



Independent Verification Objectives and Recent Lessons Learned

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Objectives

- Objective of Independent Verification (IV)
- Factors to Consider when Planning for IV
- Recent Lessons Learned

Goals of Independent Verification

- Independent evaluation of final site conditions and validation of contractor's final status survey procedures, results and documentation
- Increases probability of complete remediation and documentation—greatly enhances public credibility since it's an unbiased look at the D&D process
- Helps to address potential future questions regarding the adequacy of cleanup actions

Common IV Misconceptions

- Independent Verification Contractor (IVC) does NOT perform another final status survey (MARSSIM)
- The IVC is NOT the regulator, and only makes recommendations to the regulator
- The independent verification survey is NOT a replacement or supplement to the final status survey—rather, it serves to validate the final status survey

Types of IV

- Type A (In-Process Inspection)
 - Document reviews, field observations, side-by-side measurements, interlaboratory comparisons
- Type B (Confirmatory Survey)
 - IV field survey activities in addition to Type A and In-Process Inspection activities
 - Typically survey a small percentage of the site, depending on how well contractor has performed cleanup

ORISE Recommendations for IV

Complexity of Site	NRC	DOE
Large site with multiple contaminants and soil + structures	1) In-Process Inspection 2) Confirmatory Survey	1) Type A Review (with in-process inspection component) 2) Type B Review
Small site with limited contaminants and only one type of media (soil, structures, etc.)	In-Process Inspection only	Type A Review only

Rules of Thumb when Planning IV

- A Type A Review (In-Process Inspection) is recommended at a minimum for every site!
- A Type B (Confirmatory Survey) is recommended for larger, more complex sites, and for all sites where document reviews identify significant technical issues that could affect data quality
 - Scanning
 - Surface activity measurements
 - Soil sampling

Recent Lessons Learned

- Incomplete or Inadequate Characterization can “Doom” a Final Status Survey
 - Mean and standard deviation (σ) of contaminant in survey unit should be used to determine relative shift (Δ/σ):
 $(\Delta = DCGL_W - LBGR)$, where the LBGR should be set at mean concentration
 - Characterization data should be used to determine isotopic ratios, especially if surrogate measurements are being used (e.g., using measured Cs-137 concentration as a surrogate for Sr-90 or other hard-to-detect radionuclide)
 - If a consistent ratio between the surrogate radionuclide and hard-to-detect contaminant cannot be established, then another method to account for the hard-to-detect contaminant may be required

Recent Lessons Learned

- A Consistent Final Status Survey Approach should be used by all NRC-Licensees and DOE Contractors
 - The MARSSIM was developed to assure some consistency in FSS approach among all agencies
 - Many DOE sites do not follow the MARSSIM
 - DOE HQ has emphasized in recent memorandums that requests for Authorized Limits should include a discussion of radiological survey methods (Anderson 2007)
 - The FSS approach at CERCLA sites requires the EPA and DOE to come to agreement on cleanup approach, but compliance with DOE Orders is **ALWAYS** required (Grimm 1993)!

Recent Lessons Learned

- The DOE now requires that Independent Verification is performed for the release of real property (Owendoff 2008)
- Refer to the *Office of Environmental Management Plan for the Approval and Independent Verification of Authorized Limits (i.e., Radiological Release Limits)* for guidance on implementing IV at your site!

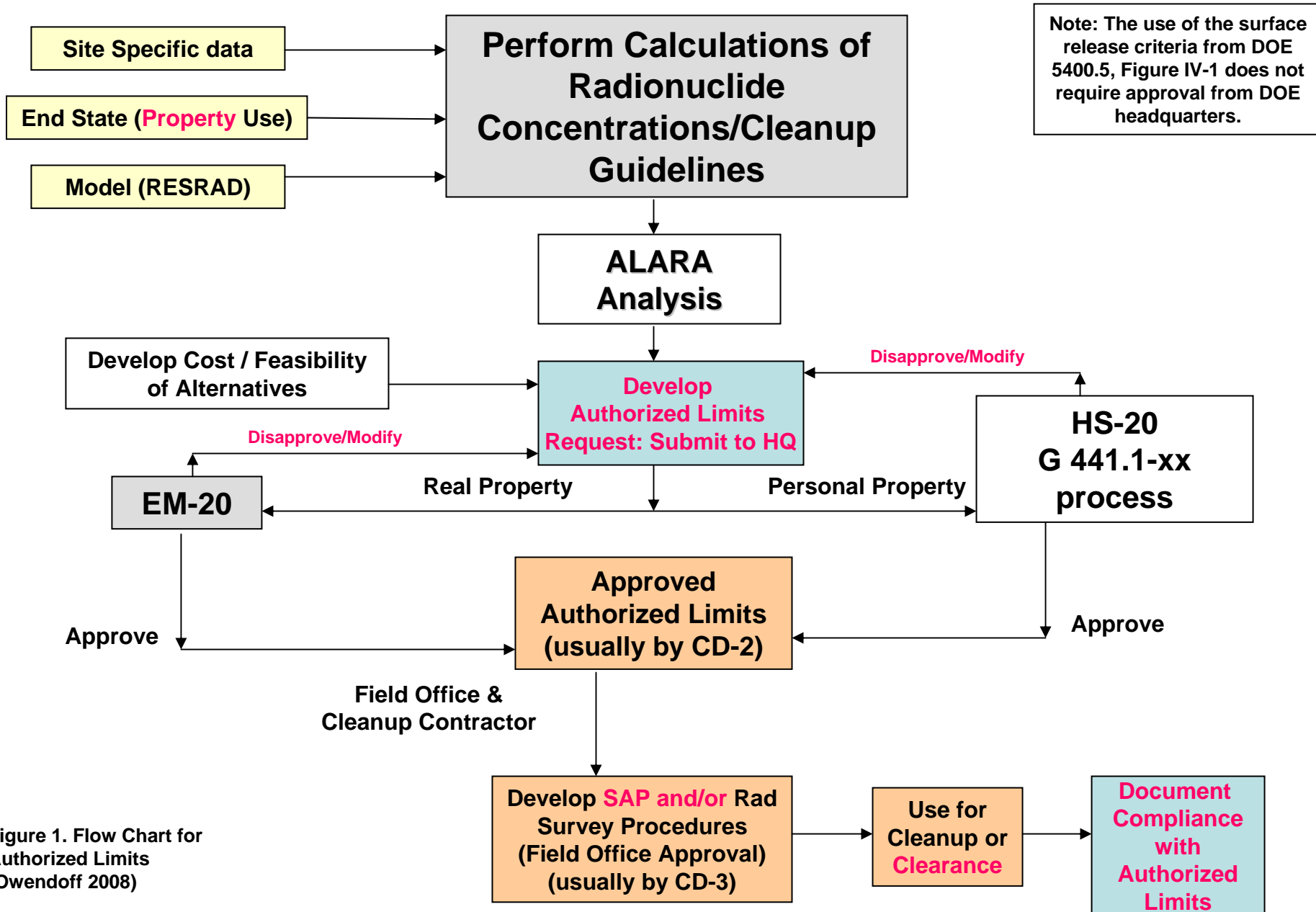


Figure 1. Flow Chart for Authorized Limits (Owendoff 2008)

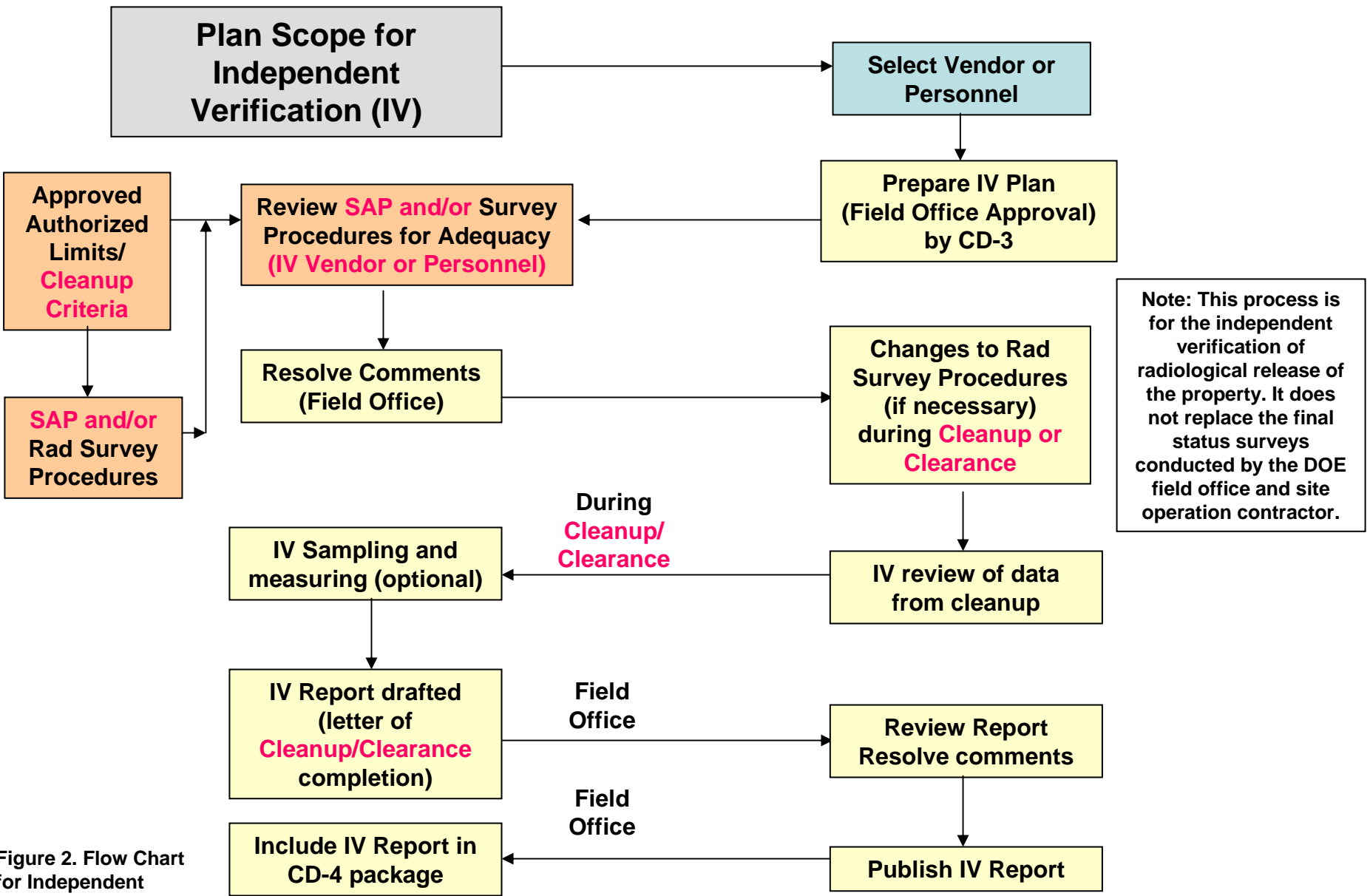


Figure 2. Flow Chart for Independent Verification (Owendoff 2008)

Recent Lessons Learned

- Documentation of technical approaches often not adequately documented in plans and procedures
 - Calibration methods must be thoroughly documented in order for the IVC to verify the site has appropriately accounted for site contaminants of concern (COCs) AND to assure consistency in the IV approach (e.g., ANSI N323A-1997, ISO-7503, etc.)
 - Scan survey sensitivities must be correctly calculated and documented

Specific Lessons Learned

- Sites should establish methods for averaging areas exceeding the site release criteria
 - If areas factors are not developed, then the magnitude at which “hot spots” can exceed the site guideline levels is not possible
 - At a minimum, the effect on risk due to identified areas with elevated contamination levels should be evaluated

Recent Lessons Learned

- The IV is a Quality Check – not a Final Status Survey!
 - When technical issues are identified and/or significant contamination is identified by the IV contractor (IVC) - the contractor should develop a path forward to correct the problem versus asking the IVC to resurvey 100% of some areas
 - Example – significant contamination in excess of the DCGLs identified at one site on structural surfaces - the contractor developed a Corrective Action Plan that addressed the investigation of contributing factors, corrective actions, and a graded approach to resurvey of affected areas
 - ORISE and the regulators reviewed and approved the plan
 - Schedule impacts were minimized

Recent Lessons Learned

- IV should be integrated into the D&D Process versus implemented following project completion
 - The identification of “missed” areas of contamination at the end of a project calls into question the entire FSS process
 - Procedural problems identified prior to the implementation of the FSS allows for a much less expensive and complicated revision to the process
 - Survey/sample results from areas already backfilled can not be adequately verified
 - Public perception is greatly enhanced when an *independent* verification contractor is involved in the D&D process

Reference Materials

- Memorandum from Charles E. Anderson to Distribution, *Clarification of Independent Verification and Radiological Release Requirements*; June 15, 2007.
- Memorandum from Paul D. Grimm to Distribution, *Compliance with DOE Orders as part of Environmental Restoration Projects Conducted under CERCLA*; April 22, 1993.
- Memorandum from James M. Owendoff to Distribution, *Office of Environmental Management Headquarters Plan for the Approval and Independent Verification of Authorized Limits (i.e., Radiological Release Limits)*; June 11, 2008.
- *Office of Environmental Management Plan for the Approval and Independent Verification of Authorized Limits (i.e., Radiological Release Limits)*; Office of Engineering and Technology Office, May 2008.