~~Appendix D~~

PUBLIC RADIATION SAFETY

~~S~~SIGNIFICANCE DETERMINATION PROCESS

DRAFT REVISION FOR EXTERNAL STAKEHOLDERS

The significance determination process (SDP) in this Appendix is designed to provide a means by which NRC inspectors and management can assess the significance of inspection findings related to public health and safety from exposure to radiation from licensed or unlicensed radioactive materials during routine operations of civilian nuclear power reactors. This process is used in conjunction with Inspection Procedure ~~71122, A~~~~Public~~ 71124, "Radiation Safety~~,@~~ Public and Occupational," to determine the risk significance of ~~a finding.~~inspection findings. A single issue may be evaluated using all applicable branches of the SDP ~~and~~with the significance determined by the ~~most restrictive~~ outcome~~.~~ that provides the highest significance. IP ~~71122 has~~71124 implements three ~~inspection areas~~Inspectable Areas[1] within the Public Radiation Safety Cornerstone:

- ~~Attachment 71122.01~~ Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems
-
- ~~Attachment 71122.02~~ Radioactive Material Processing and Transportation
-
- ~~Attachment 71122.03~~ Radiological Environmental Monitoring Program (REMP) ~~and Radioactive Material Control Program~~

I. RADIOACTIVE EFFLUENT RELEASE PROGRAM

A. Objective

~~This~~The Radioactive Effluent Release branch of the logic diagram focuses on the ~~licensee's~~licensee's routine (i.e., non-accident) radioactive effluent release program. This branch addresses ~~performance deficiencies~~findings associated with radioactive effluents, leaks and spills and direct radiation from the facility. It assesses the licensee's ability to monitor and maintain radioactive effluents to levels that are as low as is reasonably achievable (ALARA ~~(i.e.,~~) as demonstrated by radioactive effluents being within the design dose objectives contained in Appendix I to 10 CFR Part 50 and the U.S. Environmental Protection Agency's (EPA) standards pursuant to 10 CFR 20.1301(e). Being able to assess dose from radioactive effluents and maintain radiation doses to a member of the public within Appendix I design

1 Inspectable Areas are further described in IMC 0308 and IMC 2515

objectives is the success criteria.

B. Basis

The regulatory basis for requiring radiological effluent monitoring programs is given in General Design Criterion 60, AControlprovided in 10 -CFR 20.1302 and 10 CFR 50.36a. 10 CFR 20.1302 requires licensees take appropriate surveys of the unrestricted and controlled areas and effluents released into these areas to demonstrate compliance with the dose limits for individual members of the public. 10 CFR- 50.36a requires licensees to establish Technical Specifications (TS) to keep releases of radioactive materials to the environment,@ of Appendix A, AGeneral Design Criteria for Nuclear Power Plants,@ to 10 CFR Part 50, ALicensing of Production and Utilization Facilities.@ Criterion 60 requires a licensee to provide for a means ALARA and to control the release of radioactive materials in gaseous and liquid effluents during normal reactor operation, including anticipated operational occurrences. An additional requirement is in Section IV.B.1 ofsubmit yearly effluent reports to the NRC. Additionally, 50.36a provides numerical guidance via Appendix I to 10 CFR Part 50. This section requires a licensee to provide data on the quantities of radioactive material released in liquid and gaseous effluents to assure that such releases are within the ALARA design objectives. This data, pursuant to 10 CFR 50.36a, is reported to the NRC annually. There is also a requirement in 10 CFR 20. for establishing limiting conditions for operation to ensure effluents from light-water cooled reactors are ALARA. Implementation of these requirements is described in plant-specific TS and, typically, further described in licensee-controlled Offsite Dose Calculation Manuals (ODCM). Additionally, licensees are required by 10 CFR 20.1301(e) that requires power reactors to comply with the U.S. Environmental Protection Agency=sEPA's environmental radiation standards in 40 CFR Part 190. Performance deficiencies related to As discussed in the Federal Register (49 FR 2859), for licensees emitting direct radiation that is indistinguishable from background radiation levels, maintaining doses from effluents below the Appendix I design objectives demonstrates compliance with 40 CFR 190. Licensees who have radioactive sources that result in direct radiation levels that are above background must account for doses that result from direct radiation in addition to doses from effluents when demonstrating compliance with 10 -CFR -Part -20.1301(e).

Inspection findings related to monitoring and reporting radioactive effluent releases, performing direct radiation measurements and completing evaluations of the dosedoses to a membermembers of the public will be evaluated inthrough this branch of the SDP.

C. SDP Determination Process

C. SDP

Is there a finding in the licensee=slicensee's radiological effluent monitoring program that is contrary to NRC regulations or the licensee=s Technical Specifications (TS),licensee's TS, Offsite Dose Calculation Manual (ODCM), or procedures? Is there an indication of a spill or release of radioactive material on the licensee's site or to the offsite environs? If yes, was the licensee able to assess the dose to members of the public from the release of radioactive effluent and what is the dose impact (as calculated by the licensee) for the event? If the dose impact to a member of the public from the radiological release, spill or leak is less than the dose values in Appendix I to 10 CFR Part 50 and/or 10 CFR 20.1301(e), then there is minimal Arisk@

and the SDP classifies ~~it~~this finding as GREEN. The licensee is responsible to resolve the ~~finding.~~underlying performance deficiency that resulted in this finding. The NRC will periodically inspect the effectiveness of the ~~licensee's~~licensee's corrective action program.

If the licensee has a substantial failure to implement the radioactive effluent release program, then the finding would be WHITE. Failure to identify a release event~~,~~ or assess the dose consequences and the impact to the environment in a timely manner, consistent with ODCM requirements, could be considered a substantial failure to implement the radioactive effluent release program.

Examples of a substantial failure to implement the radioactive effluent release program are:

- Significant deficiency in implementing the effluent release program as defined in the plant's ~~technical specifications~~Technical Specifications, resulting in the gross inability or gross inaccuracy in characterizing an effluent release.
- Significant deficiency in evaluating an effluent release (either planned or unplanned) where the resulting dose has been grossly underestimated.
- Significant deficiency in calibrating effluent monitors used to assess effluent releases, resulting in a gross inability or gross inaccuracy in characterizing an effluent release.
- Failure to have any data by which to assess the dose to a member of the public from an effluent release (i.e., no monitor data, no independent sample data, no actual release sample data, etc.)

Usually the licensee has enough plant data (e.g., from tank volumes and periodic sample analysis of the radioactive material in the tank) to reconstruct a source term and calculate a bounding dose from the unmonitored release. A failure to properly calibrate an instrument or adequately train an individual on effluent monitor calibration or usage would usually not result in the White finding.

If the event resulted in an effluent release of radioactive material that, based on the methodology in the ~~licensee's~~licensee's ODCM, exceeded the dose values in Appendix I to 10 CFR Part 50 and/or 10 CFR 20.1301(e) but is less than 0.1 rem, the SDP classifies the event as WHITE.

If the event resulted in effluent release of radioactive material that, based on the methodology in the ~~licensee's~~licensee's ODCM, exceeded the annual public dose limit in 10 CFR Part 20 of 0.1 rem but is less than 0.5 rem, the SDP classifies the event as YELLOW.

If the event resulted in effluent release of radioactive material that, based on the methodology in the ~~licensee's~~licensee's ODCM, exceeded 0.5 rem, the SDP classifies the event as RED.

II. RADIOACTIVE ENVIRONMENTAL MONITORING PROGRAM

A. Objective

This branch of the logic diagram focuses on the ~~licensee's~~licensee's ability to operate an effective radioactive environmental monitoring program.

B. Basis

The regulatory basis for requiring radiological environmental monitoring programs is ~~given in General Design Criterion 64, "Monitoring Radioactivity Releases," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Licensing of Production and Utilization Facilities." Criterion 64 requires a licensee to provide for a means for monitoring the plant environs for radioactivity that may be released during normal operations, including anticipated operational occurrences, and from postulated accidents. In addition, Section IV.B.3 of Appendix I to 10 CFR Part 50 requires that the monitoring program~~provided in 10 CFR 20.1302 and 10 CFR 50.36a. 10 CFR 20.1302 requires licensees take appropriate surveys of the unrestricted and controlled areas and effluents released into these areas to demonstrate compliance with the dose limits for individual members of the public.~~–~~ 10 ~~-~~CFR ~~-~~50.36a requires licensees to establish Technical Specifications to keep releases of radioactive materials ALARA and provides numerical guidance via Appendix I to 10 ~~-~~CFR ~~-~~Part ~~-~~50 for establishing limiting conditions for operation to ensure effluents from light water cooled reactors are ALARA. 10 CFR 50 Appendix I directs licensees to establish surveillance and monitoring programs that provide data on measurable levels of radiation and radioactive material in the environment to evaluate the relationship between the quantities of radioactive materials released in effluents and resultant radiation doses to individuals from principal pathways of exposure. Licensees are to identify changes in the use of unrestricted areas (e.g., for agricultural purposes) to permit modifications in the monitoring program for evaluating doses to individuals from principal pathways of exposure. Implementation of these requirements is described in plant-specific Technical Specifications and, typically, further described in the licensee-controlled ODCM.

Radiological environmental monitoring is important both for normal operations, as well as in the event of an accident. During normal operations, environmental monitoring verifies the effectiveness of the plant systems used for controlling the release of radioactive effluents and direct radiation. ~~-~~It also is used to confirm that the levels of radioactive material in the environment and direct radiation exposures to members of the public do not exceed the projected values used to license the plant. For an accident, the program provides an additional means to estimate the dose to members of the public. For accident assessment issues concerning as area of the radioactive environmental monitoring program, the Emergency Preparedness SDP is to be used.

C. SDP ~~Determination Process~~

Is there a finding in the ~~licensee's~~licensee's radiological environmental monitoring program that is contrary to NRC regulations or the ~~licensee's~~licensee's Technical Specifications (TS), Offsite Dose Calculation Manual (ODCM), or procedures? If yes, a Green risk significance finding is appropriate.

If the REMP identifies unexpected radiological conditions in the environment, then performance deficiencies should be assessed under the Radioactive Effluent Program branch of the SDP.

III. RADIOACTIVE MATERIAL CONTROL PROGRAM

A. Objective

This branch of the logic diagram focuses on the ~~licensee's~~licensee's radioactive material control program. It assesses the ~~licensee's~~licensee's ability to prevent the inadvertent release and/or loss of control of licensed radioactive material to an unrestricted area that can cause an actual or credible radiation dose to members of the public.

B. Basis

10 CFR Part 20 contains the requirements for the control and disposal of licensed radioactive material. At a ~~licensee's~~licensee's facility, any equipment or material that came into contact with licensed radioactive material or that had the potential to be contaminated with radioactive material of plant origin and are to be removed from the facility must be surveyed for the presence of licensed radioactive material. This is because NRC regulations, with one exception in 10~~-~~ CFR~~-~~ 20.2005, provide no minimum level of licensed radioactive material that can be disposed of in a manner other than as radioactive waste or transferred to a licensed recipient as described in 10 CFR 20.2001.

C. SDP ~~Determination Process~~

Is there a finding in the ~~licensee's~~licensee's radiological material control program that is contrary to NRC regulations and licensee's procedures? If yes, what is the dose impact to a member of the public in the restricted area, controlled area or the unrestricted area (as calculated by the licensee)? If the dose impact was less than or equal to 0.005 rem total effective dose equivalent (TEDE), then the SDP classification is Green. If the dose impact was greater than 0.005 rem TEDE, then the SDP classification is WHITE. If the dose impact is greater than 0.1 rem TEDE (exceeds 10 CFR Part 20 public dose limit), the SDP classification is YELLOW. If the dose impact was greater than 0.5 rem TEDE, the SDP classification is RED.

Individuals who have not been classified ~~as occupation~~by the licensee as occupational workers are sometimes permitted access to a licensee's Restricted Area for job-related or public information purposes. Such individuals are either physically escorted, or are granted limited unescorted access following the successful completion of appropriate orientation training and security screening.~~–~~ Exposure received by such individuals associated with a radioactive material control finding involving licensed radioactive material will be evaluated using the dose-based criteria in this SDP (i.e.~~g.,~~ less than 0.005 rem TEDE – Green; greater than 0.005 TEDE – White; greater than 0.1 rem TEDE – Yellow; or greater than 0.5 rem TEDE, Red).

It should be noted that discrete radioactive particles (also known as hot particles, or fuel fleas) are not ~~applicable to~~within the scope of this ~~program~~SDP if the dose from the discrete radioactive particle does not result in a TEDE dose as defined in 10 CFR Part 20. Generally, the exposure from these types of particles results in a dose ~~from the particle is~~ to a very small localized area of the skin and ~~is~~does not ~~equivalent to the risk of a~~result in an appreciable TEDE dose. However, if the discrete radioactive particle is of such a magnitude that a TEDE dose (i.e., equal to or greater than 1 mrem) is received, then the finding should be evaluated ~~in the~~with this SDP.

~~VII~~IV. TRANSPORTATION

A. Objective

This ~~branch~~section of the ~~logic diagram~~SDP focuses on the ~~licensee's~~licensee's radioactive material packaging and transportation program. It assesses the ~~licensee's~~licensee's ability to safely transport radioactive material on public roadways in accordance with regulations.

The SDP described below is intended to be used only for those radioactive material shipments classified as ~~Schedule 5~~Low Specific Activity I (LSA-~~1~~I) through ~~11 (~~Fissile Radioactive Material~~),~~, as described in NUREG-1660, U.S. Specific Schedules of Requirements for Transport of Specified Types of Radioactive Material Consignments. Performance deficiencies involving correctly classified radioactive material shipments in the radioactive material, excepted package classifications (i.e., -UN2908, UN2909, UN2910, and UN 2911) should be dispositioned as minor violations. If a shipment ~~is~~was incorrectly classified ~~as Schedule 1 (Limited Quantities) to Schedule 4 (Empty Packages)~~in the radioactive~~,~~ material, excepted package classifications, but was actually ~~a Schedule 5~~an LSA-I through ~~Schedule 11~~Fissile Radioactive Material shipment, then this branch of the SDP is used.

B. Basis

The regulatory basis for the transportation program is contained in 10 CFR Parts 20, 61, and 71~~,~~. 10 CFR 20.1801 requires licensees to secure licensed material that is in storage and 20.1802 requires licensees to control licensed material that is not in storage. 10 CFR 20.2006 requires the manifesting of waste that is shipped for disposal to a licensed land disposal facility. 10 -CFR -61.55 and 61.56 provide requirements for the classification and characterization of radioactive waste destined for disposal at a licensed land disposal facility. 10 CFR 71.5 requires, in part, that licensees engaged in transportation of licensed material comply with the applicable requirements of 49 CFR 107, 171-180, and 390-397 -that are appropriate to the mode of transport.

The NRC and U.S. Department of Transportation (DOT) regulations ~~contained in 49 CFR Parts 170-189.~~contain definitions and activity limits for Type A quantities of radioactive material. Many reactor licensee shipments will qualify to be shipped as Type A shipments either, because, as described in 49 CFR 173.431, the transported material meets the specific definition of a Type A quantity, or because, as described in 49 CFR 173.427, the material meets the definition, and transportation requirements, of Low Specific Activity (LSA) or Surface Contaminated Objects (SCO). As required by 49 CFR 173.431 and 49 CFR 173.427, radioactive material whose activity exceeds the Type A quantity, or does not satisfy the requirements to be designated as LSA or SCO must be transported in an NRC-approved Type B container (i.e. a container that meets the requirements of 10 CFR Part 71 as demonstrated through an NRC Certificate of Compliance).

C. SDP Determination Process

a. Packaging

When determining the significance of transportation findings, it is important to first determine if the correct packaging was used for the type of material being transported. 49 CFR 173.431 provides activity limits for Type A and Type B packages. In addition to applicable descriptions and limits provided in 49 CFR 173.403, LSA and SCO material is assigned specific conditions of transport pursuant to 49 CFR 173.427. One of the conditions for transporting LSA and SCO is provided as a limitation on exposure level at a distance from the unshielded material of 1 rem/hr at 3 meters. This exposure scenario is similar in radiological significance to that level of

exposure that serves as the basis for the Type A quantity limits. Specifically, the International Atomic Energy Agency's (IAEA) Q-System for the calculation of A quantities states that the basis for the Type A quantity is a level of public exposure following an accident involving a transport package that results in 50 mSv in 30 minutes at a distance of 1 meter. This level of exposure is equivalent to 10 rem/hr at 1 meter, which is approximately 1 rem/hr at 3 meters. It is important to note that it is possible for an LSA or SCO shipment to contain activity that exceeds a Type A quantity; however, as long as the exposure level at 3 meters does not exceed 1 rem/hr the material can be shipped in accordance with provisions applicable to LSA or SCO and does not have to be shipped in an NRC-approved Type B container.

When incorrect packaging is used and the shipped material exceeds a Type A quantity, or is composed of LSA or SCO that exceeds the applicable conditions of transport of 49 -CFR -173.427, then the finding would be WHITE; otherwise the finding would be GREEN. If the shipped material exceeds multiples (i.e. 5x and 10x) of the Type A limit or, in the case of LSA or SCO, the approximate external exposure at 3 meters corresponding to those multiples, as applicable, then the significance of the finding increases to YELLOW and RED, respectively. This branch of the SDP categorizes the significance of a licensee's failure to properly package and ship radioactive material (regardless of whether the shipment occurred without incident) and to provide a suitable input to the assessment process that would result in the appropriate level of supplemental inspection in response to that failure.

b
~~C. SDP Determination Process~~

~~a~~. Radiation Limits Exceeded

The radiation limits of a package offered for transport are found in 49 CFR 173. These include ~~both~~ limits for external radiation ~~and~~, removable surface contamination~~.~~ and the activity that can be contained within a particular type of package. Since section IV.C.a addresses packaging use (i.e. the activity that can be contained within a particular type of packaging), this section of the SDP assumes that the correct packaging is used for the application and focuses on external radiation levels and surface contamination levels.

The external radiation limits vary as a function of shipment type (i.e. non-exclusive and exclusive-use). Specific limits also exist as a function of distance from the package, such as the transport index (TI), and for the area occupied by the driver. These external radiation limits are found in 49 CFR 173.441 and are duplicated in 10 CFR Part 71.47 (as related to Type B radioactive material shipments).

The limits for removable (non-fixed) surface contamination on a package are found in 49 -CFR -173.443 (Table 11) and vary as a function of shipment type (i.e. non-exclusive and exclusive use), and ~~vary relative to~~ the type of ~~nuclides~~ (nuclide based on the emitted radiation (i.e. alpha, and beta/gamma emitters).

The external radiation level branch provides for a graded approach for ~~assessing~~determining the ~~level of~~ significance of findings. Exceeding the limit yields a GREEN finding and then ~~with~~ increasing ~~multiplies~~multiples of the ~~limits~~limit provides for ~~GREEN,~~ WHITE, YELLOW and RED findings. To assess the significance of a finding, consideration ~~is~~should be given to risk-informing findings based on the accessibility of the package~~.~~ to members of the public. An accessible area is defined in ~~the~~this SDP as an area that can reasonably be occupied by a major portion of an ~~individual's~~individual's whole body. The definition of whole body ~~is~~can be

found in 10 CFR 20.1003. For example, consider a shipment that consists of a package loaded directly on a ~~flat bed~~flatbed trailer~~, and~~ that is secured in place. An example of an inaccessible surface is the underside of the package, which is sitting directly on the trailer. It is highly improbable that any member of the public could gain access to that location, assuming normal conditions of transport. Examples of accessible areas include the topside, underside, and outside of the trailer, the unlocked cab, accessible surfaces of the package, and at two meters from the loaded package. ~~Accessibility~~When determining accessibility, the likelihood that a member of the public would access the area in question may be considered when determining if the envisioned scenario is reasonable. Finally, accessibility is not a factor that is considered if the dose rate on the external surface of the package is greater than two times the regulatory limit.

In addition to accessibility, consideration may be given to risk-informing findings associated with situations where only a small area of a package exceeds the radiation limits. In its response to Petitions for Rulemaking (PRM) 20-9 and 34-1 (ADAMS Accession No. ML11116A176), the NRC provided a position relevant to compliance with the surface survey requirements of 20.1906. This position is also summarized in Health Physics Position (HPPOS) 13. The NRC stated that averaging radiation levels over a cross-sectional area of a probe of reasonable size is acceptable for demonstrating compliance with the requirements specified in 10 CFR 20.1906(d)(2). "A probe of reasonable size" was defined as: (1) the sensitive volume of the probe being small compared to the volume of the package being measured, and (2) the largest linear dimension of the sensitive volume of the probe being no greater than the smallest dimension of the package. The NRC made this position in regard to 20.1906, which applies to packages containing greater than a Type A quantity of radioactive material; however, the practice of averaging radiation levels over a cross-sectional area of a probe of reasonable size to demonstrate compliance with other regulations that require radiation measurements on package surfaces (e.g., 49 CFR 173.441(a)) is acceptable.

The removable surface contamination level branch provides for a graded approach for assessing the level of significance of findings. Exceeding the limit yields a GREEN finding and then ~~with~~ increasing ~~multiplies~~multiples of the ~~limits provide~~limit provides for ~~GREEN,~~ WHITE, YELLOW and RED findings. Note that to have a RED finding, the surface contamination levels must not only exceed 100 times the limit, but the unrestricted area must have been contaminated as well.

c~~b~~. Breach of Package ~~During~~during Transit

DOT and NRC shipping regulations relative to packaging requirements are diverse. Generally, these requirements become more stringent as a function of several factors. As the quantity, type, and form (i.e., readily dispersible) of radioactive material varies (increases), then the potential impact on the public (dose) increases as a result of a package breach during transit. Consequently, NRC and DOT requirements for packaging design and testing become more stringent as the contents increase in radiological significance. For purposes of risk significance determinations, a package breach means a loss of containment. The actual or potential impact on the public from a package breach then is a function of the package contents. For Type A packages normal conditions of transport are assumed; this includes rough handling tests as specified in the DOT regulations (i.e., drop, water, puncture and crush tests). Thus, during normal conditions of transport Type A packages are designed to prevent the loss or dispersal of radioactive material contents, and maintain radiation levels below limits. If a breach occurs under conditions more adverse than the rough handling tests, then a breach finding would not be appropriate unless it can be shown that licensee negligence contributed to the loss of containment. If a package breach occurs during transit with equal to or less than the normal

conditions of transport and the licensee failed to meet transportation requirements (resulting in the breach), then a breach finding is appropriate.

Under certain circumstances, the DOT regulations allow the use of General Design Packages. These types of packages are expected to contain radioactive material in a form that is less hazardous than more robust packages (e.g., Type A package) and, thus, are not subjected to testing requirements. Therefore, breach scenarios (assuming no dose to the public or first responders) involving general design packages are assigned a lower significance (GREEN).

In the logic diagram, when a decision block asks for a package type (e.g., "Type B Package?"), it is asking~~,~~ what type of packaging was actually used for the shipment in question. In some cases shippers use packaging of a higher tier than is required by the DOT regulations. However, the expectations for integrity of the higher tier package are not relaxed because the package is used to ship material that is less radiologically significant. Finally, the DOT regulations allow the use of certain types of Industrial Packages (IP) when shipping certain types of LSA or SCO; therefore, for the purposes of this the logic diagram, IP-2 and IP-3 packages are treated in the same manner as Type A packages.

Type B packages must meet the performance and packaging requirements of Type A, as well as beyond normal conditions of transport. They are designed to withstand hypothetical serious accident conditions with no loss of containment (no breach), as measured by leak-rate testing. These design considerations and criteria are contained in 10 CFR Part 71.73, and include free fall, crush, puncture, fire, and water immersion. Given these rigorous design requirements, any breach of a Type B package in transit (in less than hypothetical accident conditions) is a candidate for a YELLOW or RED finding. If the licensee failed to meet the transportation requirements, and this failure contributed to the breach, then a breach finding is appropriate. The risk significance determination after a design basis accident will be determined on a case-by-case basis.

~~The less-than-or-equal-to Type A shipment~~The "Package Breach" branch provides for a graded approach for assessing the level of significance of findings. If a breach in a Type A or lesser container occurs as a result of the failure to meet transportation requirements, but no loss of control of the contents is evident, then the finding is GREEN. An example could be a solidified radwaste liner, inside a Type A package where the closure lid was loose (not tightened down). In this case, given the form of the radioactive contents, loss of control of the material is very unlikely. However, on a similar shipment, failure to properly torque the closure lid bolts (35 ft-lbs~~.~~ versus required 45 ft-lbs~~.)~~) is not a breach, assuming the licensee analysis demonstrates that package integrity would be maintained during the normal conditions of transport. If package integrity was not maintained for a Type A package, and the result was a loss of contents[2] then a WHITE finding would be appropriate. As previously discussed, failure to maintain integrity with a loss of contents for a general design package is assigned a lower significance and would be GREEN.

While power reactor shipping history has demonstrated that serious mishaps are highly unlikely, if a transportation incident occurs with a package breach, then public dose consequences could result. ~~The next two blocks in~~To address this, the ~~Type A~~"Package Breach" branch ~~(assuming~~has a ~~breach) focus~~section that focuses on public and occupational doses that occur as a result of the loss of control of package contents. These are actual doses to real individuals, and depending on the level, would lead to either WHITE, YELLOW or RED findings.

[2] The loss of package contents means that radioactive material has been released and can be detected and distinguished in a low background area at a distance of 30 cm from the item with a micro-rem per hour-type instrument, which typically uses a 1 inch by 1 inch scintillation detector.

Note that for a member of the public, the dose would in almost all cases be an estimate. Designated on-scene trained responders (e.g., local county Hazmat emergency team) would be designated occupational workers, subject to the occupationoccupational dose limits.

The greater than Type ABB section of the "Package Breach" branch provides for a YELLOW finding, assuming no loss of control of package contents. A RED finding would result if package contents controlcontainment was lost resulting in the release of material that was distinguishable from background. An example of a YELLOW finding is where a receiving facility finds the incoming shipment (irradiated components) package=spackage's drain valve on the package open presenting a direct pathway to environment, but, assuming normal conditions of transport, no potential for loss of control of materials (assuming normal conditions of transport).occurred because of the type of material being shipped. A RED finding is appropriate for the same A"open valve@" scenario if the package contents were spent fuel fission product gases could feasibly have been released continuously to the environs during the shipment, assuming normal conditions of transport. However, in the event of a transportation accident that led to loss of fuel integrity, public dose consequences could exceed acceptable levels before adequate protective measures could be implemented.

cd. Part 61 Finding

If a licensee ships Class C or greater waste and it is determined that the waste was under-classified, contrary to the requirements of 10 CFR 61.55 (e.g., waste classified as Class A or Class B, but later found to be Class C or greater), then the finding is WHITE. In addition, if a licensee ships Class A or Class B waste and it is determined that the waste was under-classified, contrary to the requirements of 10 CFR Part 61.55 (e.g., waste classified as Class A, but later found to be Class B), and resulted in the improper disposal of the waste, contrary to the requirements of 10 CFR 61.56, then the finding is WHITE. If the under-classification of Class A or Class B waste did not result in the improper disposal of the waste (i.e., not resulting in an actual increase in risk), then the finding is GREEN.

Determination of the acceptability of the waste for disposal is made by the applicable regulatory agency for the waste disposal facility; either NRC or the Agreement State. Agreement States have the authority under the Atomic Energy Act to promulgate regulations that are compatible with NRC=sNRC's disposal regulations in 10 CFR Part 61. They also have the authority and responsibility to issue disposal facility licenses under their Part 61 compatible regulations, and to disposition a non-compliance by a licensee.

de. Failure to Make Notifications or Provide Emergency Information

This branch of the logic diagram focuses on vital communication and information, and notification requirements that must be provided by the licensee. Shippers of hazardous materials are required to provide emergency response information. Failure to provide these required notifications could seriously hamper or prevent the ability of the federal, state and local agencies to adequately respond as needed to transportation events and accidents. By hampering or preventing this regulatory response, the public health and safety could be negatively impacted

These requirements (in 49 CFR Part 172, Subpart G, Section 172.600) apply to any shipment which is required to have shipping papers. Shipments of excepted radioactive material packages (limited quantities, Aempty@ packages, etc) are not subject to the emergency response information.

NRC regulations (10 CFR 71.97) require advance notification to state governors for shipments of irradiated reactor fuel and nuclear waste under certain conditions. These notifications include quantity and form, and type of shipping container required. Notifications must be made in a timely manner to all the states hosting the radioactive material shipment. Additionally, 10 CFR 20.1906 requires receivers of certain packages of radioactive materials to perform timely external and surface contamination radiation monitoring upon receipt of the packages. If applicable radiation limits are exceeded, the receiving licensee must then report the event to the appropriate NRC Regional Office.

For Block N1 (10 CFR 71.97 non-compliance), if the licensee fails to make the required notifications to the governor of a State, or the governor's designee, before the shipment entered the State=sState's boundary (crossed the State line) for interstate shipments, the finding would be WHITE. For intrastate shipments, if the shipment was put on public roads/rails before the Governor, or his designee, received the required notification, then a finding would be WHITE. Note that for any other timeliness non-compliance (e.g., notification not postmarked at least 7 days before the 7 day shipment period), these findings would be GREEN. Failures to notify the NRC when required by the regulations are typically dispositioned using traditional enforcement because these failures result in an impediment to the regulatory process.

For Block N2 (49 CFR 172.602 non-compliance), if the licensee fails to provide the required emergency response information to the shipment carrier (the shipment leaves the licensee=slicensee's facility and control without the required information), the finding is WHITE. If the carrier misplaces or loses the information (beyond the licensee=slicensee's control), the finding is GREEN.

For Block N3 (49 CFR 172.604 non-compliance), if during an actual emergency the licensee does not respond in a timely manner in accordance with the requirements (or had not provided the 24-hour telephone number), the finding is WHITE. For an incorrect or missing emergency response telephone number as required by 49 CFR 172.604, if there were no actual accidents or situations where the emergency contact information was needed, then the risk significance would be minimal and the finding is determined to be Green.

For Block N4 (10 CFR 20. 1906), if the licensee=slicensee's receipt surveys show 1) the package'=s external radiation levels in excess of five times the Part 71 limits, or 2) the surface radioactive contamination level in excess of five times the Part 71 (49 CFR 173) limits, and the licensee facility fails to make an immediate report, then the finding is WHITE. Other non-compliances are GREEN.

ef. Certificates of Compliance

Pursuant to 10 CFR 71.3, a licensee may not deliver or transport licensed material without a general or specific license. The general license for the use of an NRC-approved package is discussed in 10 CFR 71.12. Section 71.12 grants a general license to a licensee to transport or deliver to a carrier for transport, licensed material in a package for which a license, certificate of compliance (CoC), or other approval has been issued by the NRC. Additionally, Section 71.5 requires the licensee to comply with the applicable DOT regulations in 49 CFR. Physical damage or structural failure of a transport package is processed through the package breach flow chart.

Usually, the form of approval issued by the NRC is a CoC. For purposes of readability, consider the CoC as discussed here to mean any NRC issued approval for a package. The CoC

approves a specific package design, including a detailed allowable contents description consistent with the use of the general license of Section 71.12. The CoC also lists the requirements or ~~A~~conditions~~@~~ for the use and maintenance of the package in block 4 of the CoC. Frequently, these conditions include references to the package'~~-~~s Safety Analysis Report (SAR) or procedures supplied by the CoC holder to the package owner or user. The user of the package must comply with the requirements of 10 CFR Part 71, the applicable regulations of 49 CFR, the CoC and their own transportation program instructions, including quality assurance requirements, to ship material.

The following discussion provides a step-by-step description of the decision steps which make up the ~~Certificate of Compliance (~~COC~~)~~ portion of the Significance Determination Process (SDP) flowchart for Transportation & Part 61. It is anticipated that the inspector will have properly followed the Transportation and Part 61 SDP flowchart through the Radiation Limit Exceeded and Breach of Package decision points to the decision point where this COC branch begins. It is also expected that the inspector follows previous guidance concerning multiple findings on a single incident. That is, a finding with a package breach which resulted in a YELLOW determination and a CoC deficiency which resulted in a GREEN determination would be considered to be a YELLOW finding. This is because the YELLOW signifies a more serious problem with the package breach aspect of the finding, than the CoC deficiency aspect of the finding.

This branch of the logic diagram resolves an NRC, or licensee, identified finding that deals with package preparation, use and maintenance. It includes a noncompliance with a CoC specification(s) or condition(s) for a transportation package/cask. The following is a list of all the decision blocks contained in the COC SDP flowchart for Transportation & Part 61.

1. Design Documentation Deficiency (1st decision block)

Any documentation deficiency related to maintenance or use of an NRC-approved package. This does not include deliberate misconduct related to documentation. The deficiencies covered here are expected to be purely documentation non-compliances and not the failure to perform a required action. These non-compliances would not be considered safety significant (i.e., GREEN) because the required action was performed and, often, the required documentation can be re-created with appropriate measures to show its creation after the actual performance of the activity.

Examples of documentation deficiencies include, but are not limited to, the failure to properly document compliance with:

- 49 CFR requirements such as shipping papers
- Section 71.87, Routine determinations (failure to document performance of the loading checklist)
- Section 71.89, Opening instructions (failing to document providing them when necessary)
- Section 71.91, Records (shipment records and evidence of package quality)
- Section 71.95, Reports
- CoC conditions such as the loading/unloading requirements of Section 7 of the Package SAR or CoC holder supplied procedures (including failure to use latest revision)
- CoC conditions such as the maintenance requirements of Section 8 of the Package SAR or CoC holder supplied procedures (including failure to use latest revision)

It is assumed that a documentation problem will be documented in the licensee'~~=~~s corrective action program and appropriate actions will be taken to correct the problem and preclude repetition in the future. Thus, the finding would be GREEN.

2. Maintenance/Use Performance Deficiency (2nd decision block)

This section is intended to cover physical problems with the package or the failure to verify the physical condition of the package. It includes the failure to perform required actions, or the improper performance of required actions. It does not include the physical failure of a package or the results from a physical failure, such as excessive exposures, personnel injury or property damage. These non-compliances would not be considered safety significant because a single occurrence of failure to perform one of these individual actions will not usually result in a significant event. Any consequences of the noncompliance would be considered elsewhere in the SDP (radiation exposure, breach of package, etc.)

Examples of performance deficiencies include, but are not limited to, the failure to properly perform:

- Section 71.87, Routine determinations (failure to perform the loading checklist, verify package is in unimpaired physical condition)
- Section 71.89, Opening instructions (failure to provide then when necessary)
- Package is found to not meet the basic design criteria of the CoC (wall thickness is too thin, empty weight is incorrect, package is rusted/corroded beyond tolerances)
- CoC conditions such as the loading/unloading requirements of Section 7 of the Package SAR or CoC holder supplied procedures
- CoC conditions such as the maintenance requirements of Section 8 of the Package SAR or CoC holder supplied procedures as evidenced by the wrong closure bolts, wrong gaskets (no gasket), or weld problems
- Section 71.85, Preliminary determinations or Section 8 of the SAR (failure to verify that the container is in accordance with the CoC)

It is assumed that the discovered problem would also be documented in the corrective action program. The deficiency would be corrected and a root cause evaluation would be conducted to preclude repetition. This finding would be GREEN.

3. Minor Contents Deficiency (3rd decision block)

Where the NRC or licensee found that a specification regarding cask contents with minor safety significance included in the CoC was not met (e.g. not a temperature, pressure, geometry, weight, burn-up, enrichment, or moderator specification nonconformance), this finding would be considered GREEN. This type of deficiency would have low risk significance relative to causing a radioactive release to the public, or causing public or occupational exposure. If a radiation limit was exceeded or an overexposure resulted due to this deficiency, that finding would be handled through a different SDP branch. This type of deficiency would also be addressed by the licensee'~~=~~s corrective action program.

Examples are:

- Minor structural component left out or improperly configured (those not required to maintain content arrangement
- Non-load bearing and not shielding related~~)~~
- Non-fissile material curie content exceeds the specification in the CoC
- A non-fissile isotope other than what is allowed by the CoC is loaded
- Residual water in a non-fissile package
- Inclusion of non-radioactive material not intended to be in the package

4. >1 Major Contents Deficiencies (4th decision block)

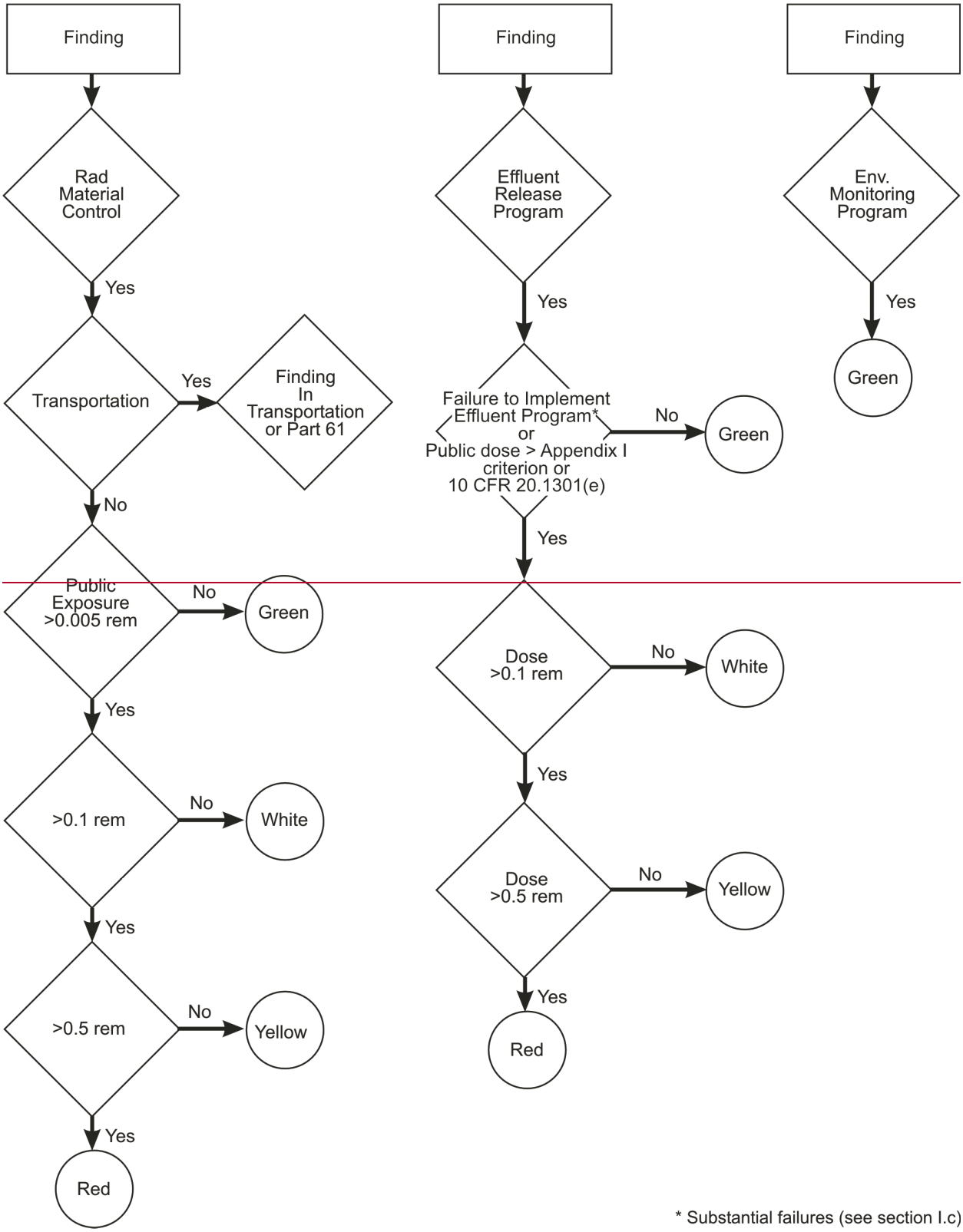
If it is determined that the package contained material such that a critical parameter was outside of the limits of the CoC, or that the closure/containment system was deficient, then the significance would be determined here. Deficiencies such as these would be risk significant in that they are more likely to lead to a criticality event, a breach of package, a radioactive release, the failure to exercise adequate controls, or a public or occupational dose exceeding NRC limits. If one critical deficiency was identified by the NRC or licensee, then the finding would be WHITE. If more than one critical deficiency was identified, then the finding would be YELLOW.

Examples are:

- Temperature
- Pressure
- Geometry/configuration
- Weight
- Burn-up
- Enrichment
- Moderator presence when not allowed/moderator exclusion when required
- Neutron absorber not present when required
- Fissile material curie content or quantity exceeds the specification in the ~~CoC~~ CoC
- Major structural item left out (internal brace, basket, shoring, foam, shielding etc.) or structural deficiency/failure.

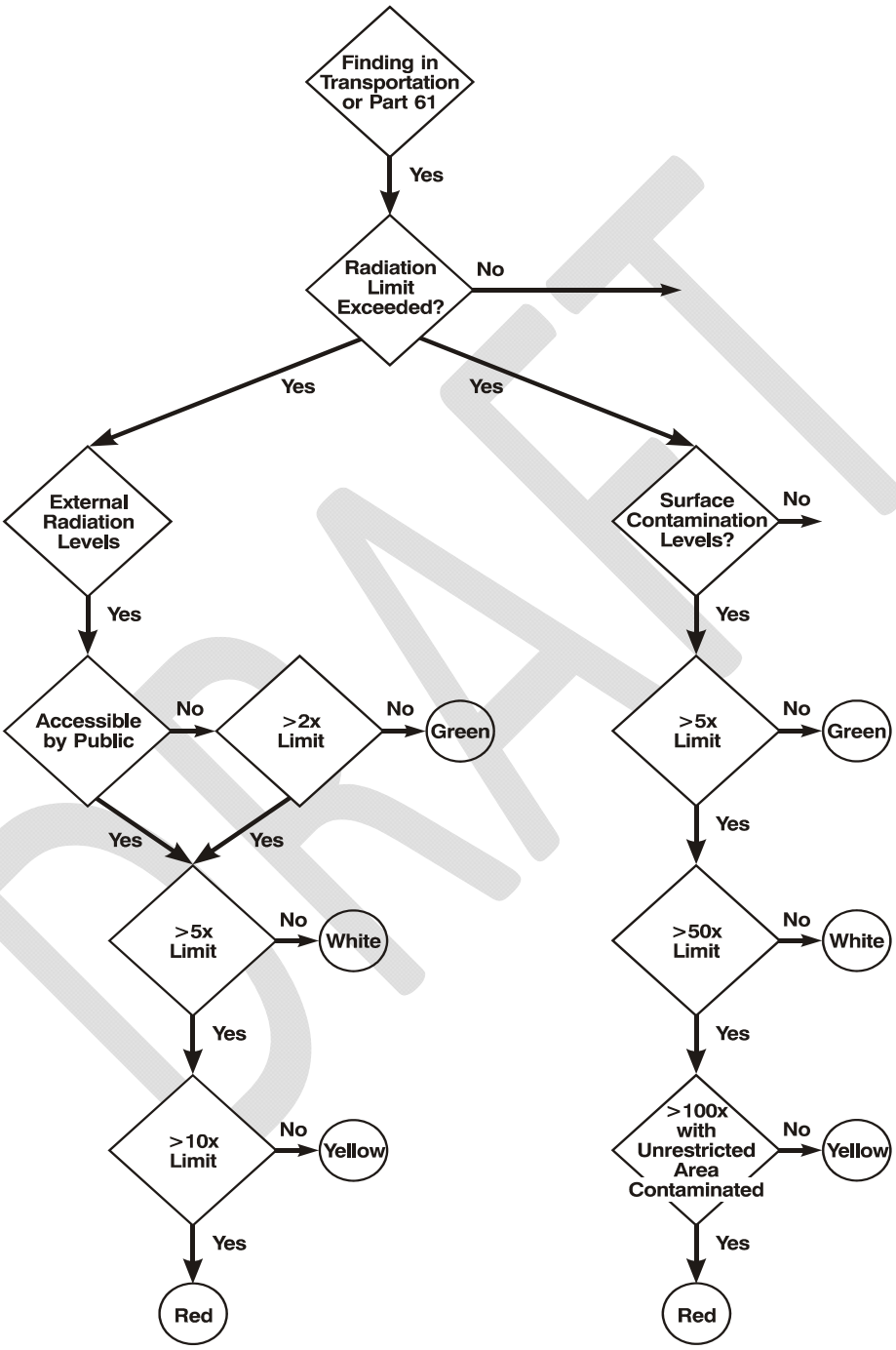
END

PUBLIC RADIATION SAFETY

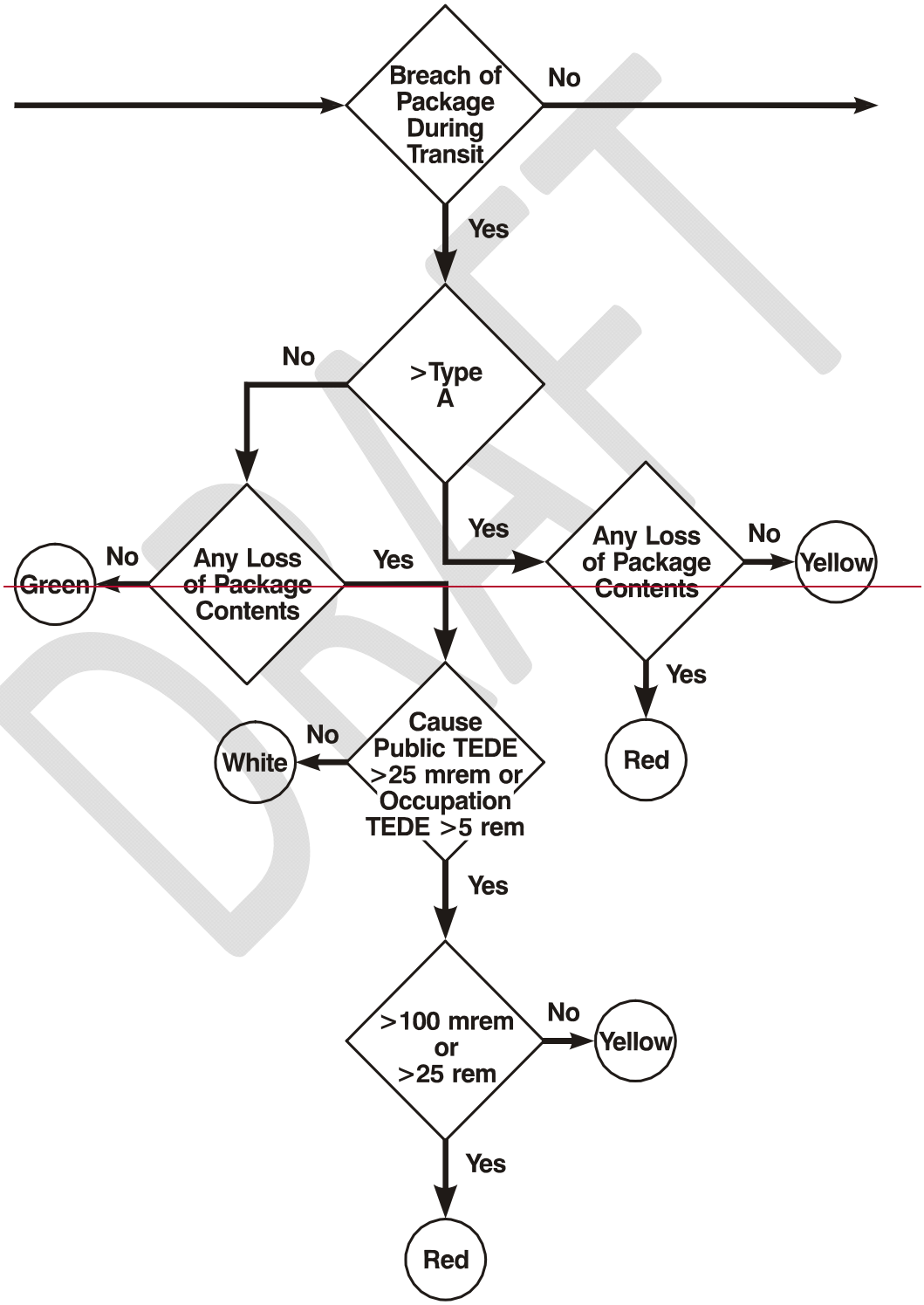


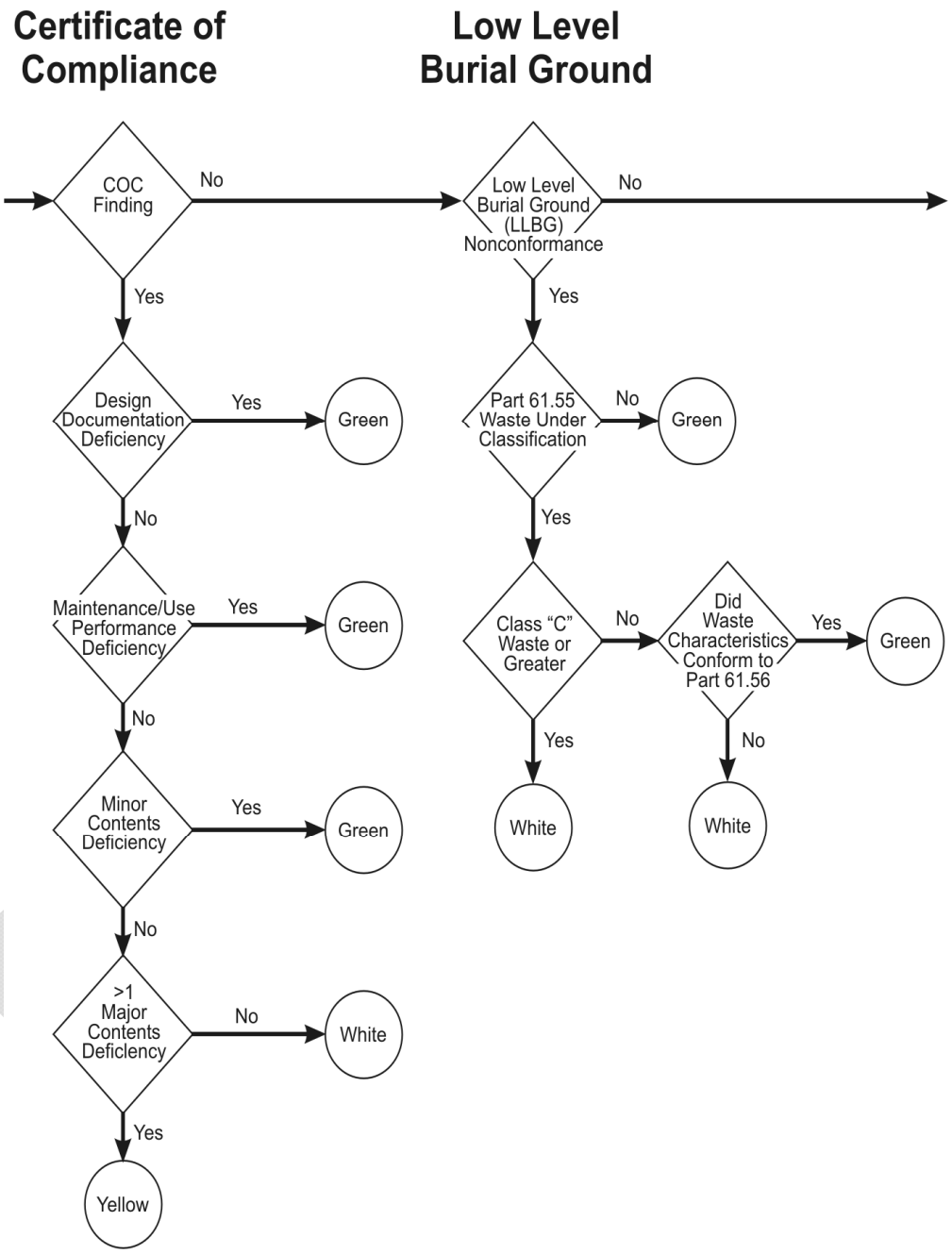
* Substantial failures (see section I.c)

Radiation Limits

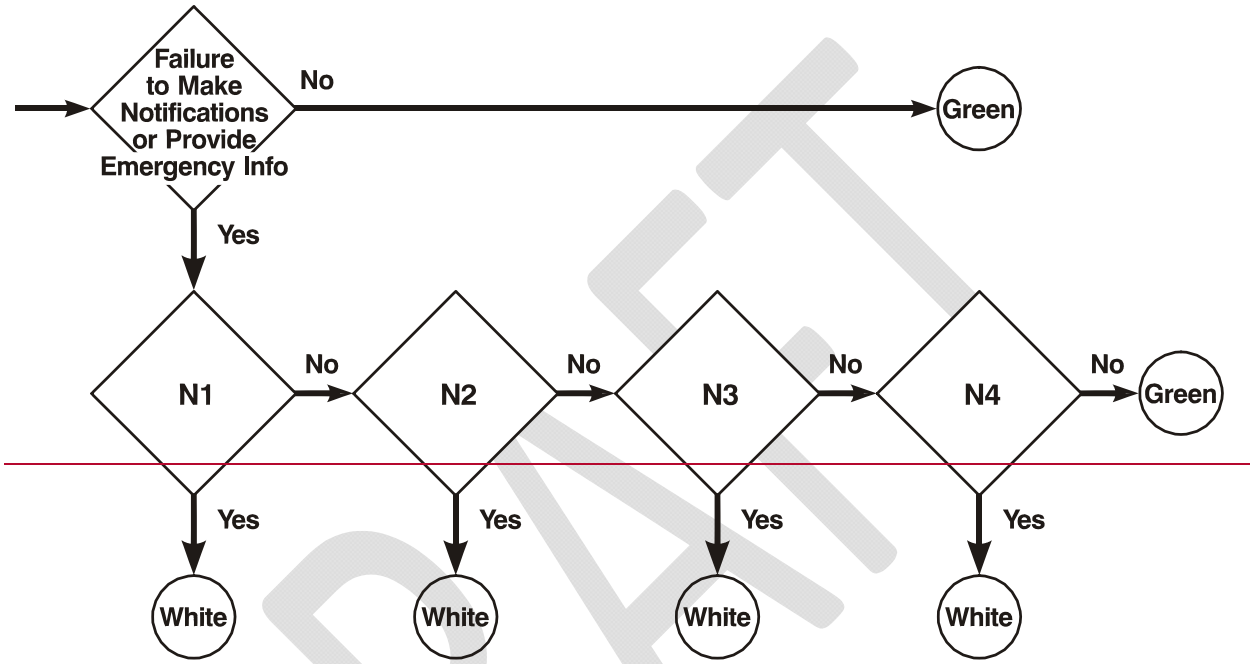


Package Breach




Certificate of Compliance
Low Level Burial Ground
COC Finding
No
Yes
Design Documentation Deficiency
Yes
Green
No
Maintenance/Use Performance Deficiency
Yes
Green
No
Minor Contents Deficiency
Yes
Green
No
>1 Major Contents Deficiency
No
White
Yes
Yellow
Low Level Burial Ground (LLBG) Nonconformance
No
Yes
Part 61.55 Waste Under Classification
No
Green
Yes
Class "C" Waste or Greater
No
Did Waste Characteristics Conform to Part 61.56
Yes
Green
Yes
White
No
White

Notification & Emergency Information



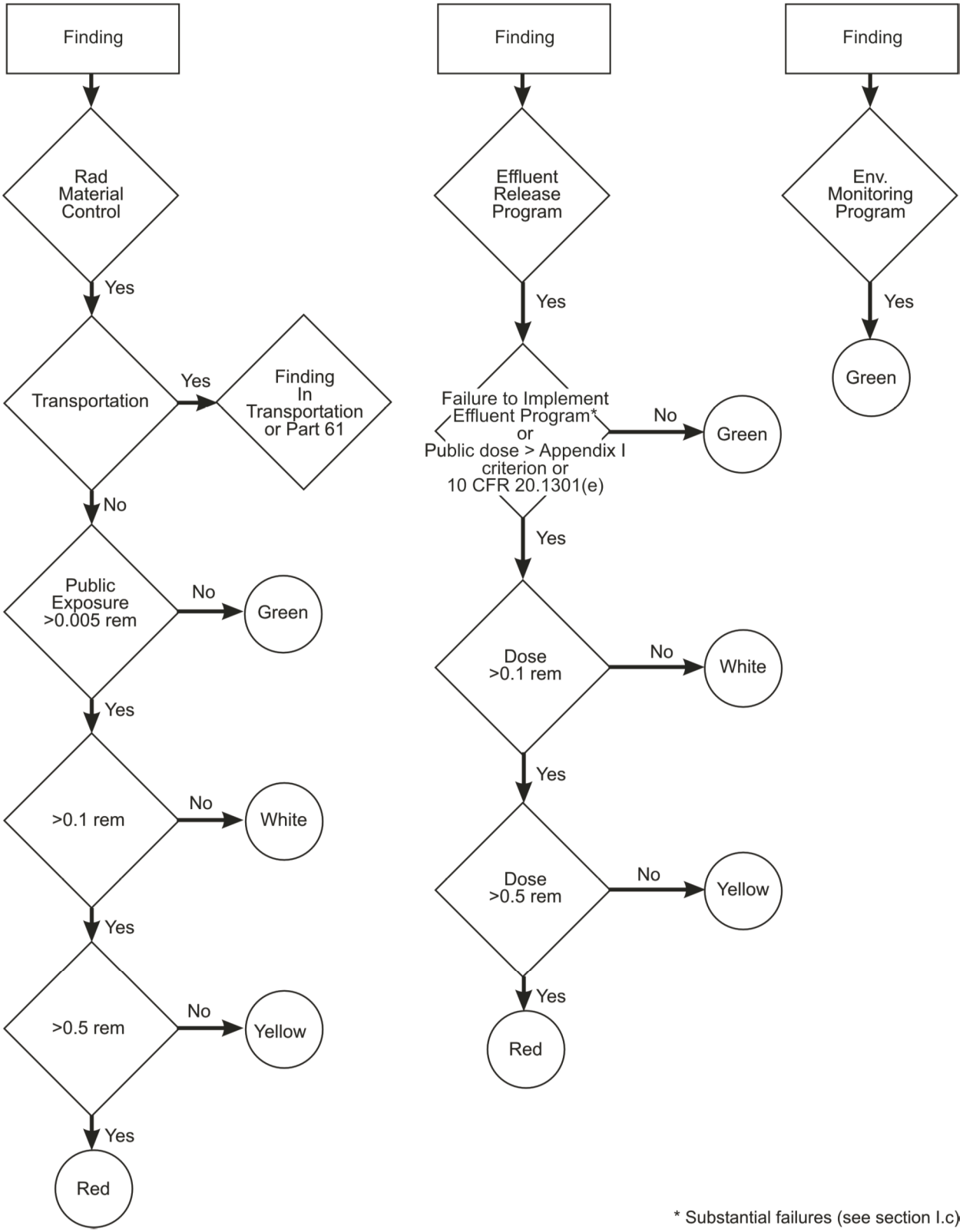
N1 - Failure to comply with 10 CFR 71.97 - Made a shipment w/o notifying state governor prior to shipment entering state

N2 - Failure to provide emergency response info required by 49 CFR 172.602

N3 - Failure to respond during actual request IAW 49 CFR 172.604

N4 - Failure to make notification of 5x limits exceeded as required by 10 CFR 20.1906

PUBLIC RADIATION SAFETY



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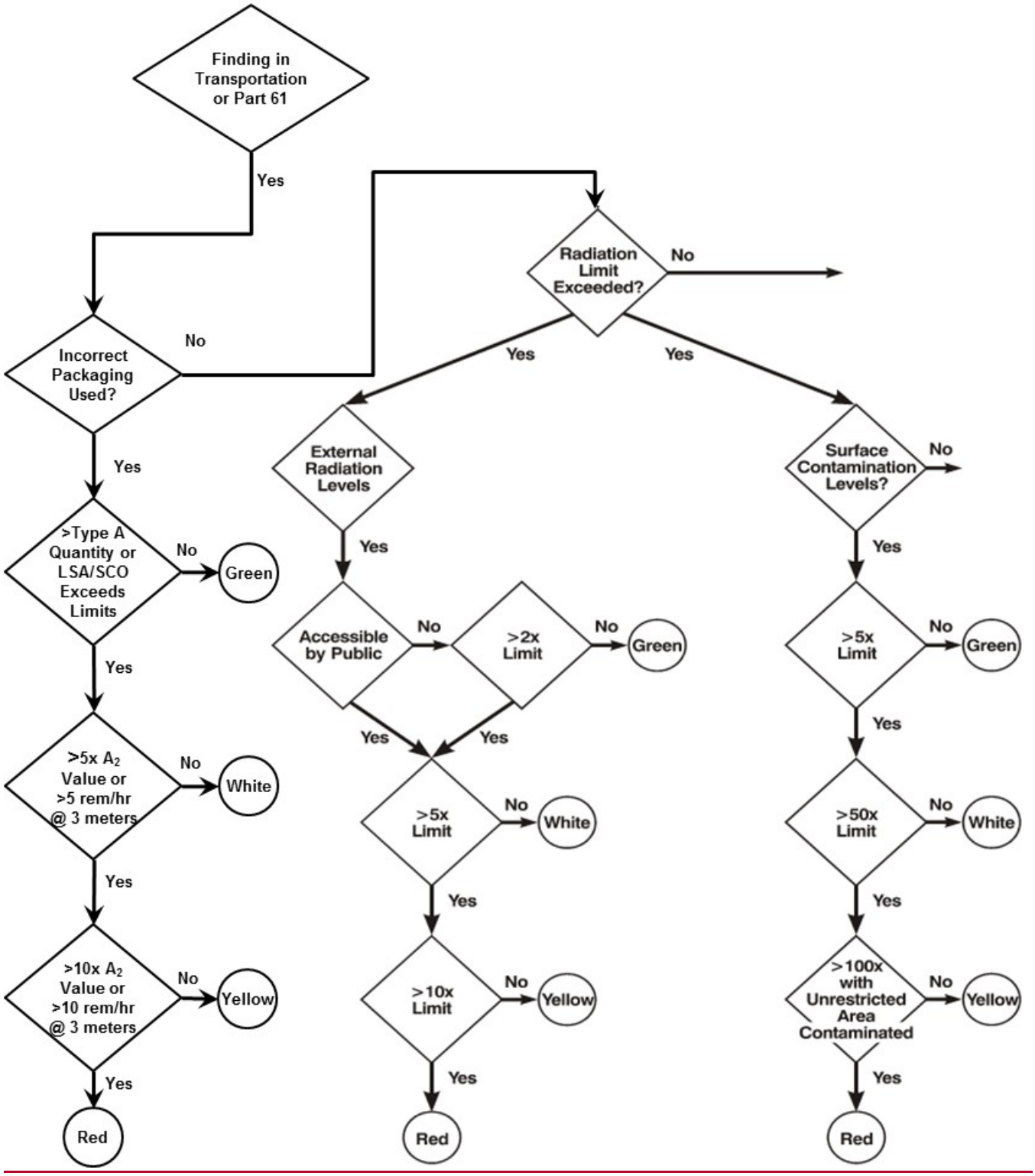
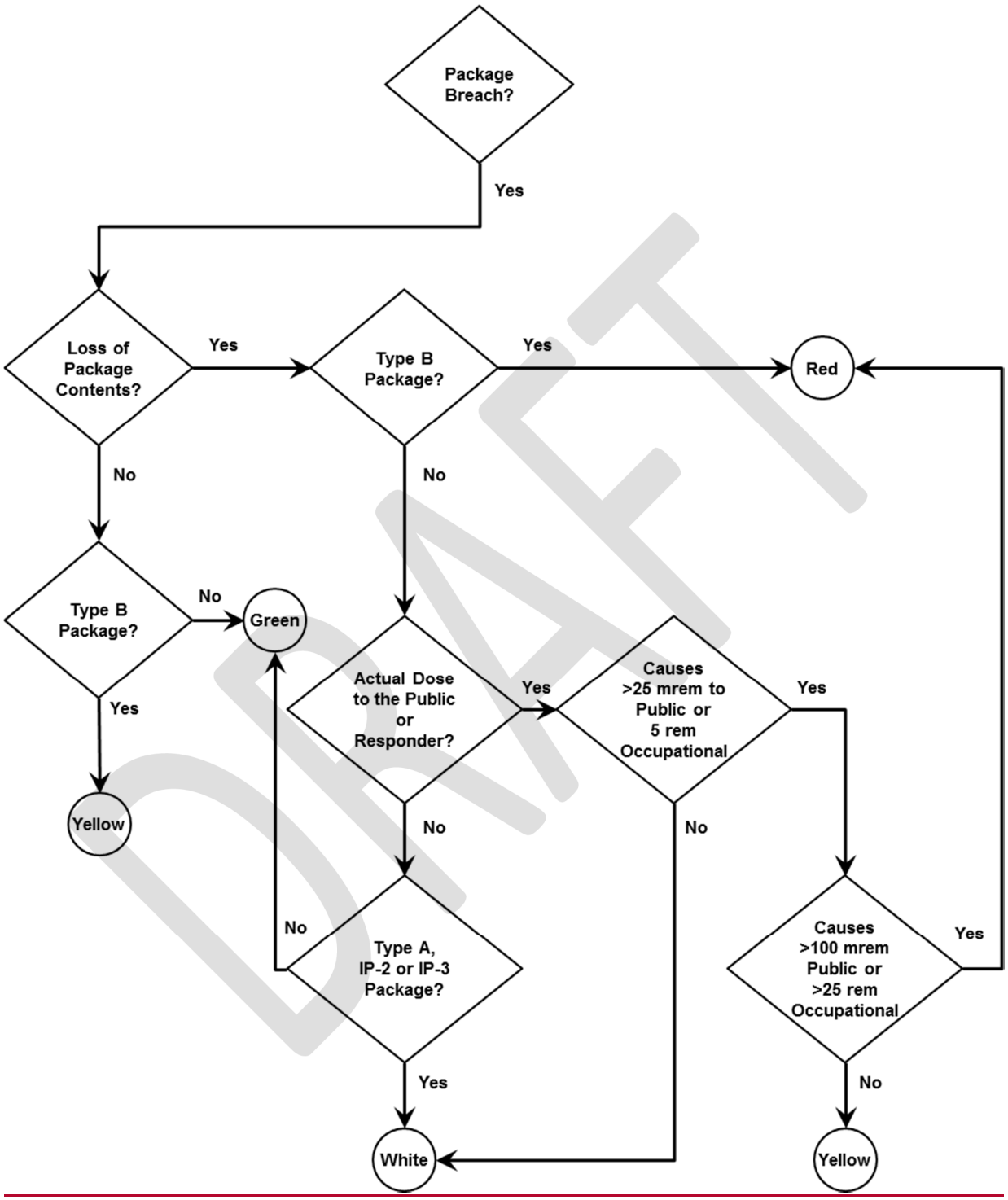
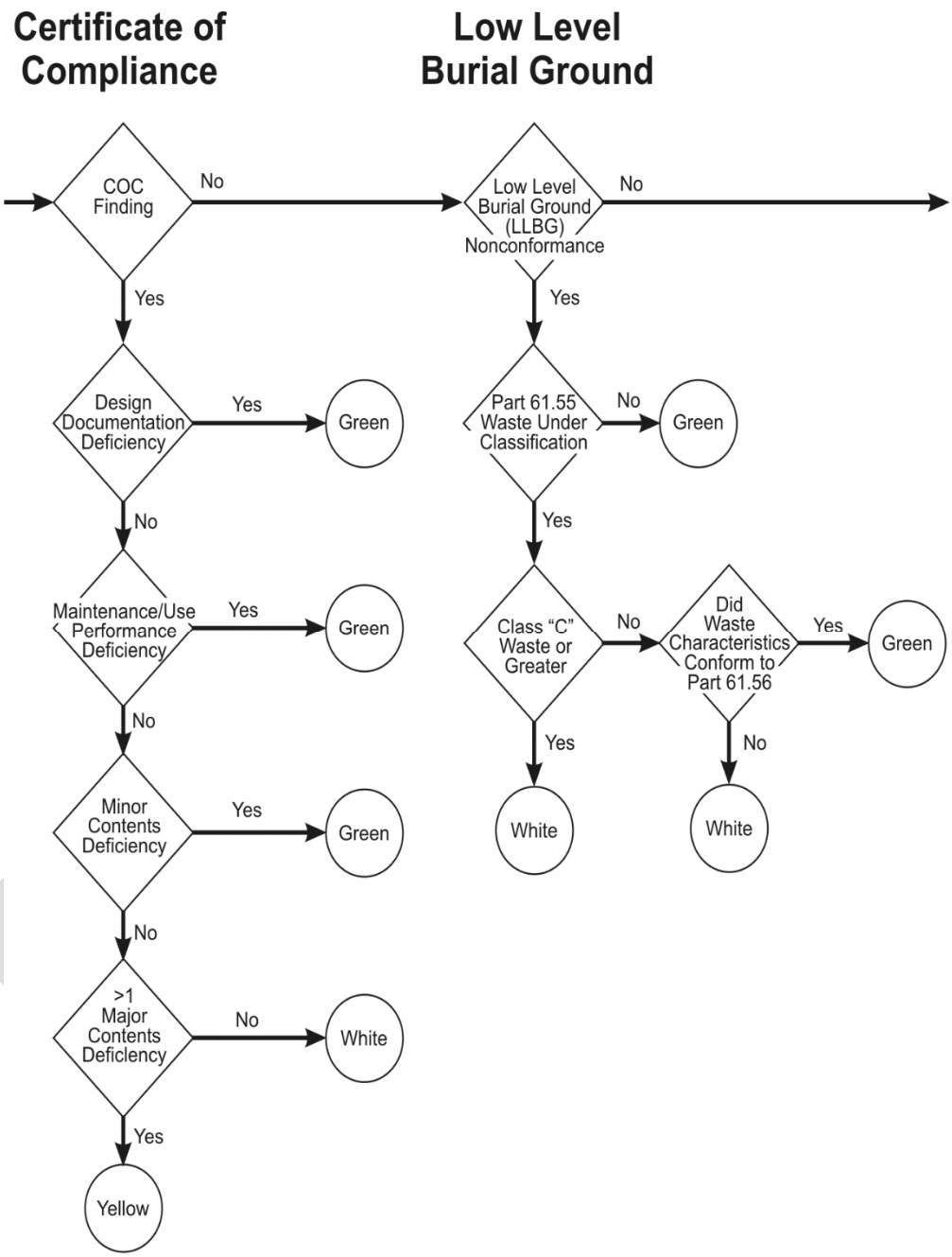
Packaging and Radiation Limits

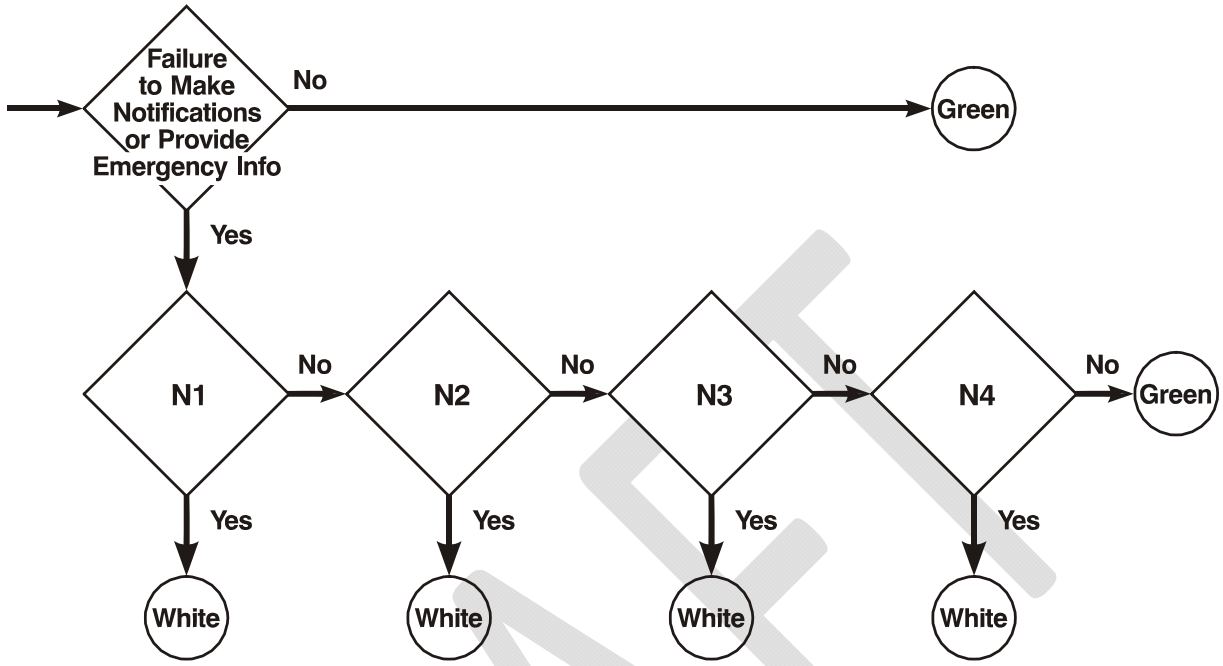


Package Breach




Certificate of Compliance
Low Level Burial Ground
COC Finding
No
Yes
Design Documentation Deficiency
Yes
Green
No
Maintenance/Use Performance Deficiency
Yes
Green
No
Minor Contents Deficiency
Yes
Green
No
>1 Major Contents Deficiency
No
White
Yes
Yellow
Low Level Burial Ground (LLBG) Nonconformance
No
Yes
Part 61.55 Waste Under Classification
No
Green
Yes
Class "C" Waste or Greater
No
Did Waste Characteristics Conform to Part 61.56
Yes
Green
Yes
White
No
White

Notification & Emergency Information



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ATTACHMENT 1

Revision History for IMC 0609, Appendix D

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
N/A	10/16/06 CN 06-027	This IMC has been revised to incorporate comments from the Commission in which the term public confidence has been change to openness	None	N/A	N/A
N/A	02/12/08 CN 08-007	This IMC has been revised to incorporate changes approved by the Commission in SECY-07-0112, including eliminating the White finding in the Environmental Monitoring branch. Other changes include removing the Yellow finding from the Low Level Burial Ground branch and eliminating the aggregation of findings in the Radioactive Materials Control Branch.	None	N/A	ML080220247
N/A		Modified regulatory basis for radioactive effluent release program to reference 20.1302, 50.36a and plant T.S.	Inspector Seminar	N/A	N/A
N/A		Modified regulatory basis for radiological environmental monitoring programs to reference	Inspector Seminar	N/A	N/A

		20.1302, 50.36a, App I and plant T.S.			
N/A		Added SDP logic and discussion for incorrect package use. Added language to describe LSA/SCO conditions of transport	Inspector Seminar	N/A	N/A
N/A		Added discussion in regards to averaging radiation levels over a probe of reasonable size when determining significance of exceeding radiation limits on the external surfaces of the package	Inspector Seminar	N/A	N/A
N/A		Added SDP logic and language for Type A package in the Package Breach scenario	Inspector Seminar	N/A	N/A