

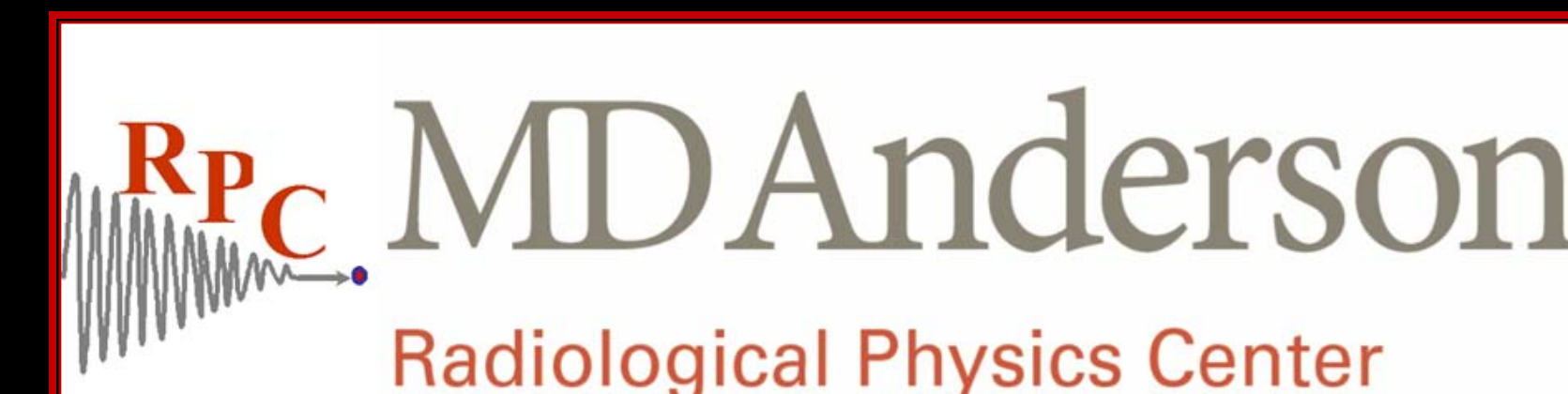
Common Errors Found in Low Dose Rate (LDR) Prostate Credentialing

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Introduction

The Radiological Physics Center (RPC) has performed LDR prostate credentialing of teams comprised of a radiation oncologist and physicist wanting to participate in LDR prostate clinical trials over the past 14 years. The purpose of credentialing is to verify that the radiation oncologist and other personnel involved are capable and familiar with the protocol prior to enrolling patients with the goal of reducing the number of deviations. The RPC has compiled the most common errors determined from the dosimetry and clinical reviews which resulted in an unacceptable LDR prostate credential.

Methods

LDR prostate credentialing requires that the following be completed: Knowledge Assessment, with an attestation that the Radiation Oncologist and Physicist have treated 10 or more patients utilizing this technique, Facility Questionnaire, 2 benchmark cases (single seed and geometric benchmark case) and a previous patient case treated in similar fashion to the protocol. The two benchmark cases are recalculated by the RPC using the most up to date TG-43 parameters. The previous patient case is reviewed by a Radiation Oncologist.

1. The Knowledge Assessment (KA): RTOG requires that the prostate team must have performed at least 10 TRUS guided prostate implants. At the bottom of the KA Form (figure 1) you will be asked to attest to this by your signature.

Figure 1: Knowledge Assessment Questionnaire

Methods (cont'd)

2. The Facility questionnaire includes information about personnel that are responsible for implants, data related to treatment planning system, isotope types, model, and seed quality assurance processes.

Figure 2: Facility Questionnaire

3. Reference case 1 is a single seed, strength 0.5U for I125 use 2.5U for Pd103

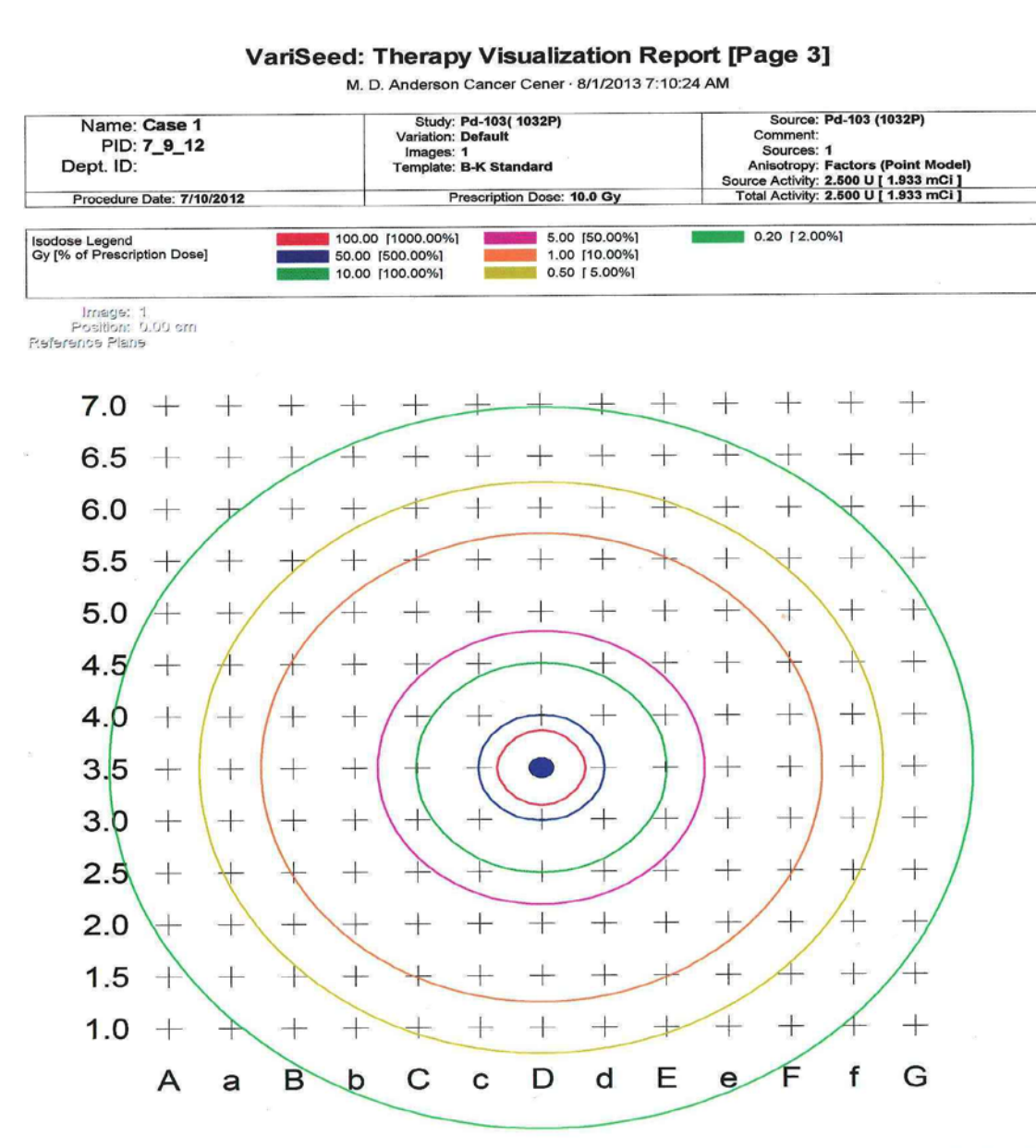


Figure 3: Reference Case 1 – Single Seed

4. Reference case 2 is a geometric case. A diagram on how to do this case can be found on the RPC's website at rpc.mdanderson.org

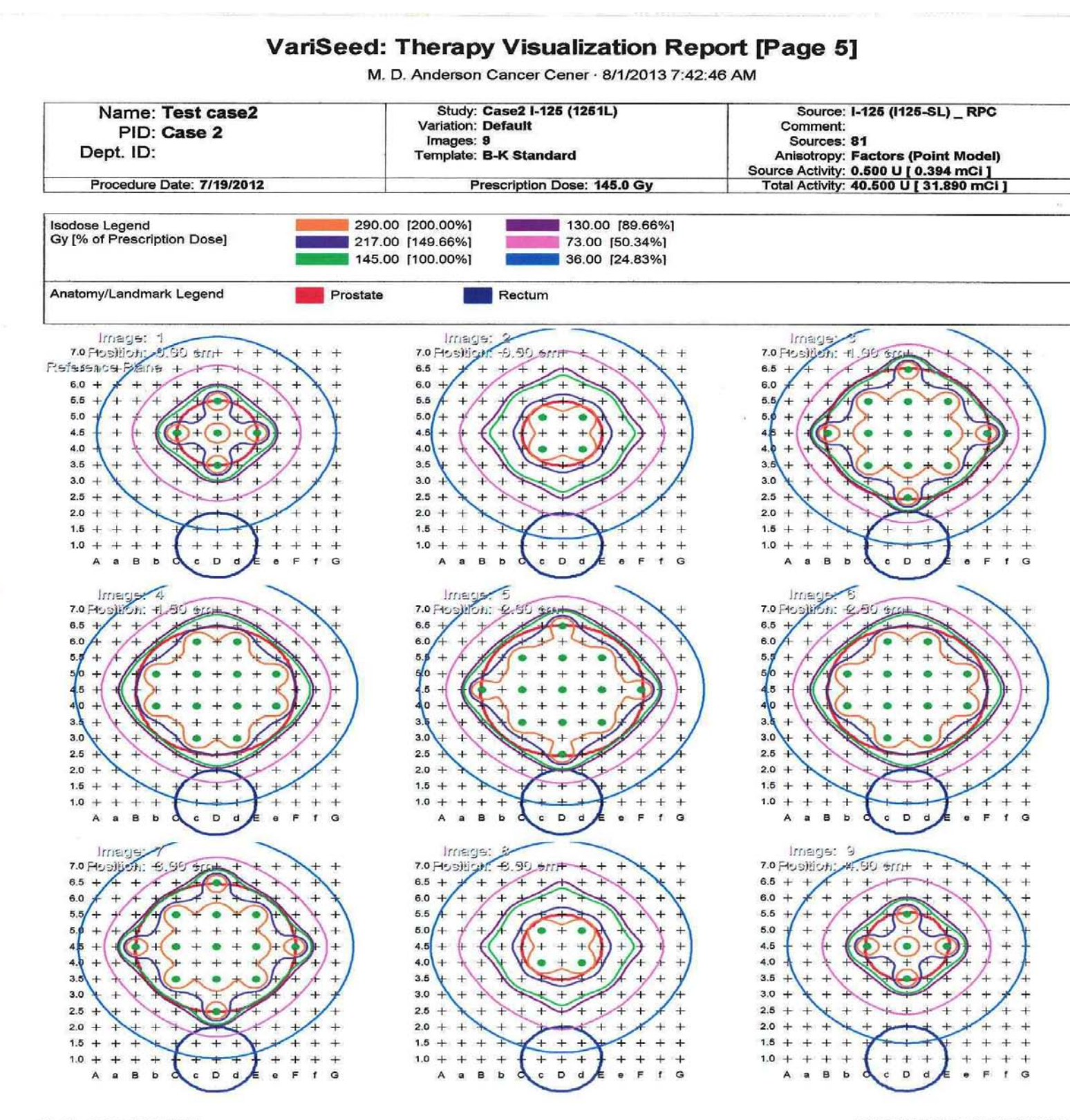


Figure 4: Reference Case 2 – Geometric Case

Methods (cont'd)

5. Dry-Run Cases are a Pre-implant and Post-implant plans of a previous patient treated in similar fashion to the protocol. The clinical evaluation review of the Dry-Run is to compare parameters between the pre-implant and post-implant, which includes: prostate volumes, lengths, V100, D90, R₁₀₀, source type and activity, implant patterns, contouring of the tumor volume (PTV/ CTV), and critical structures.

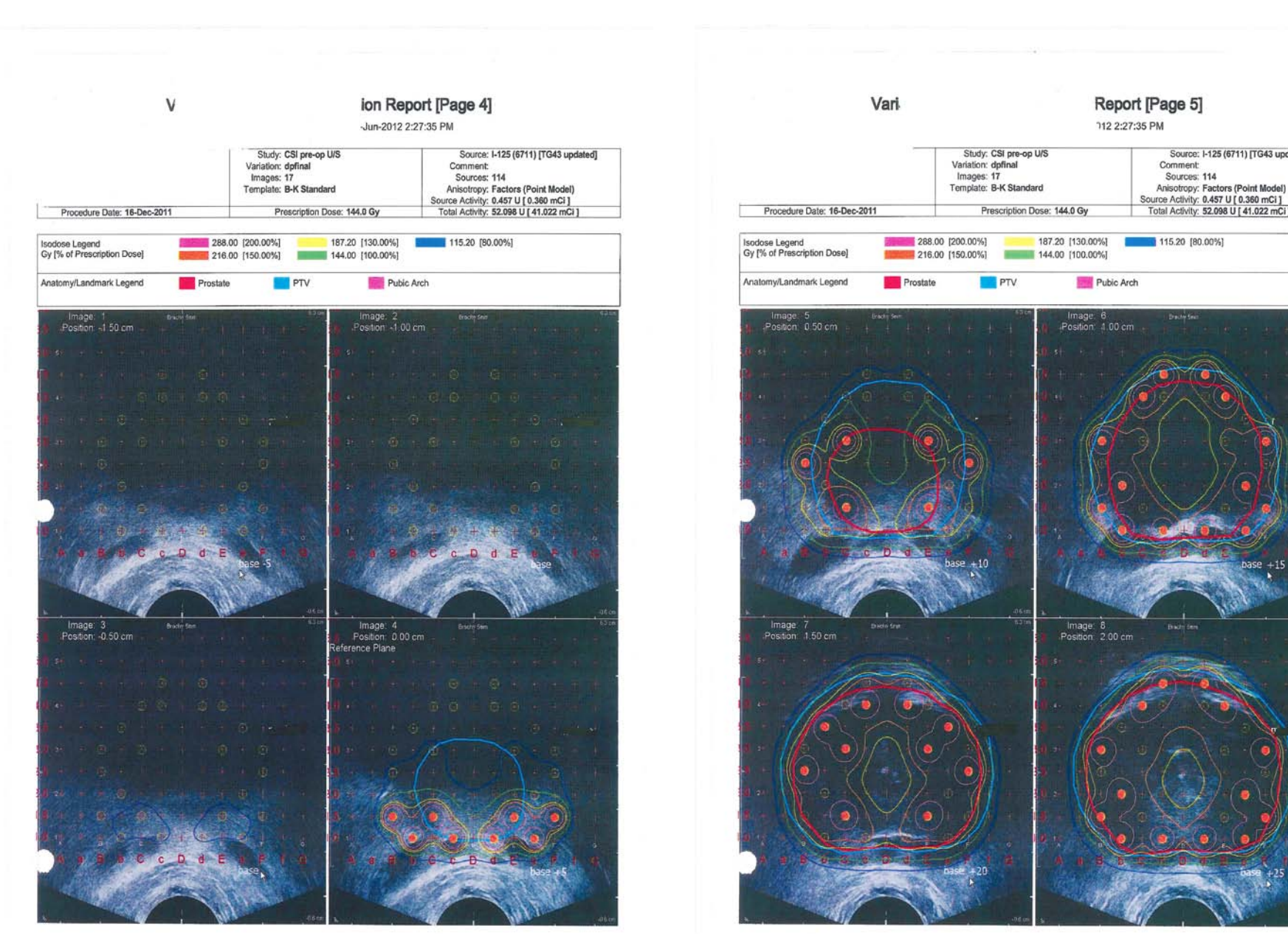


Figure 5: Pre-implant UltraSound

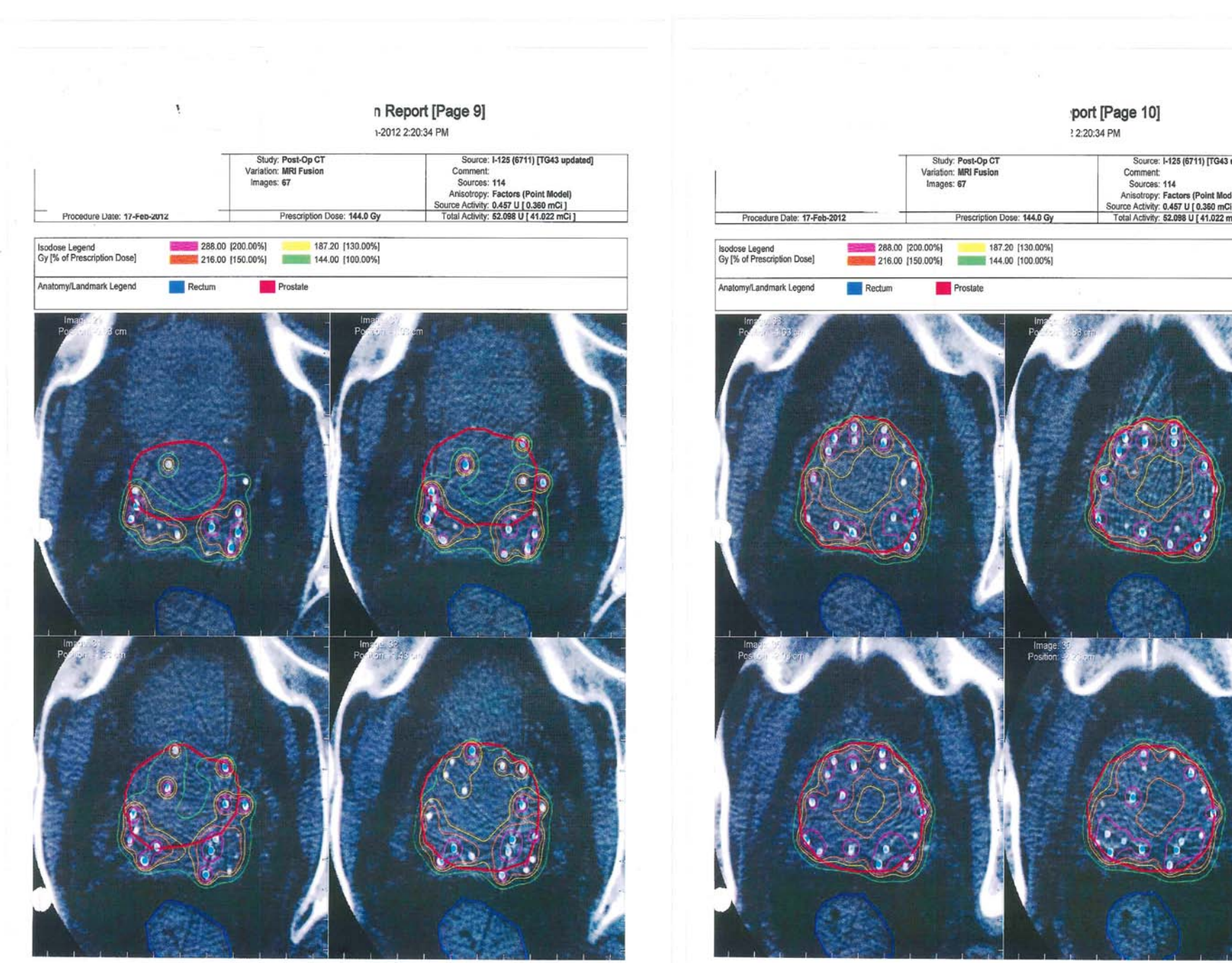


Figure 6: Post-implant CT

Figure 7: Pre-implant and Post-implant Plans Dose Information

Results

The RPC has reviewed 413 LDR prostates credentialing submissions. Of these, 65% of the applications are not approved with their first submission. Common clinical errors found include:

- ETV outlined was too small
- Prostate contours were inaccurate
- No PTV drawn on ultrasound
- Apex and/or Base not covered adequately
- Implanted seeds located outside the prostate
- V100 coverage < 90-95%
- R₁₀₀ > 1cc
- Post implant done > 30 days from implant
- Seeds implanted in row D
- D90 > 130%
- D90 < 90% and high source activity used per seed.

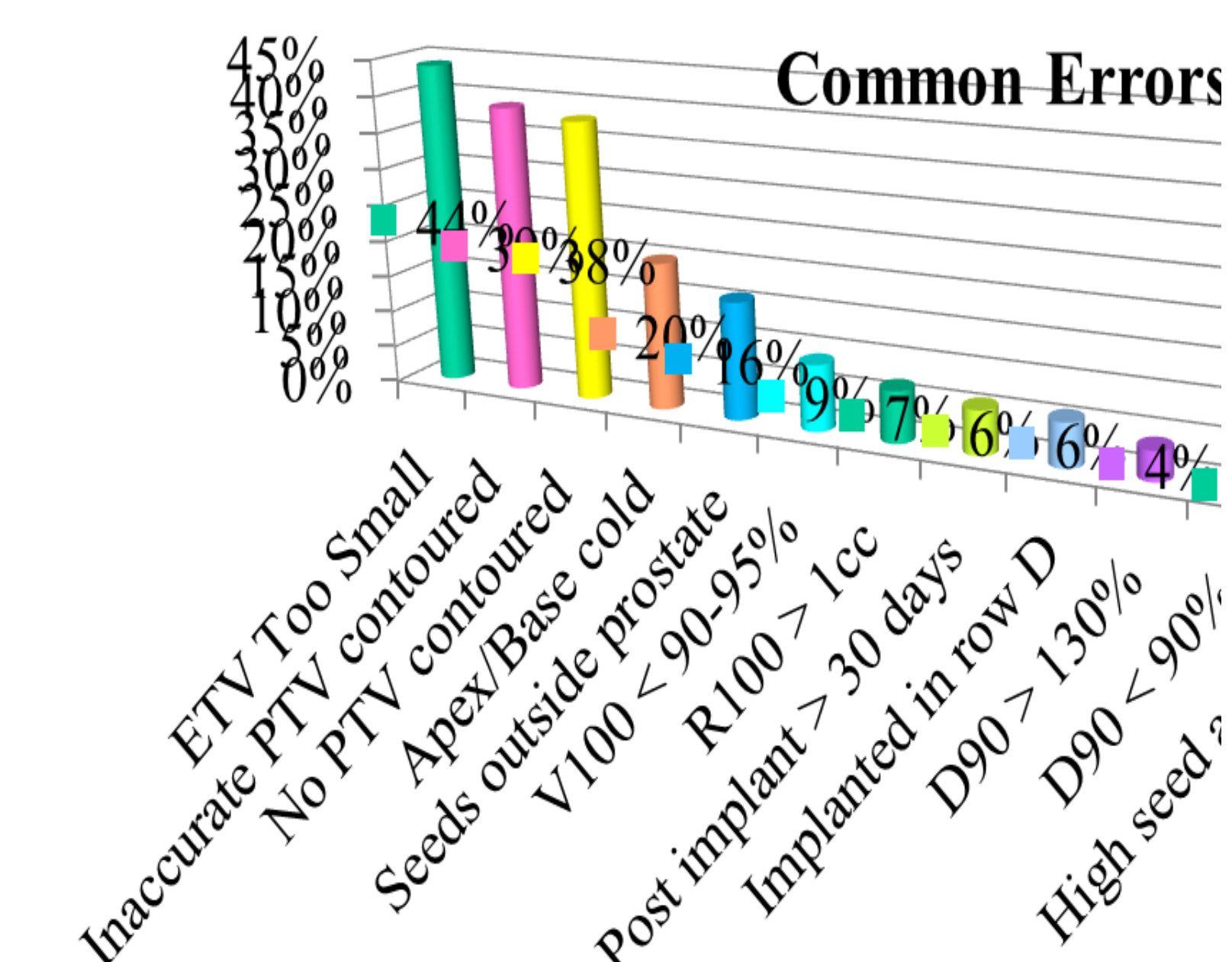


Figure 8: Percentage of clinical errors found

The Common dosimetric errors found in the reference cases include:

- source dosimetry parameters not updated to the most current values from TG-43 Update
- prostate not contoured accurately
- rectum not contoured accurately
- incorrect source activities used.

Conclusions

The LDR prostate credentialing process has identified many potential errors, both dosimetric and clinical, which would have resulted in protocol deviations

Support

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