Real & Pseudo Close: Processing of Pointer Blocks in DDS

I. Close and Pseudo Close:

Attached to each pointer block are 3 flags

1. Needed-on-disk: At least one descendant data block exists, hence the block must appear in the final disk copy.

2. Needed-in-DDS: At least one descendant data block is attached, hence the block must appear in DDS. (Note: sometimes set on a block with no attached descendants; see pseudo-close)

3. Dirty relative to Disk Copy: At least one disk address in the DDS version differs from the version on the disk.

The processing of non-root pointer blocks proceeds in two phases:

a) Phase 1 ("PBLKIN") performs functions detailed below.

b) Phase 2 ("PBFLUSH") deletes the DDS copy if Needed-in-DDS is not set, and deletes the disk copy as per instructions left by phase 1. The disk block is added to a "free-list" and is not actually released until the FHB has been written.
Phase I processing by cases:

II. Close: During real-close, Needed-in-DOS is never set, so PBFLUSH always deletes all pointer blocks (except the root, of course)
    Thus, action on each pointer block is determined by:
      1) Needed/Not Needed on Disk
      2) Dirty/Clean rel to Disk copy

    Moreover, the case "not-needed and clean" is not possible, so only 3 cases occur:

    A. Needed and Clean: simply forgets having brought the block in; i.e. set status to ORT and marks father block Needed-on-Disk.

    B. Needed and Dirty: Old copy is put on free-list and fresh copy is written on disk. New disk addr is placed in pointers, but pointer is not made busy during I/O since father block is about to be written too. Father block is marked Needed-on-Disk and Dirty.

    C. Not-needed and Dirty: Old copy is put on free-list. Pointer is set to non-existent and father block is marked Dirty.
III. Pseudo-Close: Pseudo-close must keep track of which pointer blocks are needed-in-DDS and delete only the unneeded ones. Thus, action for each block is determined by:

1. Needed/Not-needed on Disk
2. Needed/Not needed in DDS
3. Clean/Dirty rel to Disk Copy

As in close, the case "Clean and Not-needed-on-disk" is not possible. Also, a block cannot be needed-in-DDS without being needed-on-disk, so only 5 cases actually occur.

A. Needed-on-Disk, Needed-in-DDS, Clean:
   In this case, nothing is done except to mark the father block Needed-on-Disk and Needed-in-DDS.

B. Needed-on-Disk, Needed-in-DDS, Dirty:
   The old disk copy is put on the free-list and a fresh copy is written on the disk. The block remains in DDS and the father block is marked Needed-on-Disk and Needed-in-DDS, and Dirty.

C. Needed-on-Disk, Not-needed-in-DDS, Clean:
   Status set to out and block is deleted from DDS. Father block is marked Needed-on-Disk.
D. **Needed-on-Disk, Not-Needed-in-DDS, Dirty:**
Old disk copy is put on free list and fresh copy written to Disk. Block is deleted from DDS. Status is set to Going during I/O. Father block is marked *Needed-on-Disk* and also *Needed-in-DDS* (for later update by Terminator).

E. **Not-needed-on-Disk, Not-needed-in-EC:**
Dirty: Old disk copy is put on free list. Pointer is set to "nonexistent" and father block is marked Dirty.