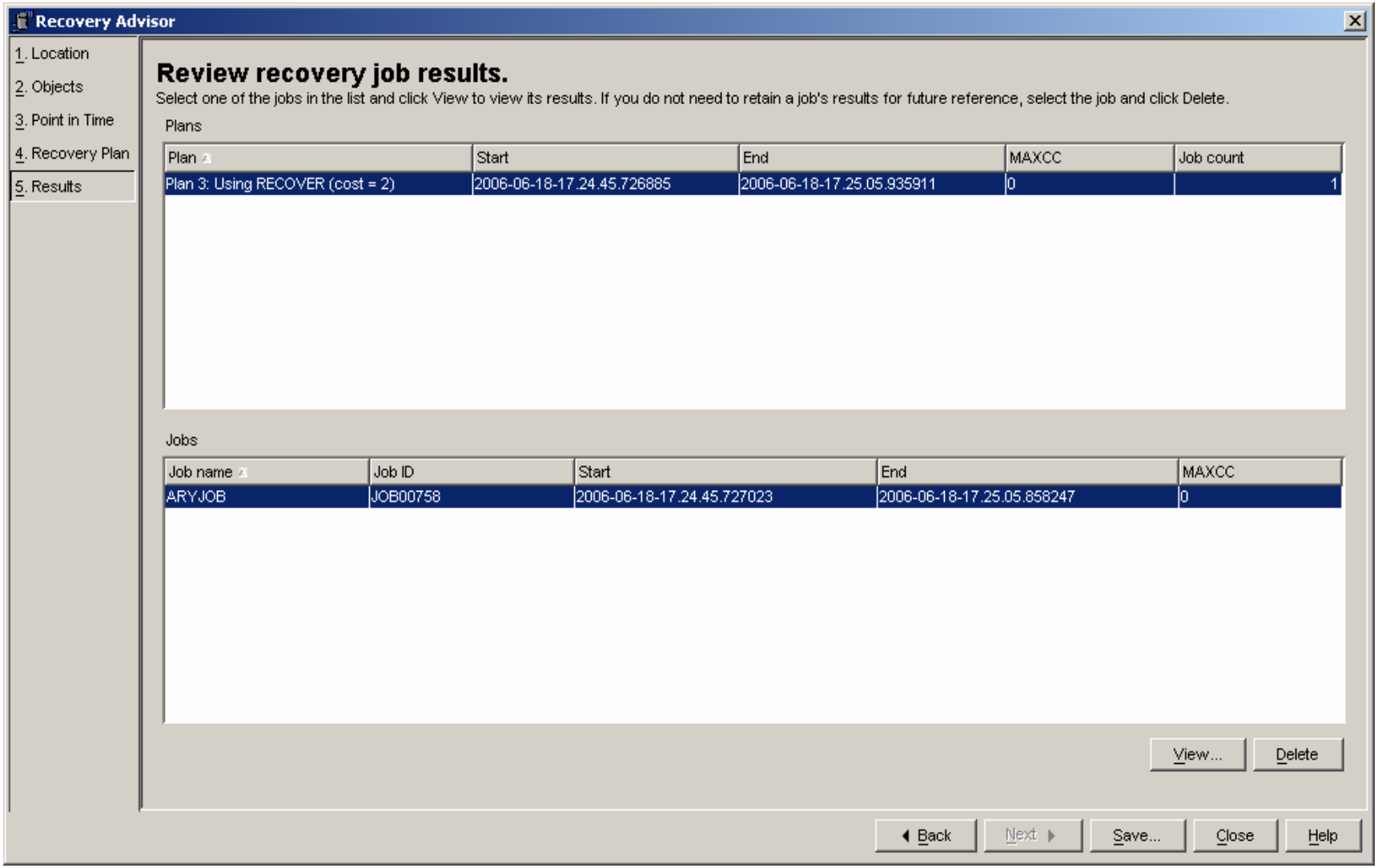
Select recovery point



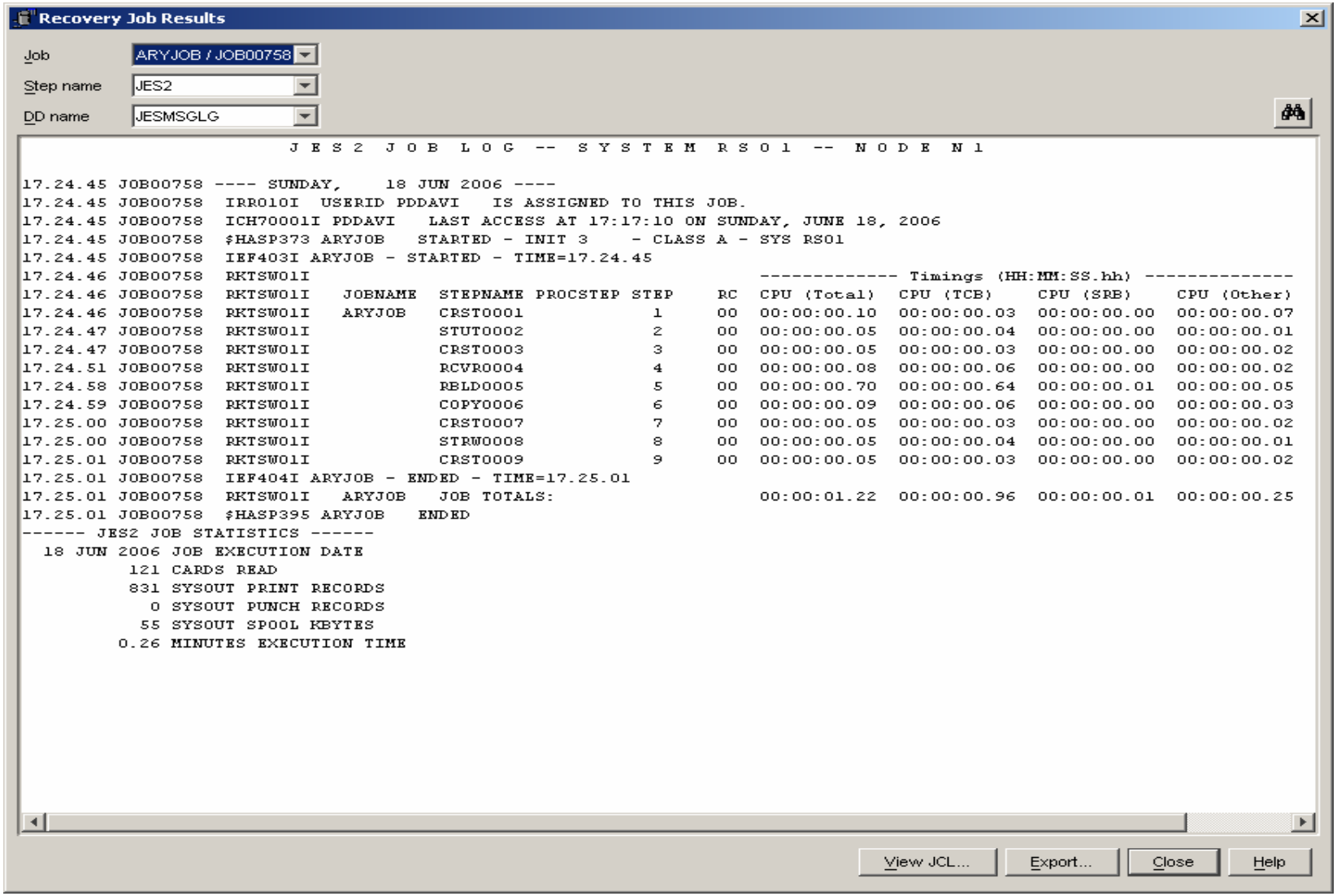
Generate and select Recovery plan then run



Recovery job results



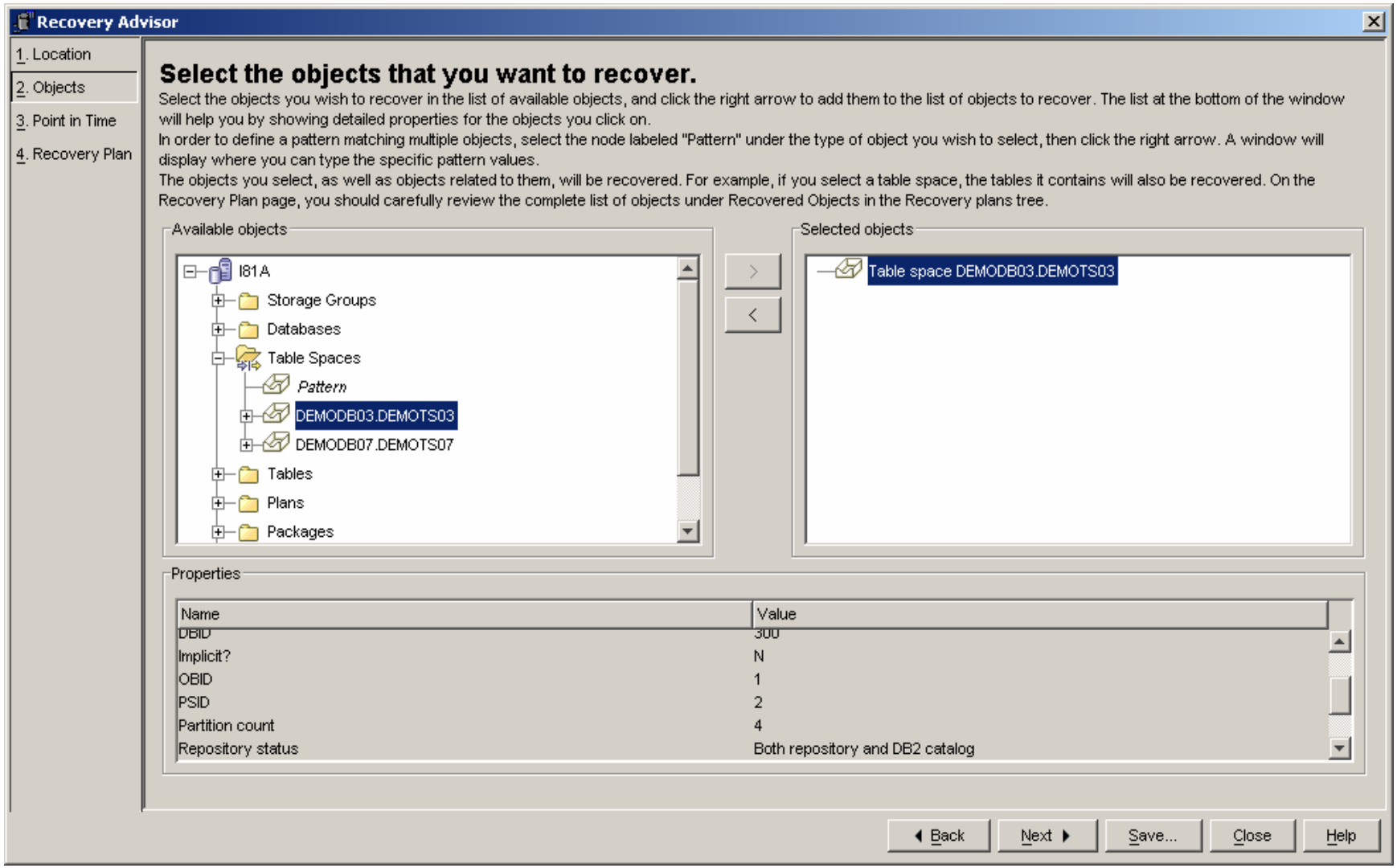
Review job output by step name



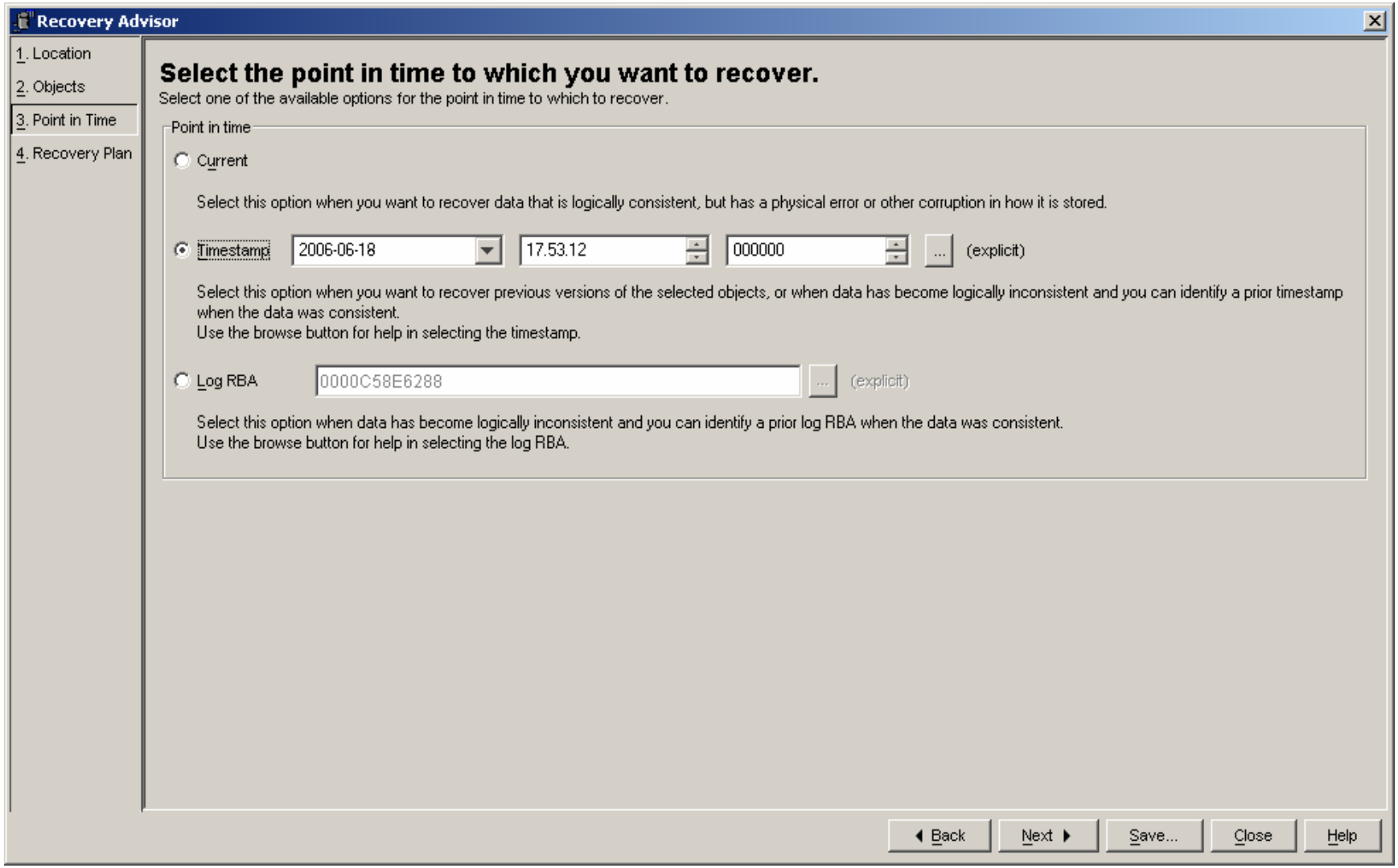
Scenario 2 – Recover TS to PIT using undo

- **Description**
  - TS DEMODB03.DEMOTS03
    - Updates to table
    - Full image copy
    - Perform SLR update
    - Updates to table
    - Incremental image copy
    - Wait
    - Updates to table
    - Quiesce
    - Wait
    - Updates to table
    - Quiesce
    - Wait
    - Updates to table
    - Selects from table
    - Perform SLR update
  - Recover to PIT, quite time
    - Using Undo SQL

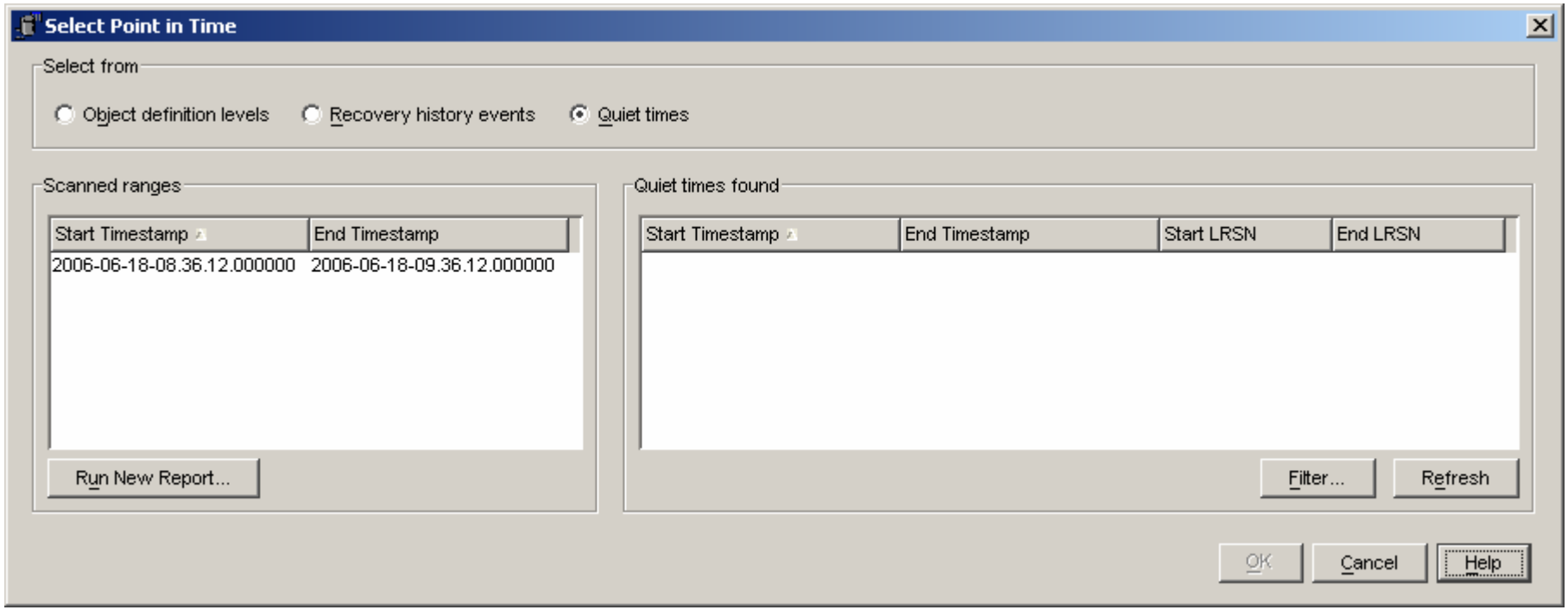
Select object to recover



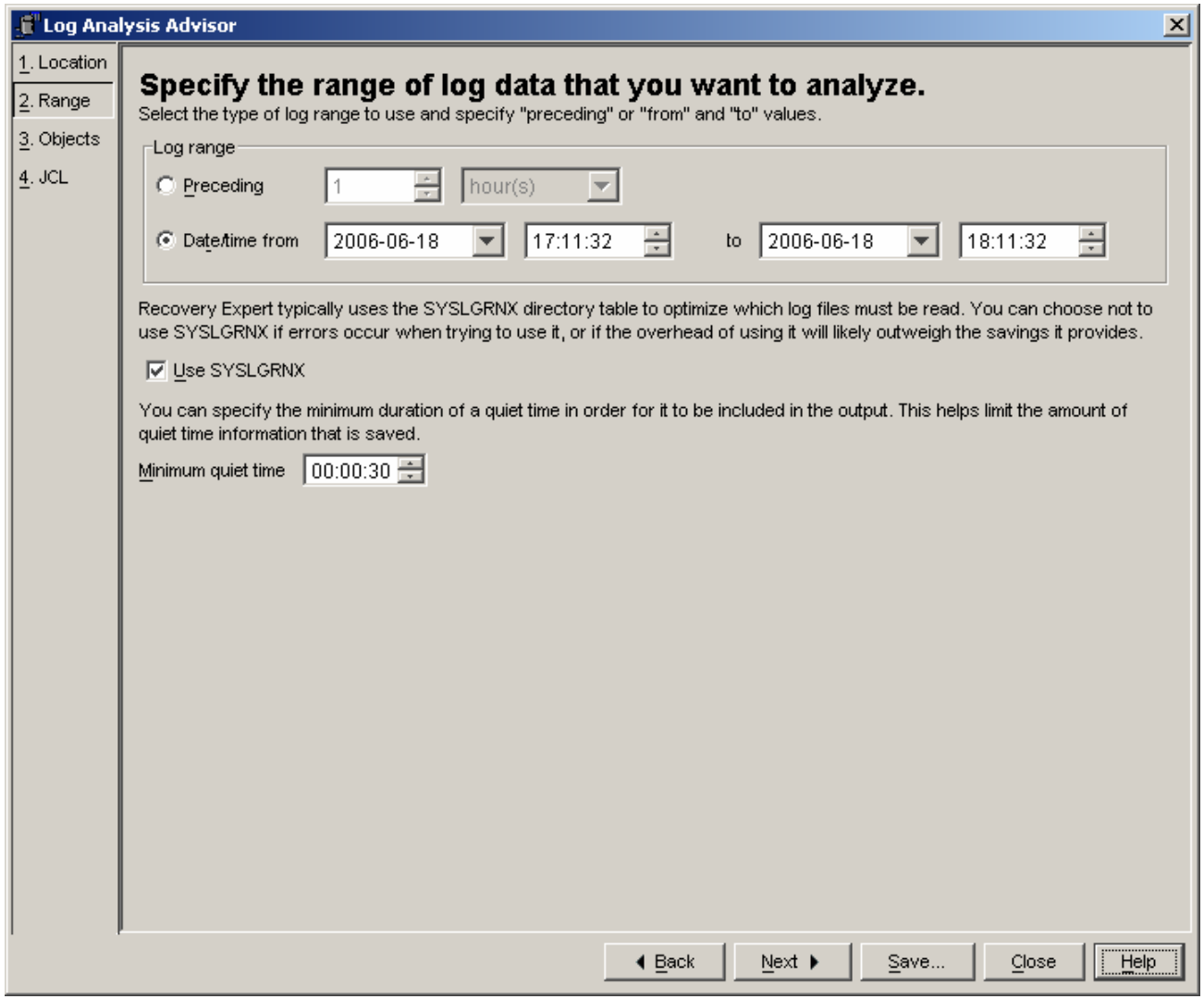
Select Timestamp and click on (explicit)



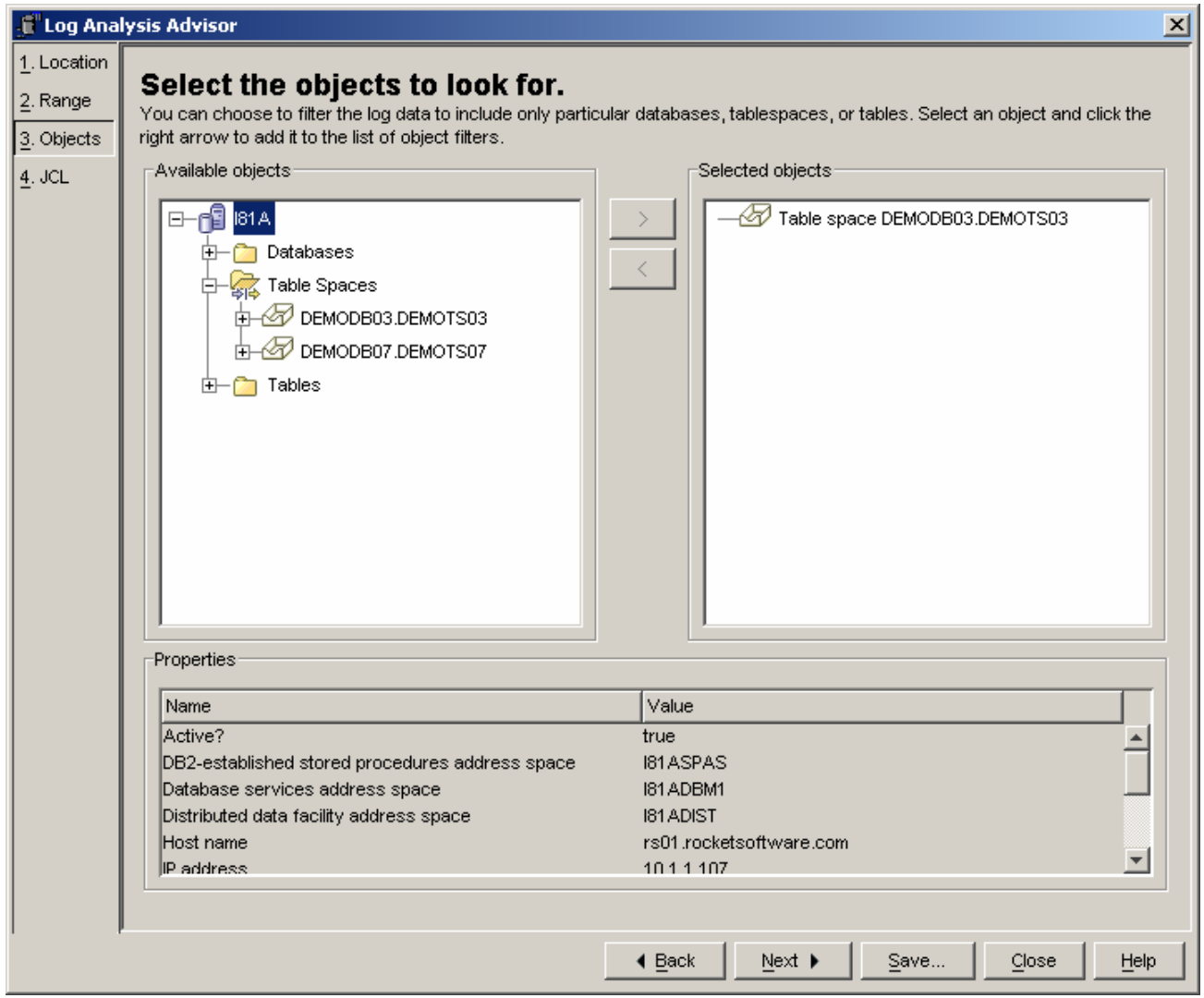
Select ‘Quiet times’ and ‘Run New Report’



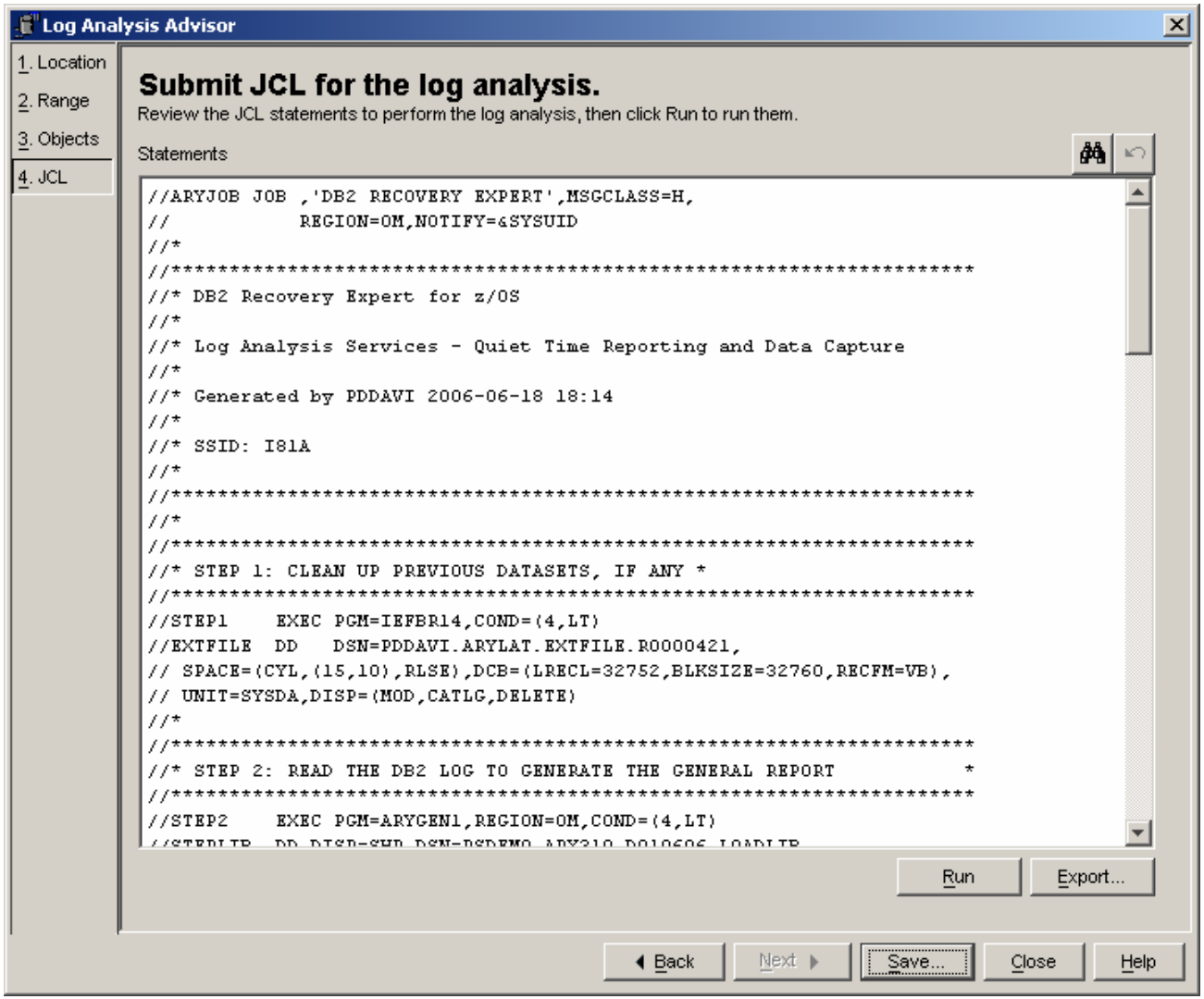
Specify date and time to analyze



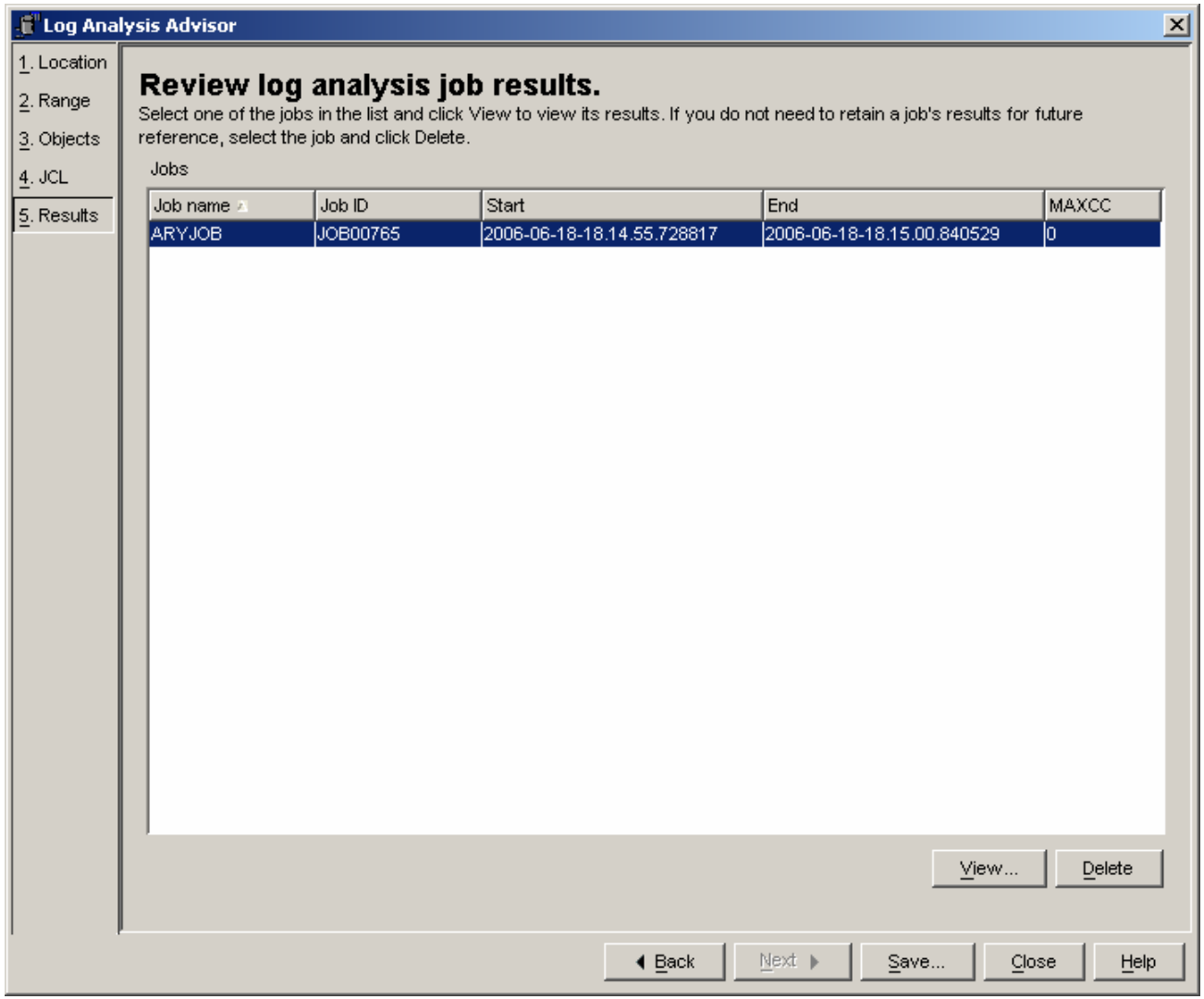
Review and change if needed objects to report on



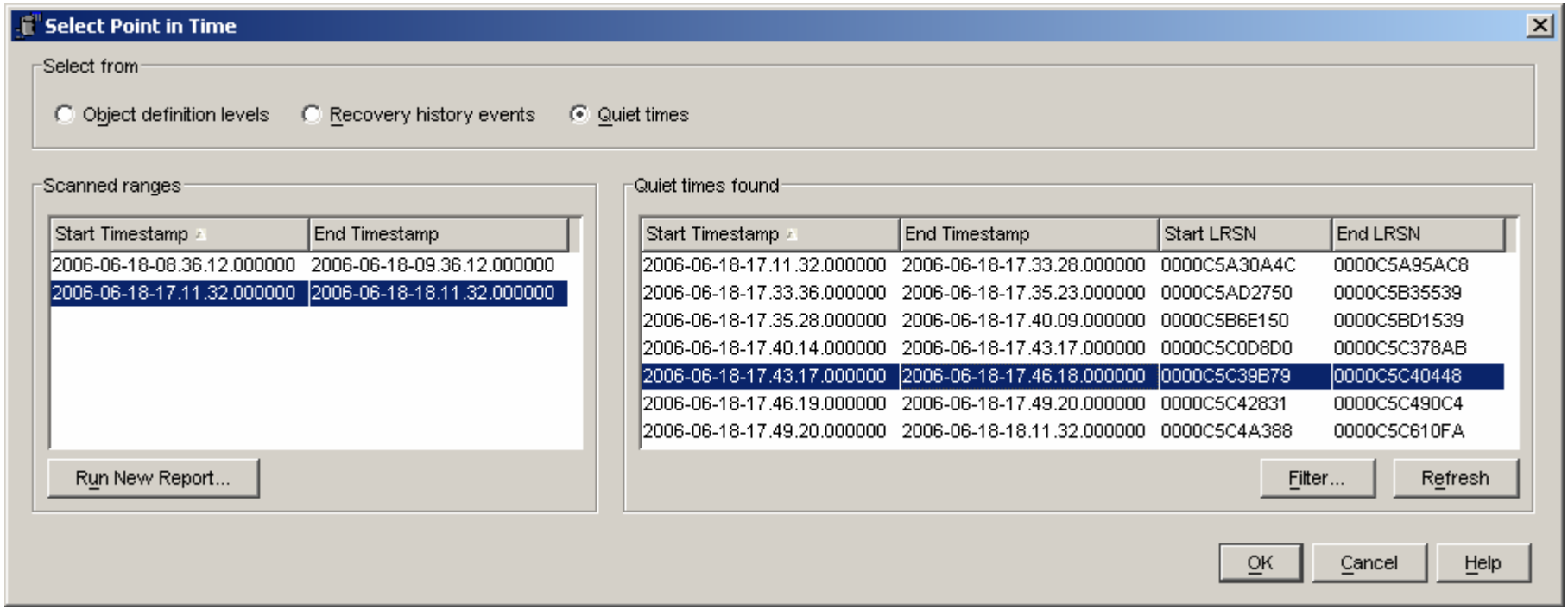
Review and sub



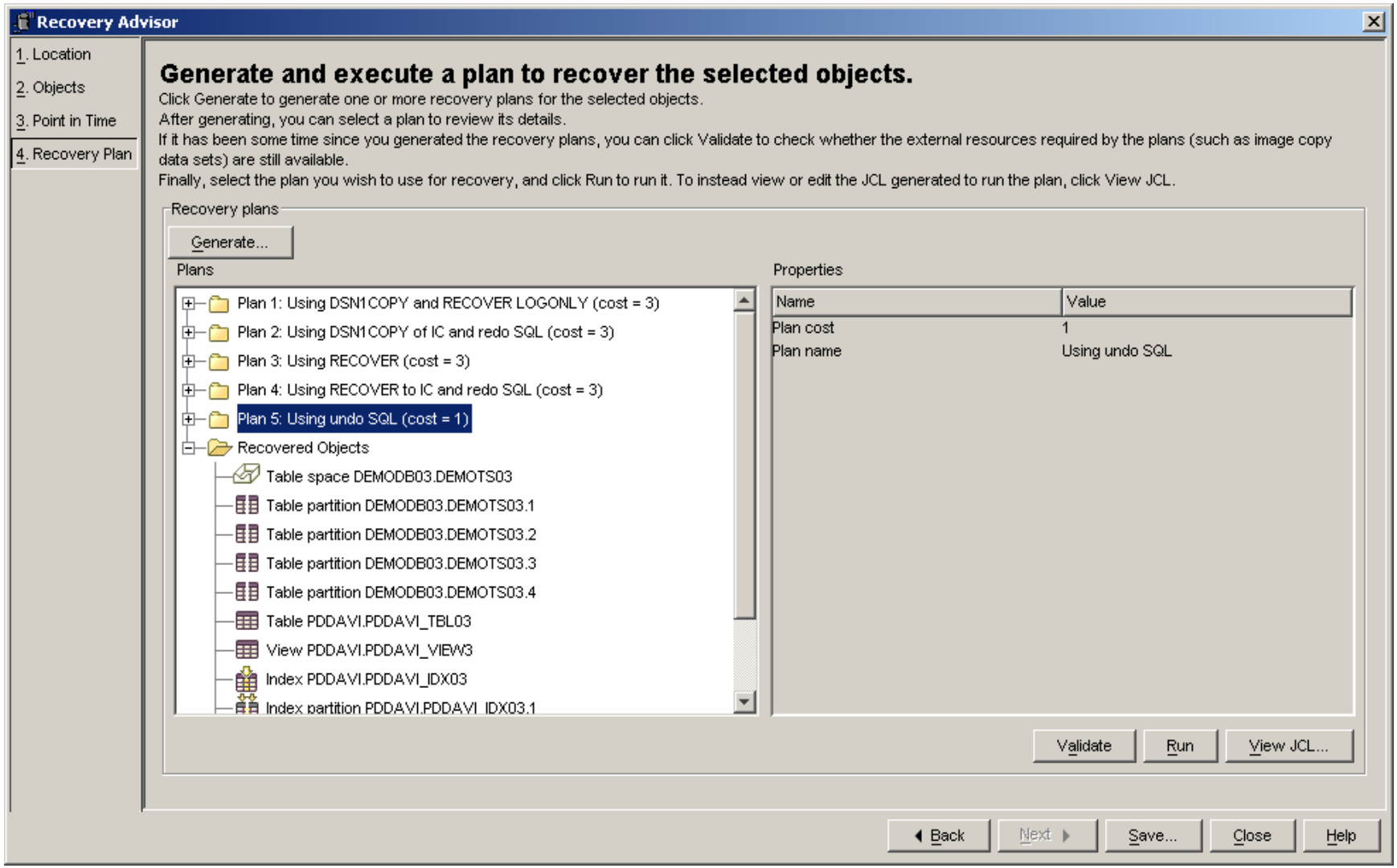
If desired review log analysis job



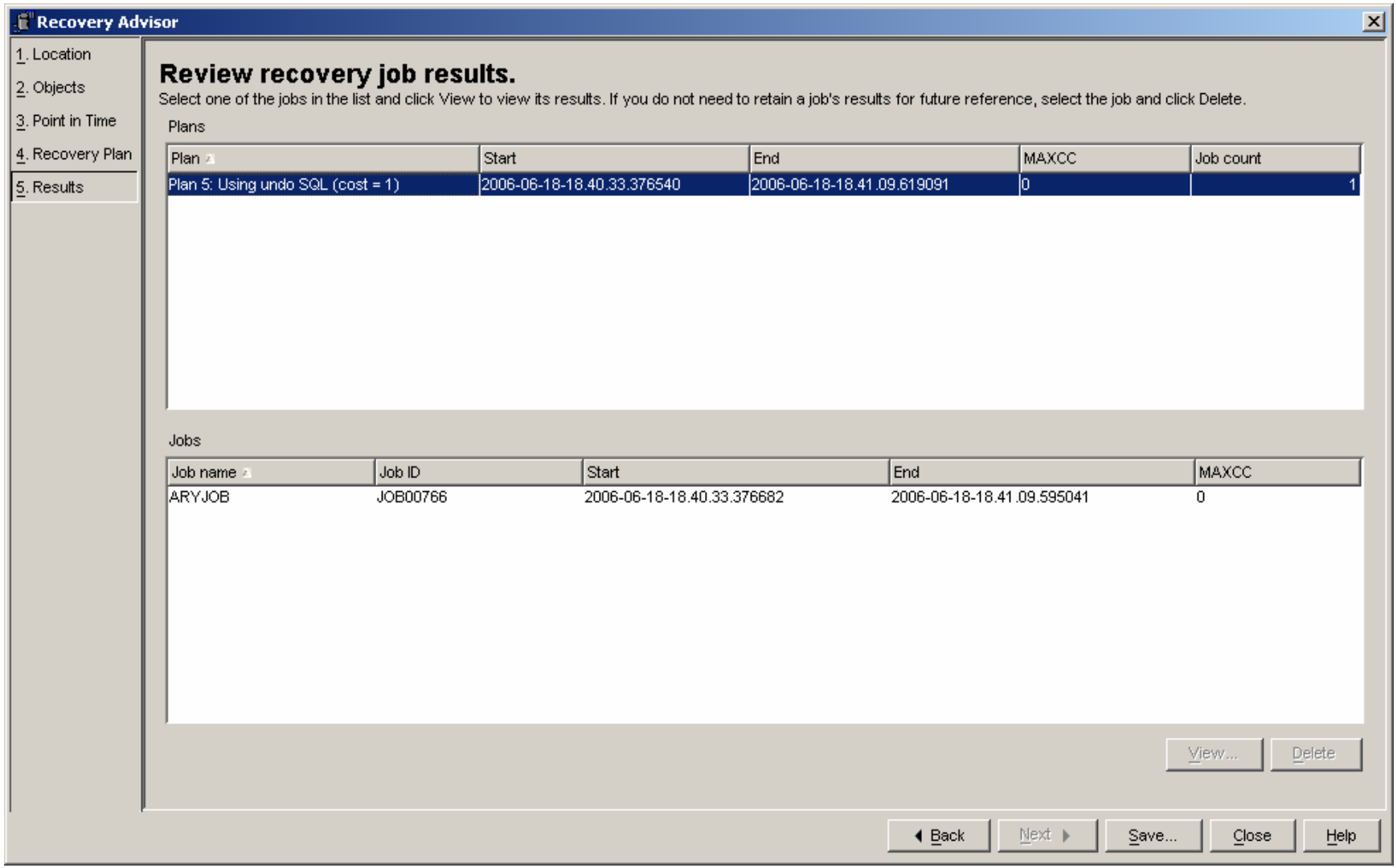
Click Refresh, select Quiet Time Timestamp, OK



Generate plans, select Recovery plan then run



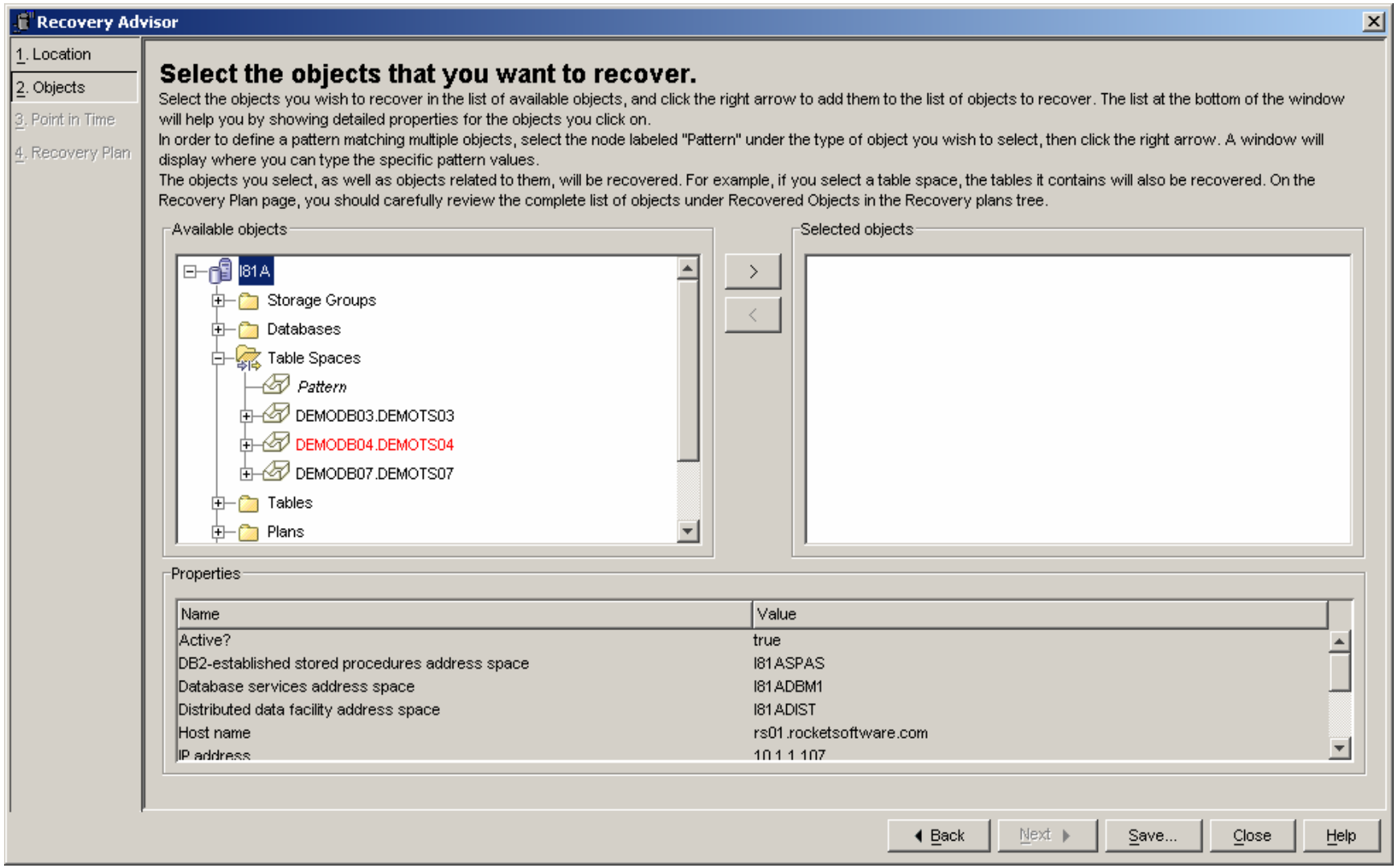
Recovery job results



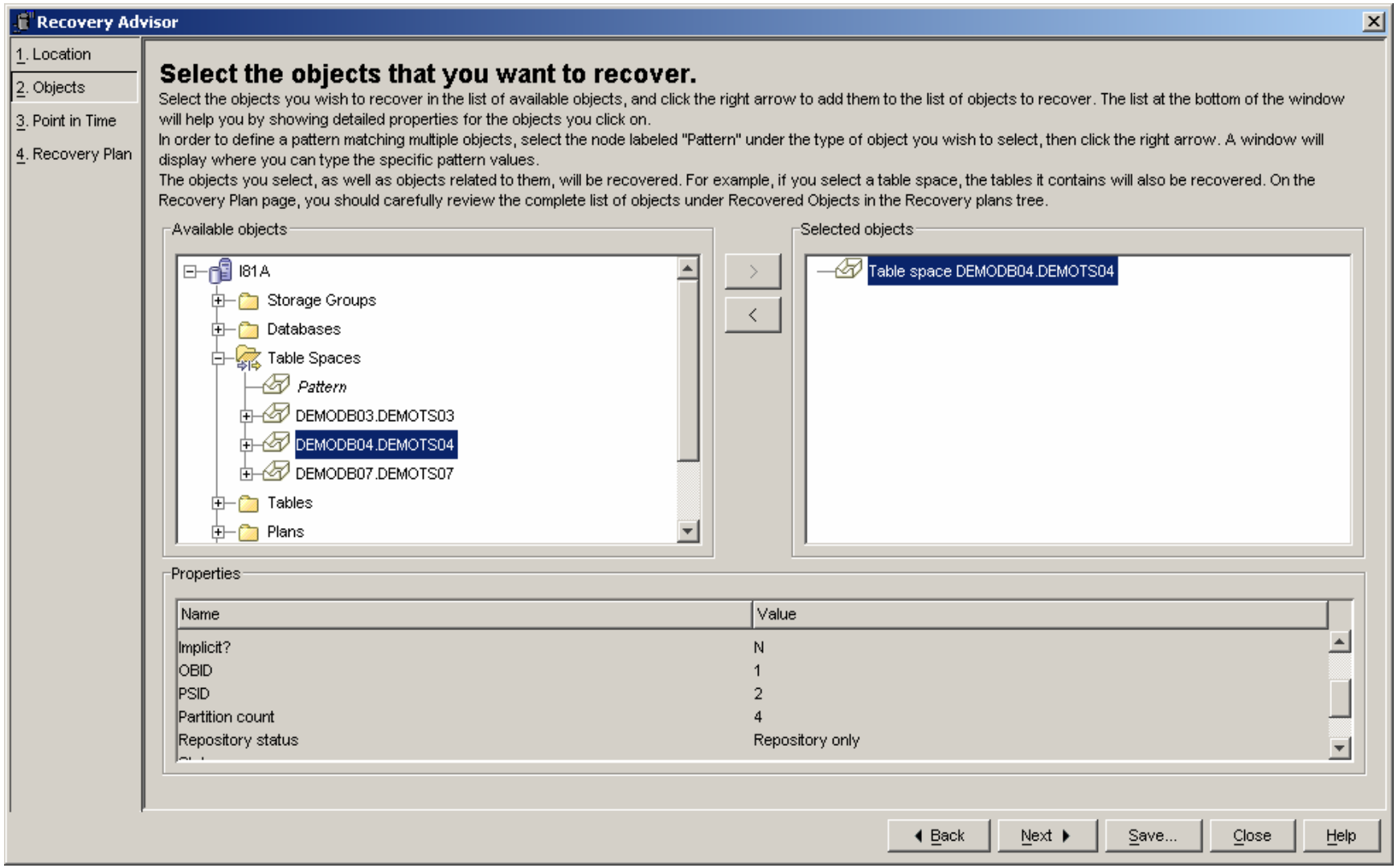
Scenario 3 – Recover Dropped TS to RBA

- **Description**
  - TS DEMODB04.DEMOTS04
    - Updates to table
    - Full image copy
    - Perform SLR update
    - Updates to table
    - Incremental image copy
    - Wait
    - Updates to table
    - Quiesce
    - Wait
    - Updates to table
    - Selects from table
    - Wait
    - Perform SLR update
    - Drop Table Space
    - Perform SLR update
  - Recover of Dropped TS to RBA
    - Using DSN1COPY and REDO SQL

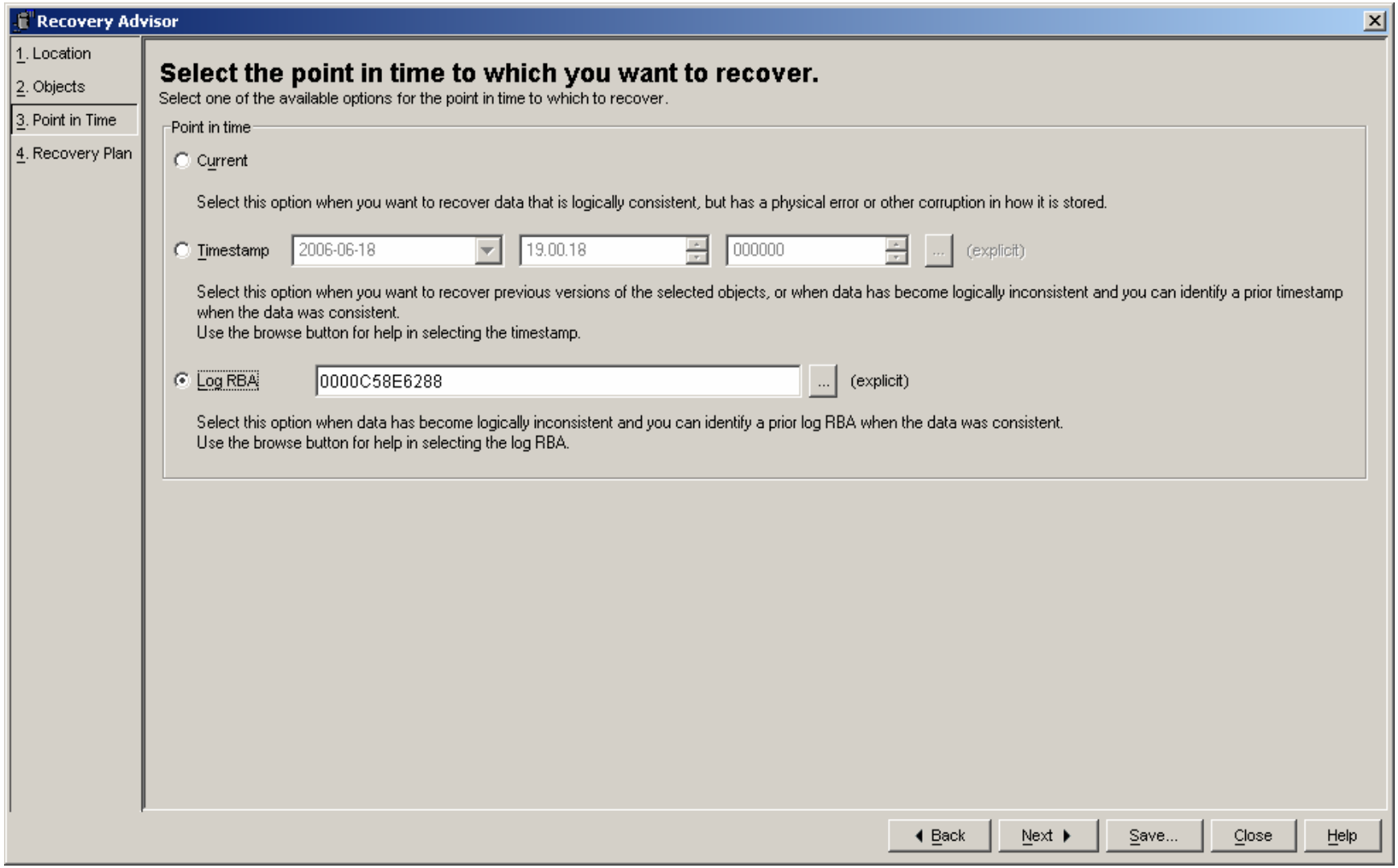
Objects in SLR only show in red



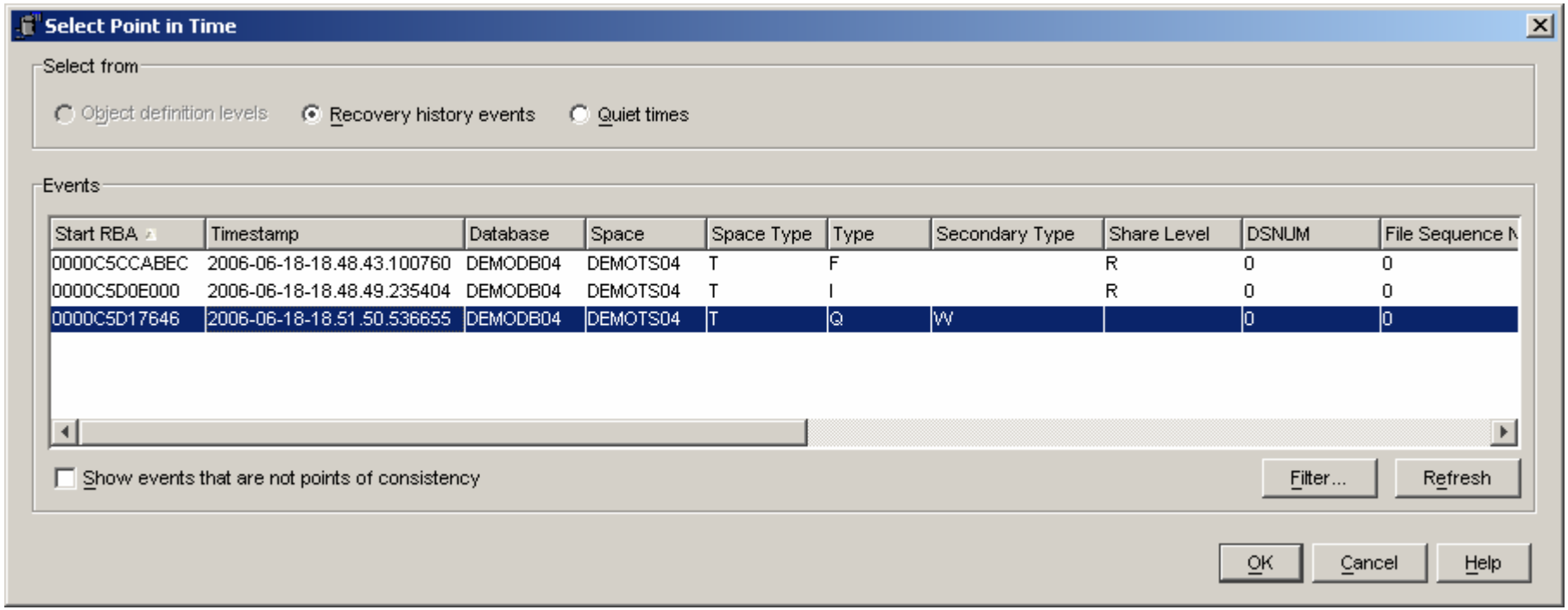
Select object to be recovered



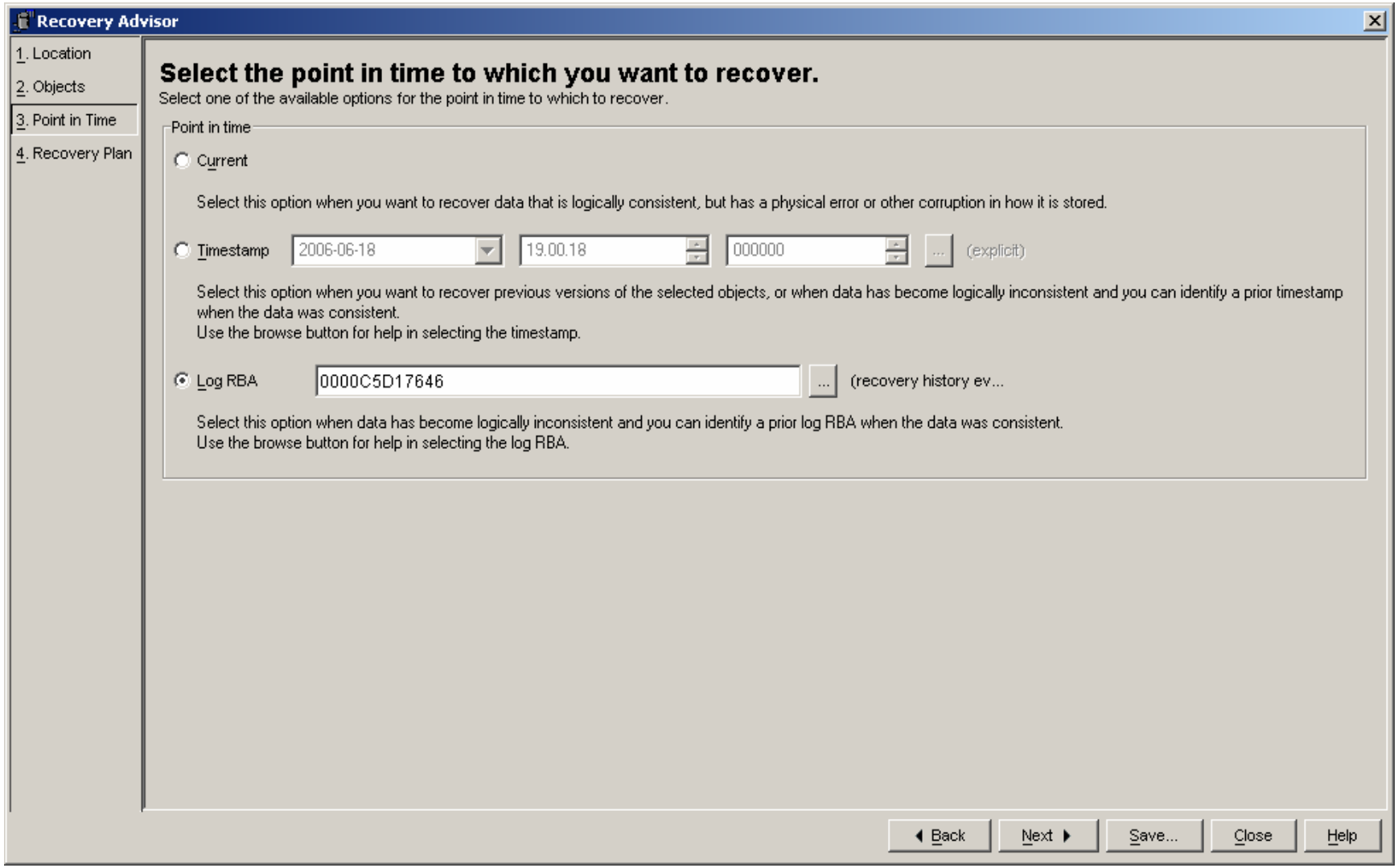
Select RBA and click on (explicit)



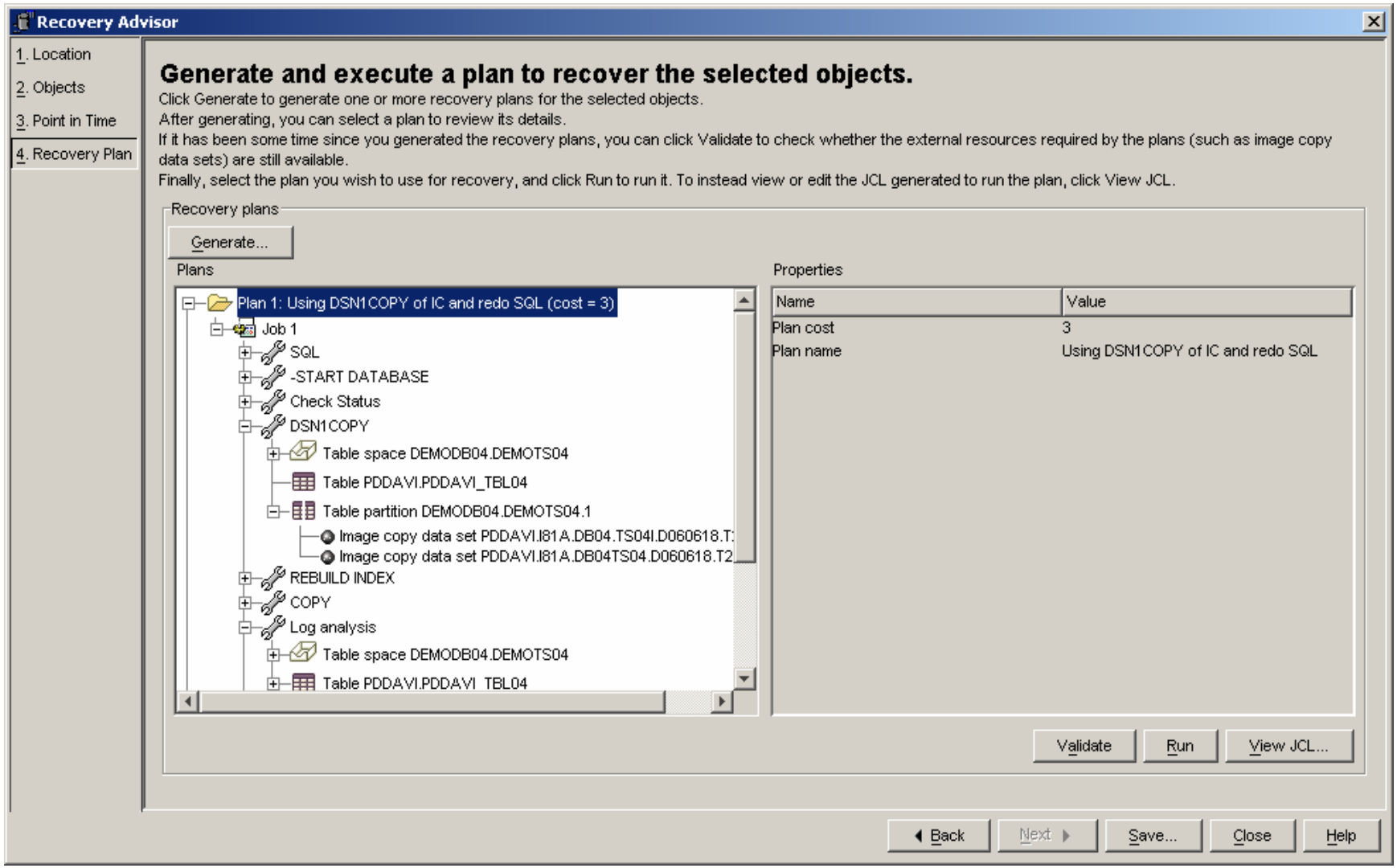
Click on ‘Recovery history events’, refresh, select



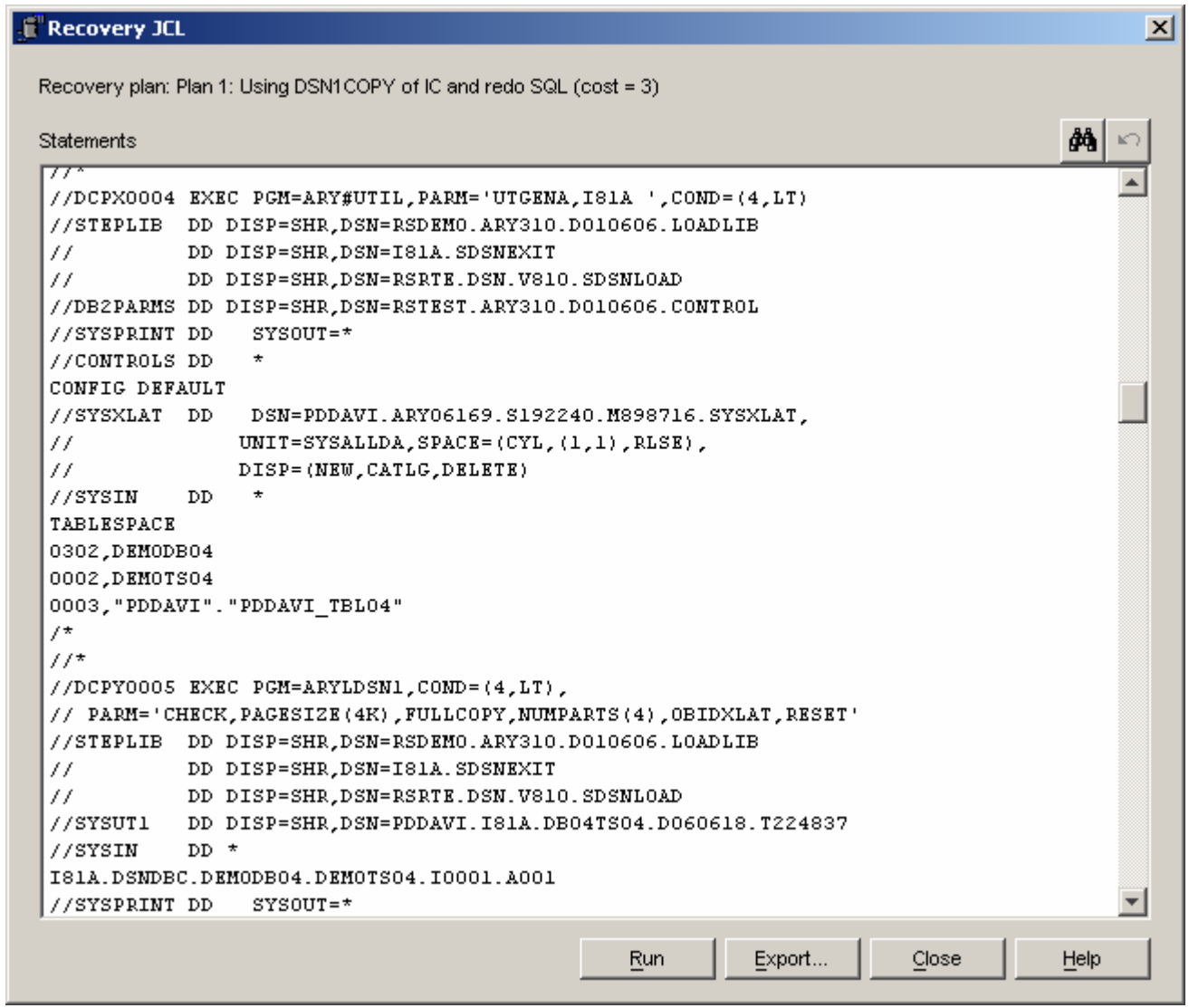
Log RBA filled for us

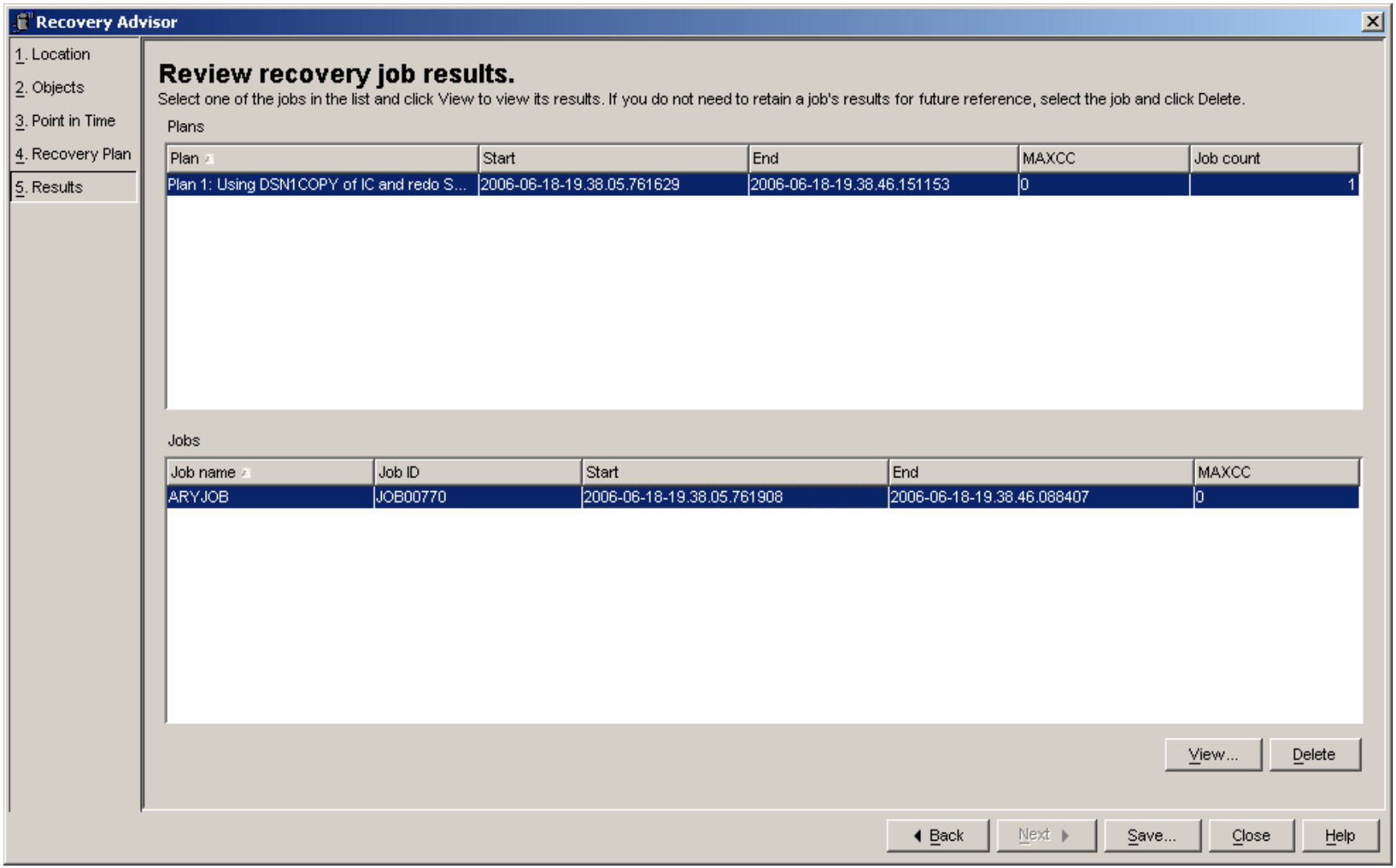


Generate and select plan, view JCL

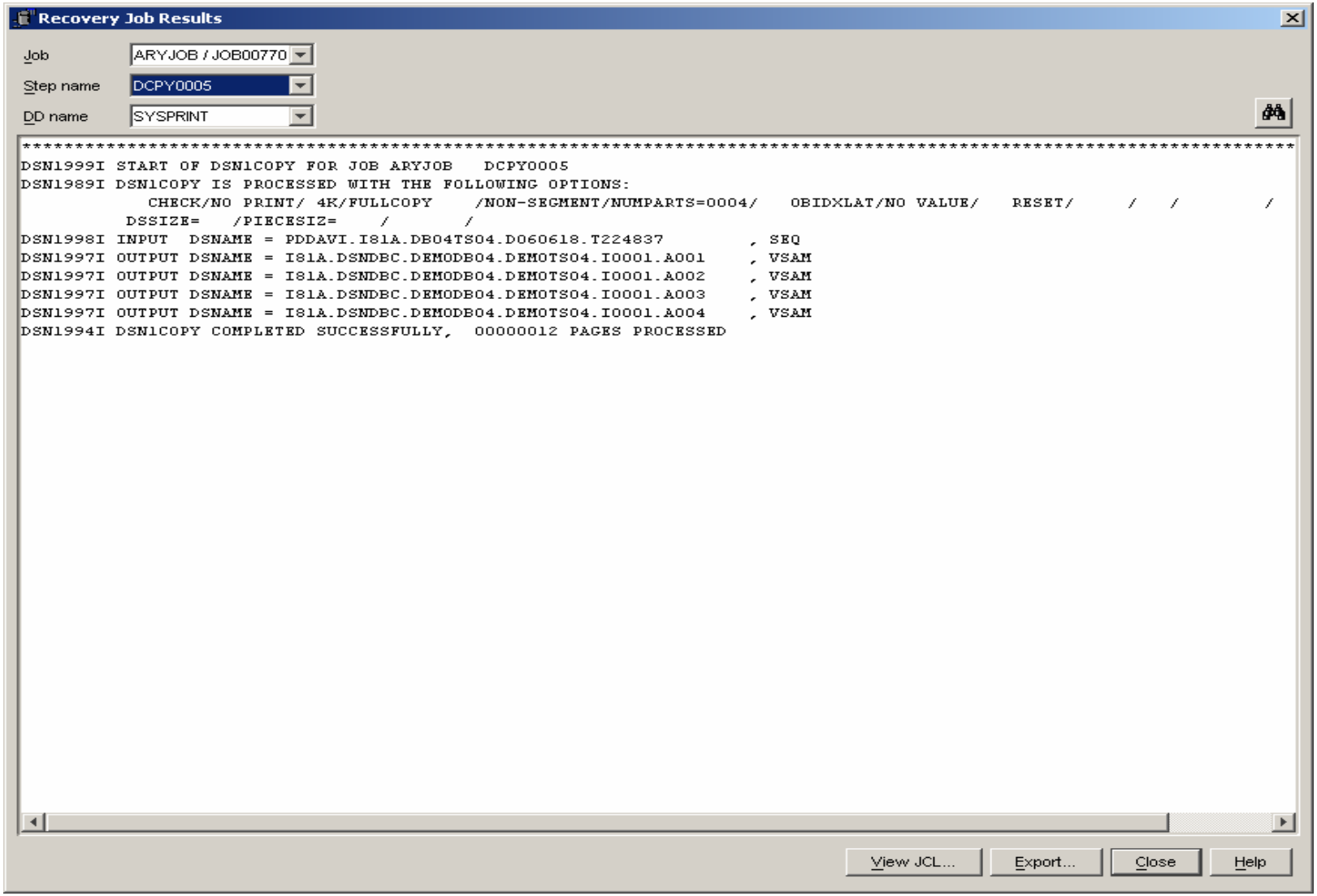


Recovery JCL





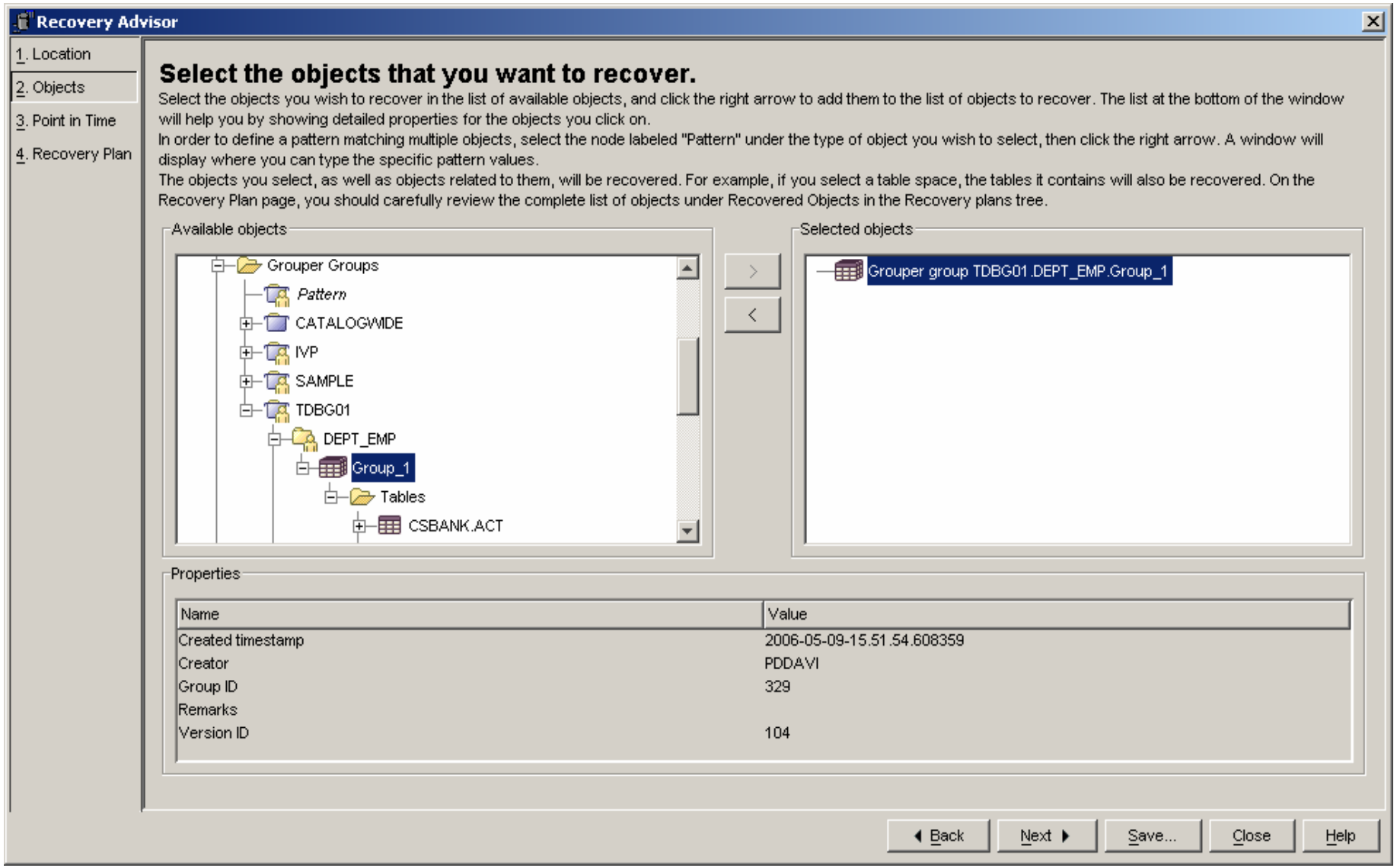
View SYSPRINT, select by step name



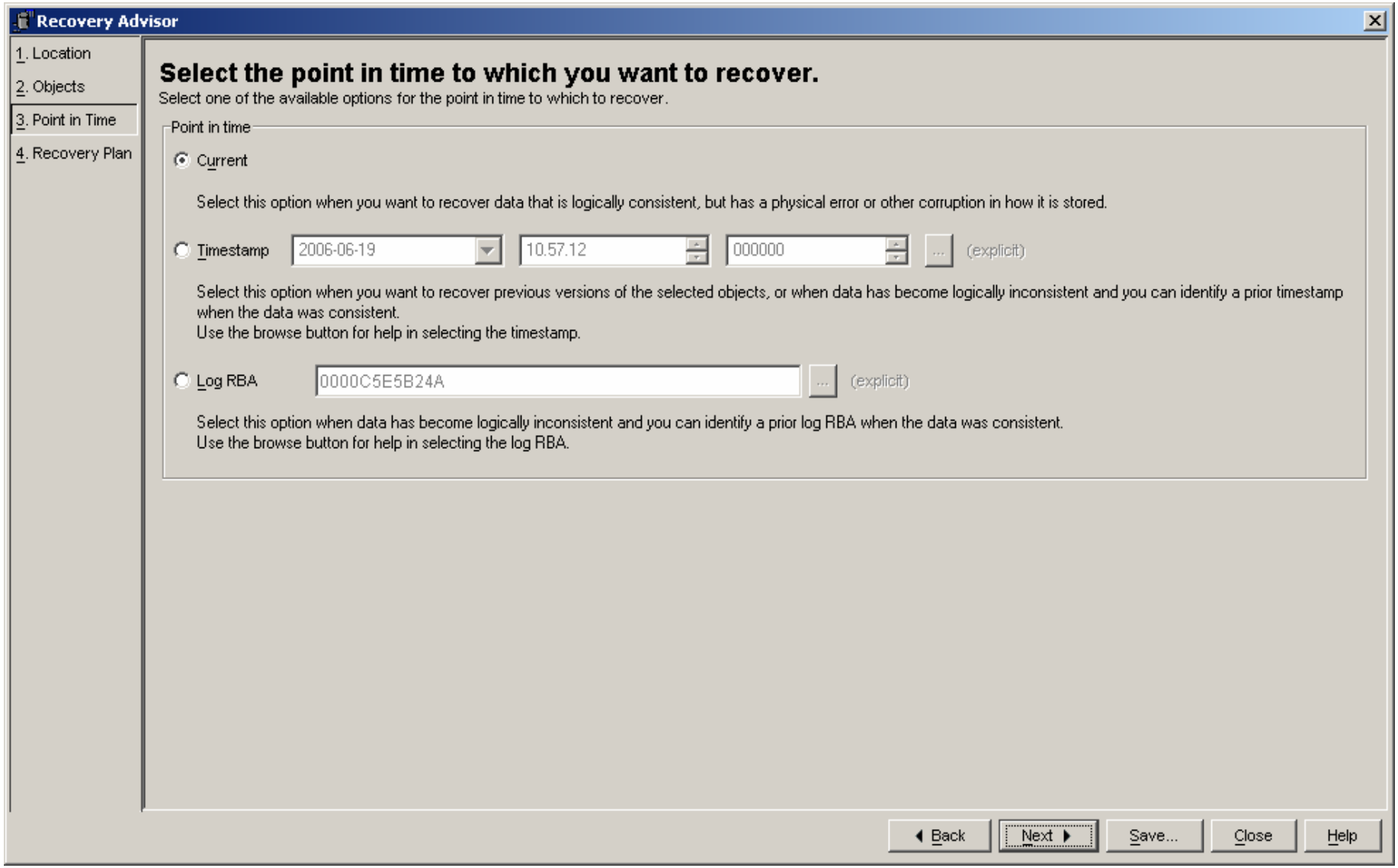
Scenario 4 – Recovery of a set of related table

- **Description**
  - Use Grouper set of related tables
    - TDBG01
      - Version DEPT_EMP
      - Group1
  - Recover
    - Using recover to current

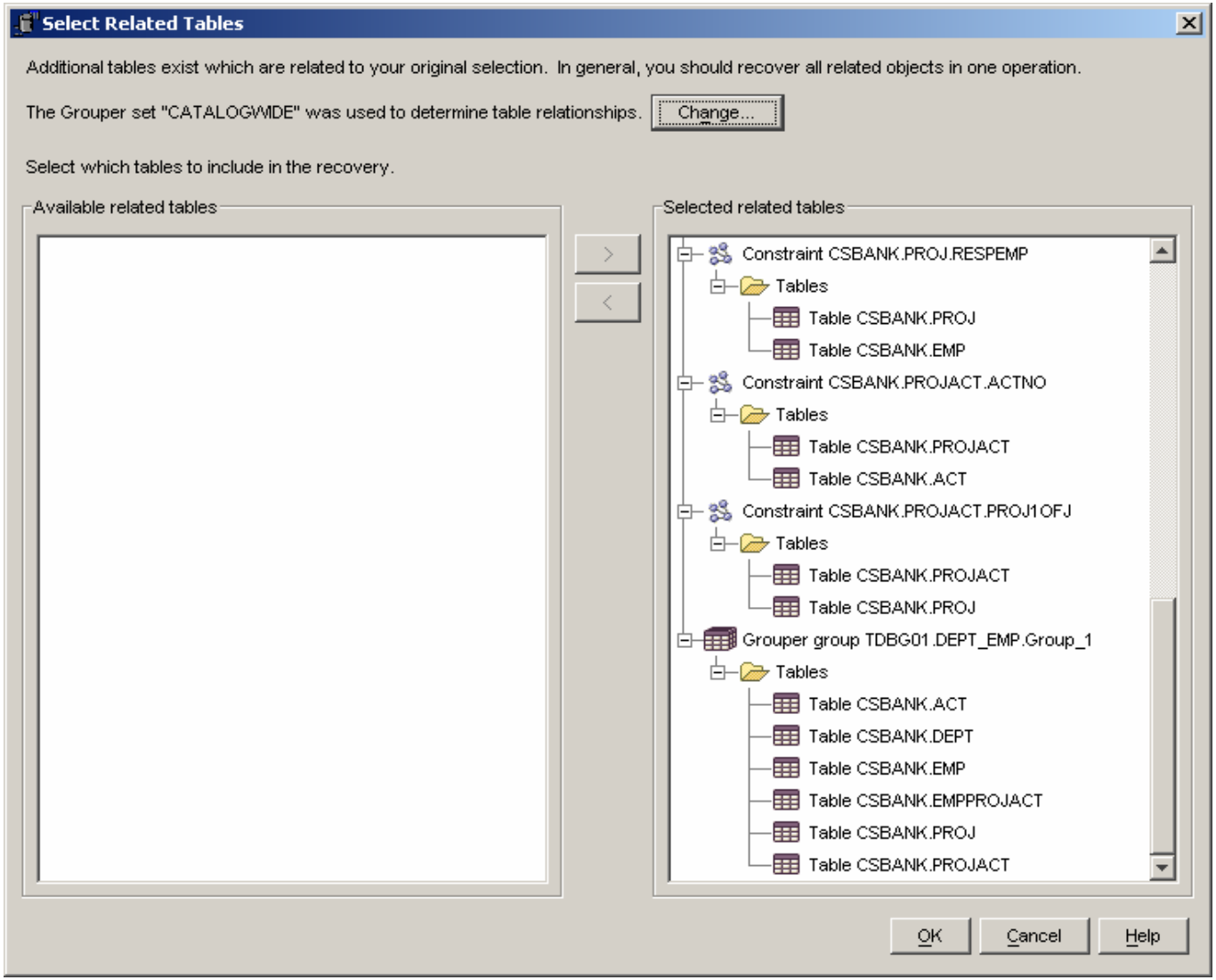
Select Grouper Set of related tables



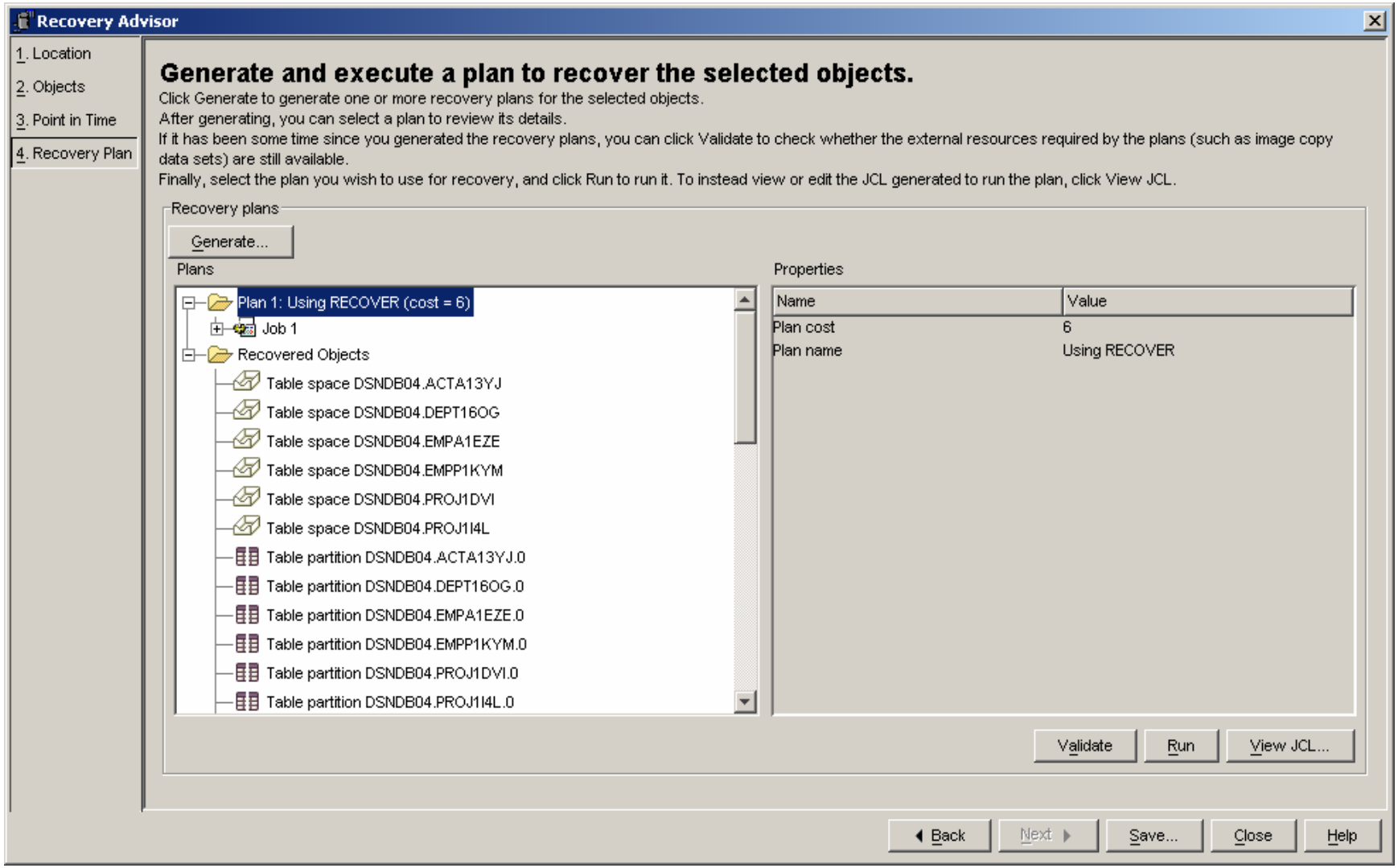
Select recover to current



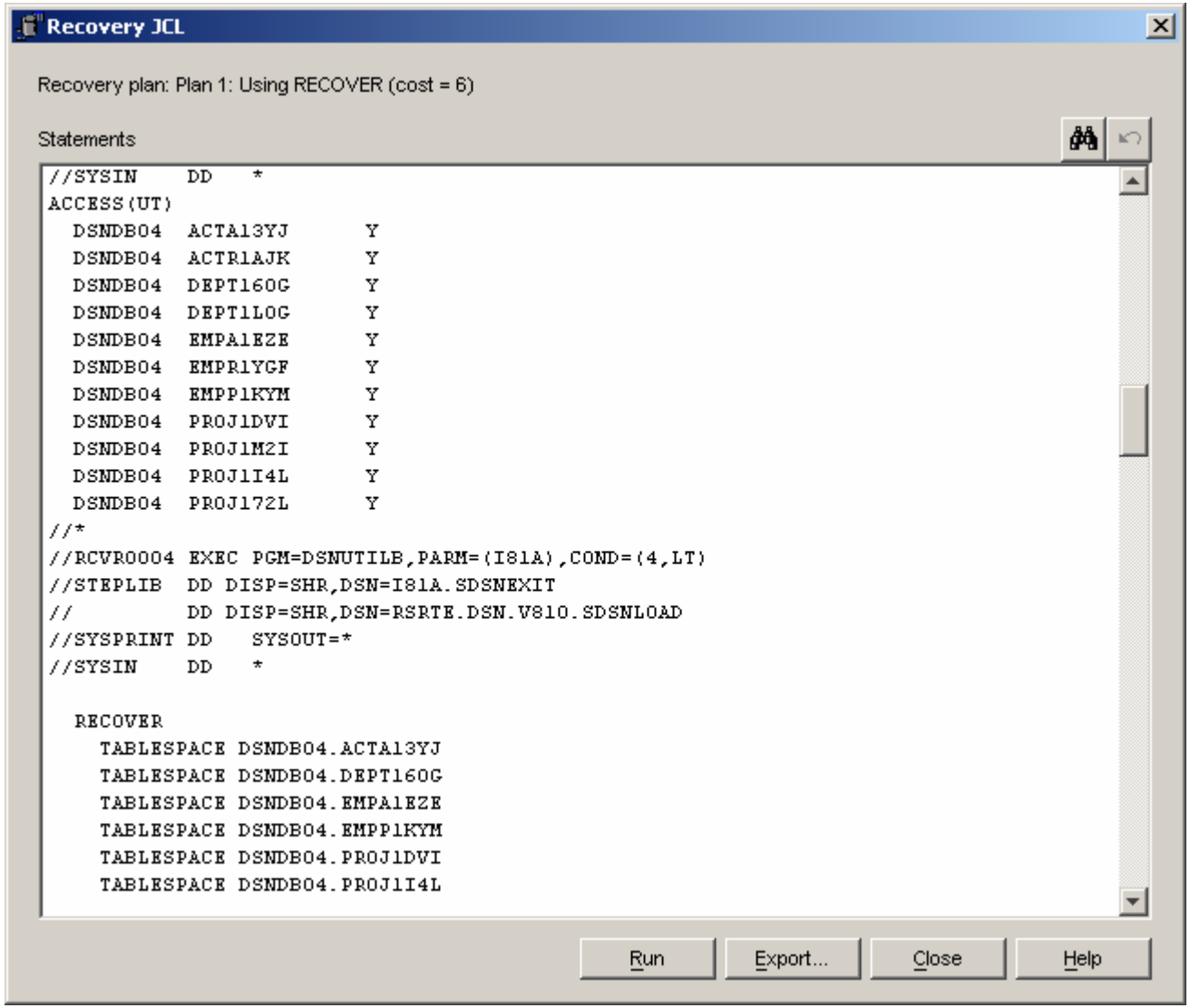
Selected Related Tables and constraints to recover



Select Plan and View JCL



Recovery JCL



Questions