Attachment F1. Rationale for Analytical Parameter Selection

1.5.1 Analytical Parameters

The analytical parameter lists for pre-acceptance waste characterization, fingerprint analysis, and additional unit-specific analysis are presented in Permit Attachment F, Waste Analysis Plan, Tables F-1, Parameters and Methods for Pre-Acceptance Representative Sample Analysis, F-2, Tests and Analytical Methods for Fingerprint Samples, and F-3, Additional Tests and Analytical Methods. The Facility shall augment these lists as necessary to ensure that additional considerations pertaining to waste-stream-specific pre-acceptance characteristics, LDR standards analysis, and other Facility operational limits are met. The rationale used to determine pre-acceptance characterization is specified in Section 1.5.1.1. The rationale for selecting additional parameters to ensure compliance with the LDR standards is specified in Section 1.5.1.2. The rationale for selecting parameters to ensure compliance with other facility regulatory and operational limits is contained in Section 1.5.1.3. For each waste stream accepted and disposed at the facility, appropriate parameters shall be selected to ensure that each of the facility acceptance criteria (see Permit Attachment F, Section 1.2, Criteria for Waste Management at the Facility) is met.

1.5.1.1 Parameters for Waste Characterization

Permit Attachment F, Table F-1 specifies parameters to confirm that a waste stream agrees with the information provided by the generator. The rationale for the selection of these parameters is as follows:

- **total volatile organic compounds (VOCs)**: This test shall determine the presence and concentration of individual VOCs;
- **total semivolatile organic compounds (SVOCs)**: This test shall determine the presence and concentration of individual SVOCs;
- **metals and inorganic constituents**: These tests shall determine the presence and concentrations of individual metals and other inorganic constituents;
- **physical appearance**: This test determines the general identity of the waste and establishes baseline characteristics that can then be subjectively compared with the waste shipment when it arrives at the facility. The waste is visually inspected and the physical appearance of the waste is recorded, including, at a minimum, the following properties: Color, physical state (solid or semi-solid), texture, viscosity, layering (single phase, bi-layer, multi-layer), and presence of free liquids;

- **pH**: This test indicates the corrosive nature of the waste. It also determines compatibility with other wastes and with liners. The tolerance range for pH is plus or minus 2.5 pH units; and

- **radioactivity screen**: This test screens each load using a gamma ray scintillation detector or other appropriate radiation detection equipment. This test will be used to ensure that the level of radioactivity observed in NORM waste or equipment from oil, gas, and water production containing hazardous constituents, or other naturally occurring radioactive materials not regulated under 20.3.14 NMAC, is not above regulated limits as defined in 20.3.14.1403 NMAC, (i.e., the maximum radiation exposure reading at any accessible point does not exceed 50 microroentgens per hour [mR/hr] and the maximum radiation reading for sludges and scales contained in oil, gas, and water production equipment does not exceed 50 mR/hr, or, if the radiation readings for removable sludges and scales exceed 50 mR/hr, the concentration of radium 226, in a representative sample, does not exceed 30 picocuries per gram [pCi/g]). Material regulated under the Atomic Energy Act of 1954, as amended, is not permitted for waste management.

1.5.1.2 Additional Analysis to Ensure Compliance with the LDR Treatment Standards

The facility shall ensure that LDR treatment standards are met by identifying the appropriate treatment standard requirements as follows:

- **total waste standards**: All hazardous constituents in the waste or in the treatment residue must be at or below the values for these constituents contained in the table in 40 CFR § 268.40;

- **waste extract standards**: The hazardous constituents in the extract of the waste or in the extract of treatment residue must be at or below the values found in the table in 40 CFR § 268.40; and

- **technology standards**: The waste must be treated using the technology specified in the table in 40 CFR § 268.40.

Identification of parameters to demonstrate compliance with LDR standards shall be conducted as follows:

- identification of all hazardous applicable characteristic and listed EPA Hazardous Waste Codes;

- identification of the appropriate subcategory for each applicable EPA Hazardous Waste Code (from the most current version of the Table in 40 CFR § 268.40);

- identification of all underlying hazardous constituents for each applicable EPA Hazardous Waste Code (from the most current version of the Tables in 40 CFR § 268.40 and § 268.48; and

- selection of the most current versions of the analytical methods associated with all identified hazardous wastes, underlying hazardous constituents, and subcategories (from Table 4-2, SW-846, or equivalent).

The rationale for the selection of additional parameters to ensure compliance with the LDR standards is as follows:

- **ignitability**: This is a qualitative test to determine the ignitable nature of the waste and indicate if the waste is prohibited. It also helps to determine whether the waste is compatible with liners, piping, structures, equipment, and other waste streams;

- **explosive meter vapor test (organic or combustible vapor test)**: This test determines the fire-producing potential of the waste and whether it is regulated as flammable or combustible by the US Department of Transportation. If liquid waste exceeds 200 ppm, the waste will also be tested for ignitability using the flash point test (EPA Method 1010, 1020 or 1030, as appropriate). ;

- **flash point test**: This test determines the flash point of the waste and determines whether the waste is ignitable;

- **pH**: This test indicates the corrosive nature of the waste. It also determines compatibility with other wastes and with liners. ;

- **reactive sulfide**: Waste will be evaluated to determine the potential to generate toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment, in accordance with 40 CFR § 261.23(a)(5). Waste generators must use waste knowledge to determine if waste exhibits reactivity;

- **reactive cyanide**: Waste will be evaluated to determine the potential to generate toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment, in accordance with 40 CFR § 261.23(a)(5). Waste generators must use waste knowledge to determine if waste exhibits the characteristic of reactivity; and

- **reactivity** (compatibility): This test determines the compatibility between the waste and the liner or equipment which the waste may contact.

  The Facility shall ensure that potentially incompatible wastes will not be disposed of in the same location. The facility shall perform a compatibility determination

based on the pre-acceptance waste characterization information. Acceptable knowledge or assessment information provided on the Waste Profile Form may be used to assign compatibility codes to each waste type form based on 40 CFR § 264, Appendix V.

Chemical analysis shall be accomplished in three steps, as appropriate for the waste being analyzed:

i. an evaluation of the waste for reactive cyanide and sulfide. This evaluation will be used to determine the waste's potential to release dangerous levels of hydrogen cyanide or hydrogen sulfide gases in acidic conditions (i.e., pH less than 2);

ii. an evaluation of the reactivity characteristics of the waste through process knowledge and a series of analytical procedures that will test for the presence of reactive chemical groups. The procedures in the EPA document, Design and Development of a Hazardous Waste Reactivity Testing Protocol, EPA-600/2-84-057, February 1984, will be followed and the results used to assign the waste a reactivity group designation. Figure F1-1, Sequence of Procedure Sets for Determining Reactivity Group, summarizes the reactivity testing protocol; and

iii. use of the reactivity group designation contained in Figure F1-3 to evaluate compatibility of the waste with other wastes by comparing it to the compatibility matrix shown in Figure F1-2, Reactivity Group Designation. (Refer to EPA document, A Method for Determining the Compatibility of Hazardous Wastes, EPA-600/2-80-076, April 1980, and 40 CFR § 264, Appendix V, for additional information on waste compatibility);

- **total VOCs**: This test shall determine the presence and concentration of individual VOCs;
- **total SVOCs**: This test shall determine the presence and concentration of individual SVOCs;
- **total metals and inorganics**: These tests shall determine the presence and concentrations of individual metals and other inorganic constituents;
- **organochlorine pesticides**: This test determines the pesticide concentration of the waste;

- **chlorinated herbicides**: This test determines the herbicide concentration of the waste;
- **PCBs**: This is a quantitative test to determine whether PCBs are contained in oil-bearing and other types of waste and to determine the concentration; and
- **leachate**: Leachate must be tested for all leachate constituents listed in the table in 40 CFR § 268.40.

1.5.1.3 Additional Analysis to Ensure Compliance with Regulatory and Operational Limits

The rationale for the selection of additional parameters to ensure compliance with the facility's regulatory and operational limits is as follows:

- **radioactivity screen**: See Section 1.5.1.1. This test shall determine if the waste is prohibited from acceptance at the facility (see Section 1.1.2 for a list of prohibited wastes);
- **PCBs**: See Section 1.5.1.2. This test shall determine if the waste contains a prohibited concentration of PCBs;
- **VOCs (Subpart BB)**: These tests are conducted as required by 40 CFR § 264.1063(d) to determine, for each piece of equipment subject to the requirements of 40 CFR § 264, Subpart BB, whether the equipment contains or exceeds 10 percent VOCs by weight. Applicable process knowledge may be used to make this determination;
- **dioxins and dibenzofurans**: This test is conducted to ensure that the waste stream does not contain dioxins and/or dibenzofurans;
- **non-biodegradable sorbent test**: This test is performed as required by 40 CFR § 264.314 (prohibition of liquids in landfills). This test is required if the facility determines that the generator did not indicate whether a sorbent was added to the waste or indicates that a sorbent was added but did not specify the name and type of sorbent and whether it is nonbiodegradable. If any of this information is not present, the generator shall be contacted for clarification. If uncertainty remains, 40 CFR § 264.314(d)(1)(i-iii) shall be reviewed. If the sorbent's biodegradability cannot be determined from the list or if the name of the sorbent is unknown, the material will be analyzed following one of the tests referenced in 40 CFR § 264.314(d)(2). The facility shall select one of the following tests:

    i. ASTM Method G21-70 (1984a) - Standard Practice for Determining Resistance of Synthetic Polymer Materials to Fungi;

ii. ASTM Method G22-76 (1984b) - Standard Practice for Determining Resistance of Plastics to Bacteria;

iii. OECD Test 301B - CO2 Evolution (Modified Sturm Test) ASTM Method G21-70 (1984a) - Standard Practice for Determining Resistance of Synthetic Polymer Materials to Fungi; or

iv. Other NMED-approved test method.

- total organic halogens (TOX): This test determines if concentrations of halogens in the waste are in compliance with the LDR treatment standards. It also determines if the waste contains constituents that could degrade a liner. Wastes containing TOX greater than 1,000 mg/l (based on TCLP extract) shall not be placed in the landfill;

- free liquid content test (paint filter liquids test): This test is a qualitative test to determine the free liquids concentration contained within the waste matrix and shall be used as a control parameter for wastes that are to be landfilled; and

- toxicity characteristic leaching procedure (TCLP): This test must be used to obtain an extract of the waste where treatment standards are based on concentrations in the waste extract:

    - major ions and metals in non-leachate (sulfides and sulfates, radionuclides, VOCs, SVOCs, pesticides, PCBs, perchlorate, and TPH).

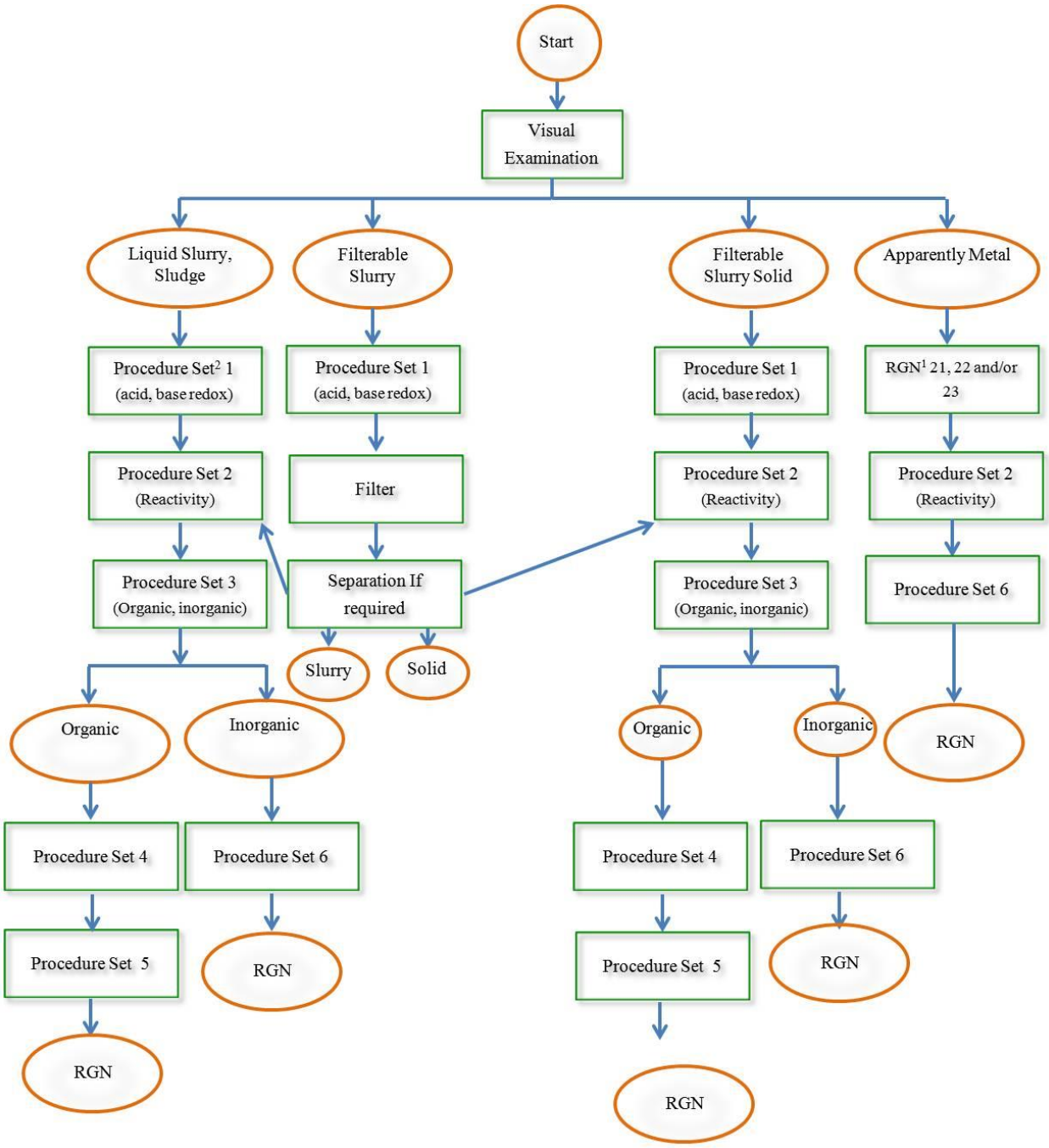

FIGURE F1-1: SEQUENCE OF PROCEDURE SETS FOR DETERMINING REACTIVITY GROUP

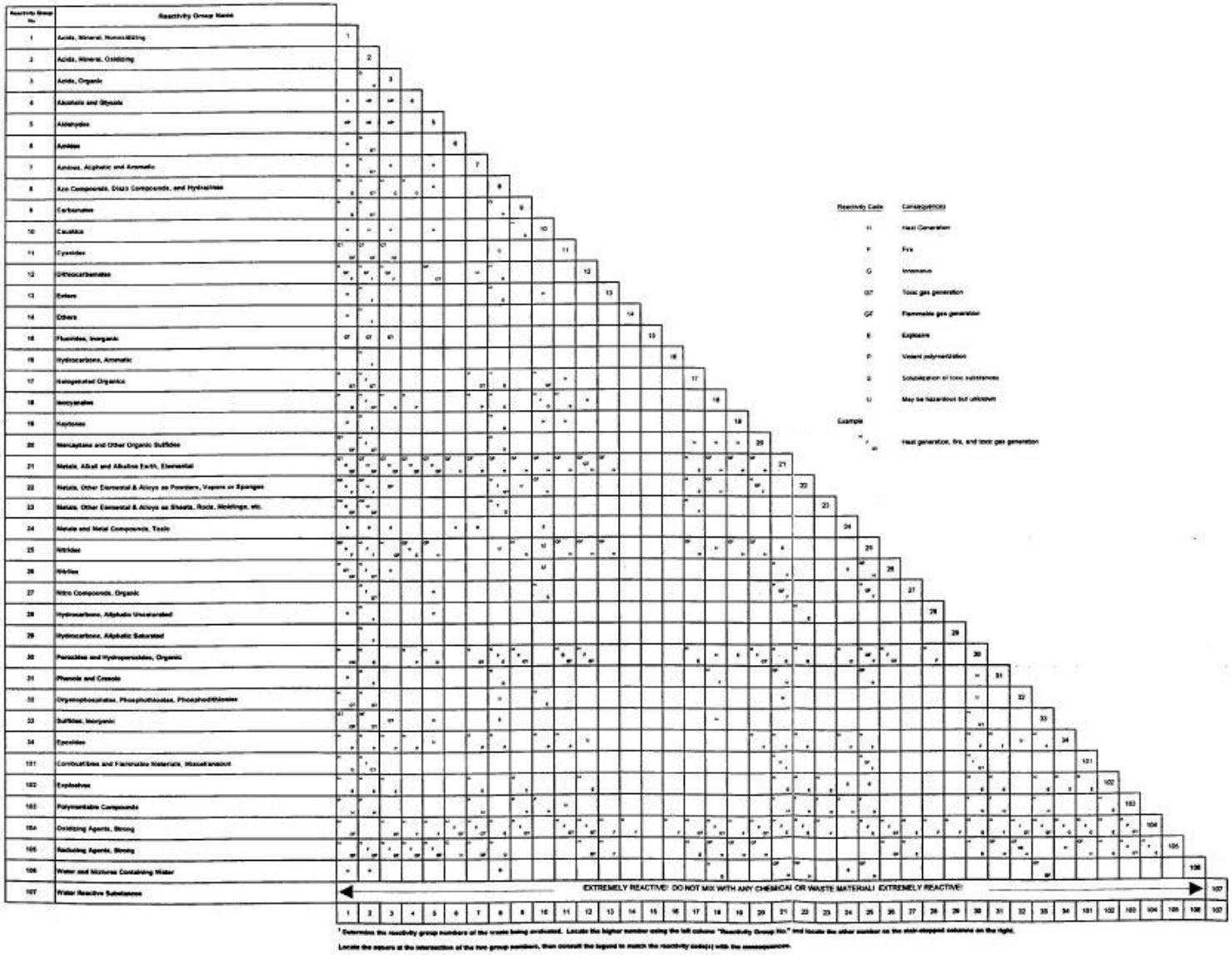

FIGURE F1-2: REACTIVITY GROUP DESIGNATION AND WASTE COMPATIBILITY MATRIX (1)